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Chinese Causative Resultative V-Vs and Their Acquisition by L1 European Portuguese Learners

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Tese especialmente elaborada para obtenção do grau de Doutor em Linguística

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List of Abbreviations

ASP = aspect marker

CL = clitic

CLF = classifier

CONJ = conjunction

CR V-V = Causative Resultative V-V

CT = comprehension task

ECM = exceptional case marking

FIN = finite

GJT = grammaticality judgment task

HSK = Chinese Proficiency Test

INF = infinite

INFL = inflected

L1 = first language

L2 = second language

L3 = third language

LF = Logical Form

NEG = negative

NON-INFL = non-inflected

PART = particle

PF = Phonological Form

PLUR = plural

PREP = preposition

RQ = research question

RVC = resultative verb compound

SG = singular

SLA = second language acquisition

SPT = semi-elicited production task

SUBJ = subjunctive

UG = Universal Grammar

UNAC = unaccusative marker

Vcaus = causative verb

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Abstract

The Chinese Causative Resultative V-Vs (CR V-Vs) express caused-result events, with the component denoting the Manner (causing eventuality) and the one encoding the Result in adjacency. They constitute an interesting construction since they exhibit both lexical and syntactic properties, show thematic flexibility, and sometimes are semantically ambiguous. In previous studies, authors generally fell into one of the following two groups: some claim that CR V-Vs are formed on the lexical level, while others claim that CR V-Vs are formed on the syntactic level. In this study, within the framework of the Minimalist Program and under the assumptions of Distributed Morphology, we attempt to provide an account that can explain CR V-Vs' properties holistically, including lexical properties such as V-V integrity and the "small size" constraint, and syntactic properties such as productivity and semantic compositionality, as well as other observed constraints such as the semantic constraint on V2 and the constraints related to causative alternation. More importantly, the syntactic structure we propose can account for the thematic flexibility and the semantic ambiguity of some CR V-Vs, which have attracted a lot of attention and imposed difficulty for explanation in the literature.

In particular, we propose that Chinese CR V-Vs involve the head v_{CAUSE}. The Manner-denoting root conflates to it as an adjunct, and the Result-denoting root is incorporated to it as its Complement. Contrastingly, Portuguese does not allow either Manner Conflation or root-selecting v_{CAUSE}. Therefore, for L1 Portuguese learners to acquire L2 Chinese CR V-Vs, parameter resetting will be required.

To find out the accessibility of Universal Grammar (UG), the role of L1, and the attainability of parameter resetting in L2 acquisition, we conducted an experiment with 27 L1 Portuguese speakers learning Chinese as L2 (intermediate to advanced level) and 27 Chinese native speakers. The experiment includes three tasks: a semi-elicited production task (SPT), a grammaticality judgment task (GJT), and a comprehension task (CT). Results show a general positive developmental trend in CR V-Vs' production and comprehension and successful acquisition of some CR V-V constraints, which is a strong argument for UG access. Native-like performance is observed in some L2 learners' responses in the SPT and CT, showing the attainability of parameter resetting. L1 transfer of both lexical properties and functional categories has been detected. However, some apparent evidence of L1 transfer of functional category properties is ambiguous because they can also be interpreted as evidence of UG access (similar to L1 acquisition). In general, the results of our study support an argument in favor of the Full Transfer Full Access hypothesis (Schwartz & Sprouse, 1994, 1996) of L2 acquisition.

Nevertheless, the results of our study are not exclusively successful. We find that different aspects of the L2 grammars form a hierarchy of acquisition difficulty. While the L2 learners were successful in acquiring properties such as the V2 constraint, the V-V integrity, and the causative alternation constraints, they did not show sensitivity to constraints such as the V-V adjacency, and proficiency effect was not detected. It seems that parameter resetting does not guarantee successful acquisition. We attribute the L2 grammar variations to factors such as the Feature Reassembly (Lardiere, 2005, 2008, 2009a, b), processing difficulties, and the input quality. The L2 acquisition process is more complicated than selecting the correct values for parameters. The learners should also learn how the bundles of features are realized in L2, namely, the Feature Reassembly. Moreover, since frequency plays an important role in efficient acquisition (see Yang, 2010), the processing difficulty and the ambiguous input may complicate the acquisition process and decrease the acquisition efficiency. When the natural input quality is poor, explicit instruction may be needed to help. Furthermore, we hypothesize that the Bottleneck Hypothesis (Slabakova, 2009, 2014, 2016, 2019) and the distinction between macroparameters and microparameters (Baker, 2008; Slabakova, 2019; Tsimpli, 2014) may also provide an explanation: the acquisition of microparameters is more difficult than that of the macroparameters; the core syntax and semantics come easily, but the functional morphology imposes the most difficulties.

Keywords: causative, resultative, resultative verb compound, second language acquisition, parameter resetting, feature reassembly, Chinese language, European Portuguese

Resumo

As sequências de verbos Causativos Resultativos V-V em Chinês (CR V-Vs) expressam eventos resultado-causado, com o componente que denota a Maneira (que causa eventualidade) e aquele que codifica o Resultado a ocorrem em adjacência. É uma construção interessante, uma vez que exibe propriedades lexicais e sintáticas particulares, mostra flexibilidade temática e às vezes é semanticamente ambígua. Em estudos anteriores, os autores dividiram-se geralmente em dois grupos: alguns afirmam que os CR V-Vs são formados no léxico, enquanto outros defendem que os CR V-Vs são formados na sintaxe. Neste estudo, dentro do quadro teórico do Programa Minimalista e sob os pressupostos da Morfologia Distribuída, tentamos fornecer uma abordagem que pode explicar as propriedades CR V-Vs de forma holística, incluindo propriedades lexicais, como a integridade e a restrição de "tamanho", e propriedades sintáticas, como a produtividade e a composicionalidade semântica, bem como outras restrições observadas, tal como a restrição semântica sobre V2 e as restrições relacionadas com a alternância causativa. Além disso, a nossa proposta pode explicar a flexibilidade temática e a ambiguidade semântica de alguns CR V-Vs, que sido objeto de amplo debate na literatura.

Em particular, propomos que os CR V-Vs chineses envolvem o núcleo v_{CAUSE}. A raiz (*root*) que denota Maneira funde-se (*Conflate*) com v_{CAUSE} como um adjunto e a raiz que denota Resultado é incorporada (*Incorporate*) em v_{CAUSE} como seu Complemento. Em contraste, o português não permite *Manner Conflation* nem a opção *root-selecting* de v_{CAUSE}. Portanto, para que os alunos de L1 português e L2 chinês adquiram os CR V-Vs, será necessário refixar os parâmetros.

Para explorar as questões de acessibilidade à Gramática Universal (GU), o papel da L1 e a possibilidade de refixação de parâmetros na aquisição de L2, levámos a cabo um experiência com 27 falantes de L1 português aprendentes de chinês como L2 (nível intermédio a avançado) e 27 falantes nativos de chinês. A experiência inclui três tarefas: uma Tarefa de Produção Semi-Induzida (SPT), uma Tarefa de Julgamento de Grammaticidade (GJT) e uma Tarefa de Compreensão (CT). Os resultados mostram, na generalidade, uma tendência de desenvolvimento positivo na produção e compreensão dos CR V-Vs e a aquisição de algumas restrições das construções CR V-Vs, o que é um forte argumento a favor da acessibilidade à UG. Observa-se um desempenho semelhante ao dos nativos nas respostas dos aprendentes L2 na SPT e na CT, o que favorece a hipótese de refixação de parâmetros. A transferência das propriedades lexicais e das categorias funcionais da L1 foi detectada. No entanto, algumas

evidências aparentes de transferência L1 de propriedades das categorias funcionais são ambíguas porque também podem ser interpretadas como evidências de acesso à UG (semelhante à aquisição de L1). Em geral, os resultados do nosso estudo constituem um argumento a favor da hipótese *Full Transfer Full Access* (Schwartz & Sprouse, 1994, 1996) da aquisição de L2.

Contudo, os resultados do nosso estudo não apontam todos para uma aquisição com sucesso. Descobrimos que diferentes aspectos da gramática da L2 formam uma hierarquia de dificuldade de aquisição. Enquanto os aprendentes da L2 foram bem sucedidos na aquisição de propriedades como a restrição V2, a integridade V-V e as restrições de alternância causativas, não mostraram sensibilidade a restrições como a adjacência V-V, e nao foi detectado qualquer efeito de proficiência (entre o nível intermédio e o avançado). É possível que a refixação de parâmetros não garanta uma aquisição bem sucedida. Atribuímos as variações da gramática L2 a fatores como a reconfiguração de traços (*Feature Reassembly Hypothesis*, Lardiere, 2005, 2008, 2009a, b), dificuldades de processamento e a qualidade do *input*. O processo de aquisição da L2 é mais complicado do que apenas selecionar os valores corretos para os parâmetros. Os aprendentes também devem aprender como são configurados os traços na L2, nomeadamente, tendo em conta a *Feature Reassembly Hypothesis*. Além disso, uma vez que a frequência desempenha um papel importante na aquisição (veja-se Yang, 2010), a dificuldade de processamento e o *input* ambíguo podem tornar complexo o processo e diminuir a eficácia da aquisição. Quando a qualidade do *input* natural é deficiente, as instruções explícitas podem ajudar. Além disso, a *Bottleneck Hypothesis* (Slabakova, 2009, 2014, 2016, 2019) e a distinção entre macroparâmetros e microparâmetros (Baker, 2008; Slabakova, 2019; Tsimpli, 2014) também podem fornecer uma explicação: a aquisição de microparâmetros é mais difícil que a de macroparâmetros; a sintaxe e a semântica essenciais adquirem-se facilmente, mas a morfologia funcional impõe maiores dificuldades.

Palavras-chave: causativo, resultativo, composto verbal resultativo, aquisição da segunda língua, refixação de parâmetros, reconfiguração de traços, língua chinesa, português europeu

1 Introduction

The type of construction in Mandarin Chinese ("Chinese", henceforth)[1] we address in this study has been referred to under different names in the literature, such as "Resultative (verb) compounds" (Cheng, 1997; Cheng & Huang, 1994; Cheng, et al. 1997; Deng, 2010; Gao, 1997; Huang, 1984, 1992; Lee & Ackerman, 2011; C. Li, 2007, 2009; Lu, 1977; Thompson, 1973), "Verb-result compounds" (Chung & Chen, 2012), "(Resultative) V-V compounds" (Y. Li, 1990, ff.; Nishiyama, 1998; Shibata et al, 2009; Yin, 2010), "V-V resultatives" (Liu, 2019), "Verb-resultative constructions" (Yin, 2011), "Resultative verb constructions" (Chang, 2003, 2007), or simply "Chinese/Mandarin resultatives" (Her, 2007; Shibagaki, 2009; Sybesma, 1993). Consider the following examples:

(1) a. 他 弄 哭 孩子们 了。
Ta nong ku haizimen le.
He make cry children ASP
'He made the children cry.'

b. 他 唱 哭 孩子们 了。
Ta chang ku haizimen le.
he sing cry children ASP
'He sang, and this made the children cry.'

Semantically, these constructions contain the meaning that a causing event causes a result to take place. Formally, the two verbal components– one denoting the causing event and the other denoting the result – are in adjacency. Since both causative and resultative meanings are involved, and the two verbal components enter in adjacency, we call this type of constructions Causative-Resultative V-Vs (CR V-Vs). Causative (C) and Resultative (R) refer to the semantic meanings involved in such construction, and the V-V notion simply refers to the fact that two verbal components are in adjacency.[2]

[1] We will use the term "Chinese" for convenience in the rest of the study, but it refers to the Mandarin variety.
[2] In fact, in most CR V-Vs, the constituents occurring in the V2 position appear to be adjectives, such as 累 *lei* 'tired' and 坏 *huai* 'damaged', since V2 denotes a result. We include them under the name of "V(verbs)" because there is not a clear line between verbs and adjectives in Chinese due to the lack of a morphological system to distinguish word classes. More importantly, Chinese adjectives exhibit syntactic features similar to those of verbs and can directly function as predicates without using any copula, as shown in the following example:

Some of the earliest studies that addressed this construction are Lü (1942), L. Wang (1943, 1958), Zhu (1958, 1963), among others. Although there have been numerous studies on this construction ever since, no consensus has been reached regarding the nature of the construction. In most works, they are treated as verb compounds, as shown by the terminology presented above. Nevertheless, CR V-Vs have also been considered serial verbs (e.g., Fan, 2016; Nishiyama, 1998; Yang, 2013; Yin, 2007). Whereas some authors hold that they are formed on the lexical level (e.g., Chang, 2003, 2007; Chao, 1968; Cheng & Huang, 1994; Cheng et al., 1997; Gu, 1992; Huang & Lin, 1992; Lee & Ackerman, 2011; C. Li, 2007, 2009, 2013; Li & Thompson, 1981; Y. Li, 1990, 1993, 1995, 1999, 2005; Ross, 1990; Thompson, 1973), others argue that they are formed on the syntactic level (Baron, 1971; Cheng & Yang, 2016; Gao, 1997; Hashimoto, 1966; Huang, 1988, 1992, 2006; Huang & Yang, 2012; Lin, 2004; Liu, 2004; Lu, 1977; Sybesma, 1991, 1993, 1999; C. Wang, 2010; L.-L. Wang, 2001; Xiong, 2003; Zhang, 2001; Zou, 1994). Most authors treat them as resultatives, while a few others (partially) categorize them as causatives: C. Li (2007) explicitly expressed that resultatives are causatives, containing a complex event structure; Basciano (2010, 2015) categorizes the CR V-Vs in which V1 does not denote a specific meaning as causatives but treats the CR V-Vs in general as resultatives; Williams (2005, 2007, 2008, 2009, 2014) has used both "causatives" and "resultatives" to refer to Chinese CR V-Vs; Cheng et al (1997) applies the term "Resultative Verb Construction (RVC)", but claims that some are resultatives, while others are causatives.

Despite the number of works on CR V-Vs, there are still some issues that need a better account, such as the following ones:

A. Semantic ambiguity

Some CR V-Vs might be semantically ambiguous, and the possible interpretations might show different degrees of acceptability. In (2), the interpretations (2a) and (2c) are acceptable, (2b) is less acceptable, and (2d) is not acceptable at all.

(2) 这 女孩 追 累 我 了。
Zh nühai zhui lei wo le.
this girl chase tired I ASP

叶子 红 了。
Yezi hong le.
leaves red ASP
'The leaves turned red.'

a. ‘This girl chased me, and it made me tired.’

b. ??‘This girl chased me, and it made her tired.’

c. ‘I chased this girl, and it made me tired.’

d. *‘I chased this girl, and it made her tired.’

In the existing literature, the semantic ambiguity of Chinese CR V-Vs has attracted much attention, but the studies mainly focus on why one reading is easier to obtain than another, instead of how the ambiguity is produced. There are numerous accounts on the argument realization in CR V-Vs. Some authors who hold a lexicalist view of CR V-Vs have proposed argument linking rules (e.g., Y. Li, 1990 ff.; Her, 2007), which are hardly applicable to other constructions or cross-linguistic data; for most authors who hold a syntactic view of CR V-Vs, each interpretation corresponds to a different syntactic structure. It seems that an optimal solution is still in need.

B. Causative alternation

Some CR V-Vs show causative alternation, i.e., they can have both causative (transitive) and non-causative (intransitive) uses. For example, (3b) is a non-causative counterpart of (3a).

(3) a. 妈妈 打 碎 杯子 了。
Mama da sui beizi le.
mom hit break cup ASP
‘Mom broke the cup.’

b. 杯子 打 碎 了。
Beizi da sui le.
cup hit break ASP.
‘The cup got broken.’

However, the causative alternation is not attested in some other CR V-Vs. For example, (4a) does not have a non-causative counterpart, as shown by the unacceptability of (4b).

(4) a. 张三 杀 死 了 李四。
Zhangsan sha si le Lisi.
Zhangsan kill die ASP Lisi

'Zhangsan killed Lisi to death.'

b. *李四 杀 死 了。

*Lisi sha si le.

Lisi kill die ASP

Intended: 'Lisi got killed to death.'

Although the phenomenon of causative alternation in CR V-Vs has been noted by a few authors (e.g., Basciano, 2010; Cheng & Huang, 1994; Huang, 1988, 1992, 2006; Tang, 2002; Yin, 2011), they were not able to explain why some CR V-Vs alternate, while other do not. Liu (2019) is one of the very few existing analyses which attempt to account for the causative alternation of CR V-Vs. However, problems remain (for example, the event decomposition account is not able to explain why V1 and V2 are strictly in adjacency, why V1 and V2 tend to be monosyllabic, and why semantic ambiguity occurs in some CR V-Vs but not in others – see these properties in §3). In this study, we will show that the causative alternation is subject to semantic constraints, which equally apply to single verbs.

C. Constraints on V1/V2

The two verb components in CR V-Vs are subject to a few constraints. First, V2 is subject to semantic constraints. For example, the verb 跑 *pao* 'run; escape' have both unergative and unaccusative uses, but when being in the V2 position in a CR V-V, only the unaccusative use is acceptable, as shown in (5a). Second, each component tends to contain only one syllable. As shown in (5b), the CR V-V with the disyllabic verb 逃跑 *taopao* 'escape' is not acceptable, contrasting to the one with mono-syllabic 跑 *pao* 'escape' in (5a).[3] These constraints have been noted by many authors (Ma & Lu, 1997; Xu, 2006; a. o.), but previous studies are mainly descriptive analysis, and convincing explanations of these constraints are still needed.

(5) a. 他 弄 跑 犯人 了。

Ta nong pao fanren le.

he make escape/*run prisoner ASP

'He made the prisoner escape/*run.'

[3] In this particular case, the semantic difference between 逃跑 *taopao* 'escape' and 跑 *pao* 'escape' may also plays a role since 跑 *pao* 'escape' denotes a pure inchoative meaning, but 逃跑 *taopao* 'escape' may involve agentivity.

b. *他 弄 逃跑 犯人 了。

*Ta nong taopao fanren le.

he make escape prisoner ASP

'He made the prisoner escape.'

A full-length description of Chinese CR V-Vs, including the properties and constraints presented above, will be presented in §3. Within the theoretical framework of Parameters & Principles (P&P) (Chomsky, 1981), specifically within the Minimalist Program model (Chomsky, 1995), and assuming with the general tenants of Distributed Morphology (Halle & Marantz, 1993, 1994; Marantz, 1997), this study will provide a syntactic account of Chinese CR V-Vs in the attempt to explain their properties holistically (see §4).

Similar to Chinese, languages such as English and Korean can form resultatives such as *John kicked the door open*; contrastingly, Romance languages do not allow the English-type of resultatives (see Talmy, 1985). As will be addressed in detail in §2, Portuguese, being a Romance language, does not have structures equivalent to Chinese CR V-Vs and is highly restricted in forming resultatives at all. In general, the Chinese CR V-Vs may correspond to single verbs, syntactic causatives, or clauses with coordination/subordination/gerunds in Portuguese. That is what makes the Chinese-Portuguese comparison so interesting and is the reason why we choose these two languages as the focus of our study. As will be proposed in §4.6, we attribute the differences between Chinese and Portuguese in forming resultatives to two features of the functional head v_{CAUSE} – the possibility of Manner Conflation and the option of root-selection. Given the parametric differences between the two languages, it would be interesting to find out whether L1 Portuguese learners can acquire such a construction that is absent in their L1.

Data of children's first language (L1) acquisition of Chinese CR V-Vs can be found in Chao (1968), Chen (2006, 2008, 2016), Deng (2010), Erbaugh (1982, 1992), Hsu (2017), Xiao et al. (2006), and Yang (2006), which all revealed very early use of CR V-Vs by Chinese-speaking children. Concerning the second language (L2) acquisition of Chinese CR V-Vs, Qiao (2008), Xiao (2010), Yuan & Zhao (2010), Zhang (2014), and Zhao (2006) are among the few existing studies, in which the subjects are mostly L1 English speakers. Data from L1 Japanese or L1 Korean speakers can be found in Yu (2003) and Zhao (2006). Although there also exist some studies with a focus on other L1s, such as Thai and Vietnamese, they are mostly error analyses, describing the error types and providing pedagogical suggestions. Reference to L2

acquisition of Chinese CR V-Vs by learners of L1 Romance languages, such as Portuguese, has not yet been found to the best of my knowledge. Therefore, there is an obvious research gap to be filled in.

Universal Grammar (UG) is characterized as the biological faculty of human language (Chomsky, 1981). According to Chomsky's (1981) P&P, UG *principles* are constant and restrict the range of possibilities for all the natural languages. Obviously, natural languages differ from each other in various ways, and such variation is captured by the notion of *parameters*. Parameters contain a finite set of options, the values of which are set by the learners based on language exposure. In this way, principles and parameters work together to restrict the range of possibilities and options in natural languages, which helps to account for children's successful and fast acquisition of their L1s, even in environments that post a learnability problem known as the *poverty of the stimulus* (i.e., the "Plato's Problem" in Chomsky, 1986).[4] In particular, without negative evidence from the language exposure, they know that certain utterances are unacceptable or ambiguous in their L1.

In generative Second Language Acquisition (SLA) studies, one of the main issues in discussion is what role UG plays, if any. Some early L2 studies in the P&P framework proposed that UG was inaccessible (Bley-Vroman, 1990; Clahsen & Muysken, 1986; Schachter 1988). In contrast, UG is claimed to be fully accessible to the L2 acquisition by some other researchers (Epstein et al., 1996; Flynn, 1996; Schwartz & Sprouse, 1994, 1996; White, 2003). Since L2 learners already possess a fully developed L1 grammar with parameters fixed to L1 settings, another main issue discussed in SLA researches is what role L1 plays when the learners attempt to acquire L2. According to Schwartz & Sprouse (1994, 1996), the entire L1 grammar is the initial stage in the interlanguage grammar, and parameters are initially set at L1 values – the full transfer view. However, Vainikka & Young-Schoulten's (1994, 1996a, b) Minimal Trees Hypothesis claims that the initial interlanguage grammar lacks functional categories altogether, and thus there is no L1 transfer in functional categories; Eubank (1993/1994, 1994, 1996)'s Valueless Feature Hypothesis claims that lexical and functional categories of the L1 are both present in the earliest interlanguage grammar, but the feature values of the functional categories are not present – they are valueless or 'inert'; Håkansson (2001) argues that syntactic rules are not transferable, and the L2 learners are building a new grammar from the L2 lexicon.

[4] However, the parametric approach has been criticized by some authors (e.g., Boeckx, 2010; Newmeyer, 2005, 2017).

Under the assumption of UG access and L1 transfer, an important task for the learners to successfully acquire an L2 then is to set the parameters (or the feature values of the functional categories) from the L1 values to those of the L2. Researchers divide in whether parameter resetting is possible. Hawkins & Chan's (1997) Failed Functional Feature Hypothesis claims that L2 functional features which are not available from L1 cannot be acquired after the critical period, and the Interpretability Hypothesis (Hawkins & Hattori, 2006; Tsimpli & Dimitrakopoulou, 2007) claims that the uninterpretable features which are not selected by the L1 are not able to be attained in the L2 grammar construction. In contrast, proponents of parameter resetting, including Schwartz & Sprouse (1994, 1996), claim that in response to L2 input, parameters in interlanguage grammars will be able to reset from the L1 value to values more appropriate to the L2. Since cross-linguistic variation has been observed in end-state interlanguages, a few hypotheses have been proposed to provide an explanation to the unsuccessful acquisition, such as Missing Surface Inflection Hypothesis (Lardiere, 1998a, b, 2000; Prévost & White, 2000a, b), Prosodic Transfer Hypothesis (Goad & White, 2004, 2006, 2008; Goad et al, 2003), Feature Reassembly Hypothesis (Lardiere, 2005, 2008, 2009a, b), Interface Hypothesis (Sorace, 2005; Sorace & Filiaci, 2006), and Bottleneck Hypothesis (Slabakova, 2009, 2014, 2016, 2019). Furthermore, Chomsky (2005) drew attention to the three factors that are involved in language development, including not only the language faculty but also experience and language- or even organism- independent principles such as data processing and computational efficiency.

Our investigation on L1 Portuguese learner's L2 Chinese acquisition will contribute to the debate on the role of UG and L1 in SLA, and the attainability of parameter resetting (if UG is accessible). The empirical part of this study consists of 3 tests (see §5). The participants include 27 L1 Portuguese L2 Chinese learners and 27 Chinese native speakers. Test 1 is a semi-elicited production task, which aims to find out whether and in what scenarios L1 Portuguese L2 Chinese learners produce Chinese CR V-Vs, and to compare their results to the ones from the Chinese native speakers. Test 2 is a grammaticality judgement task with the objective of finding out whether these L2 learners have the knowledge of CR V-Vs and their constraints. Test 3 is a comprehension task, which attempts to find out whether these L2 learners can yield the interpretations that resemble those from the Chinese native speakers.

In all, the present study addresses the following key questions:

1) What is the nature of Chinese CR V-Vs? How can we account for their semantic and syntactic properties?

2) What is the role of UG in the acquisition of L2 Chinese CR V-Vs by L1 Portuguese learners: is UG accessible?
3) What is the role of L1 in the acquisition of L2 Chinese CR V-Vs by L1 Portuguese learners: is L1 transfer evident?
4) Is there a proficiency effect in the acquisition of all the CR V-V constraints? If not, what can account for the difficulties?

The structure of this thesis is as follows. A literature review of causatives and resultatives and a relevant comparison between Chinese and Portuguese will be presented in Chapter 2. Then, Chapter 3 will focus on Chinese CR V-Vs, presenting the properties of this construction and showing their Portuguese correspondences. A syntactic account is presented in Chapter 4, where we will propose a syntactic structure for Chinese CR V-Vs in the attempt of explaining their properties and show what are the relevant parametric differences between Chinese and Portuguese. In Chapter 5, related SLA studies and hypotheses will be reviewed, and our experiment on the acquisition of Chinese CR V-Vs by L1 Portuguese learners will be described. The results of the experiment will be presented at full length in Chapter 6. Discussions will be conducted in Chapter 7 with a focus on the role of UG and L1, the attainability of parameter resetting, and possible explanations for the acquisition difficulty, effectively responding to the research questions 2-4. In the end, the main findings and the limitations of this study will be addressed in Chapter 8.

2 Causatives and resultatives

2.1 Causatives

Causatives are constructions that describe a causative situation (Shibatani, 1976). According to Kulikov's (2001) definition of causatives, a causative is a verb or verbal construction meaning 'cause to V_0' or 'make V_0', where V_0 stands for the embedded base verb (e.g., *Peter made John go*), and a construction meaning 'make Q', where Q is a quality or the like (e.g., *John cleaned the table*, with the meaning 'John made the table clean'). Language variation in causatives has been observed in various studies. Typological works (e.g., Comrie, 1976; Comrie, 1989[1981]: Ch. 8; Haspelmath, 1993; Kulikov, 2001; Nichols et al., 2004) have found that cross-linguistically, causatives can take the forms of syntactic (or analytic) causatives, morphological causatives, and lexical causatives, and that languages vary on what forms are employed to express a particular type of causative meanings, what verbs can alternate, and whether a causative marker, an anticausative marker, or no marker is involved.

2.1.1 Morphological causatives

Morphological causatives are the causatives in which causativity is encoded in a bound morpheme on the lexical predicate (Baker, 1988), such as English *awake-awaken*, and *broad-broaden*. Productive morphological causatives are attested in various languages, such as Turkish, Sanskrit, Ewenki, Georgian, Hindi, Japanese and Finnish (see Comrie, 1976; Falk, 1991; Montrul, 2001; Pylkkänen, 2002; a. o.). Consider the examples in (1).

(1) a. Japanese (Pylkkänen, 2002)
John-ga kodomo-o nak-asi-ta.
John-NOM child-ACC cry-CAUSE-PAST
'John made the child cry.'

b. Turkish (Montrul, 2001)
Düşman gemi-yi bat-ir-mış.
enemy ship-ACC sink-CAUSE-PAST
'The enemy sank the ship/made the ship sink.'

Romance languages lack productive morphological causatives (Kulikov, 2001: 888; a. o.). Some affixes can form verbs with causative meanings in Portuguese, such as *-izar, -ificar, -ear* and *-isar*, as in *cristal* 'crystal' – *cristalizar* 'to crystallize', *puro* 'pure' - *purificar* 'purify', *branco* 'white' - *branquear* 'to whiten', and *liso* 'straight' – *alisar* 'to straighten'. no causative morpheme can productively derive causatives by attaching to a base root, contrasting with languages such as Japanese and Turkish. Although many Portuguese verbs with *-ar* may involve causative meanings, such as those in (2), Matos (1999) points out that not all verbs with *-ar* involve causativity (3) and suggests that it is not the suffix but the semantic properties of the base roots that drive the causative interpretation in (2).

(2) a. [*doce*]$_{ADJ}$ 'sweet' – [*adoçar*]$_{V}$ 'to sweeten'
b. [*sujo*]$_{ADJ}$ 'dirty' – [*sujar*]$_{V}$ 'to make dirty'

(3) a. [*buzina*]$_{N}$ 'horn' – [*buzinar*]$_{V}$ 'to honk' (*'to make (into) horn')
b. [*almoço*]$_{N}$ 'lunch' – [*almoçar*]$_{V}$ 'to have lunch' (*to make (into) lunch')

Morphological causatives existed in Old Chinese but underwent a fade-away during language development. In Old Chinese, causative meanings could be expressed through phonological or morphological changes such as tonal change and affixation (see Shi, 2002; Xu, 2006; Mei, 2012). For example, the prefix *s- alters the meaning of the verb from 'to eat' to 'to feed' in (4) and alters the verb meaning from 'defeated' to 'to defeat' in (5), bringing about the causative interpretation.

(4) a. 食*^{b}mlɨk > zyik > shí 'to eat'
b. 食*^{b}**s**lɨks > ziH > sì 'to feed' (Xu, 2006: 114)

(5) a. 败*brads > *bwai* 'ruined, defeated'
b. 败***s-**brads >*prads > *pwai* 'to ruin, defeat' (Mei, 2012)

The morphological/phonological mechanism to create causatives faded away gradually in the history of Chinese, and only relics can be found in Modern Chinese. The morpheme -化 *hua* might be the only existing morpheme with causative function in Modern Chinese, similar to the English morpheme *-ify* (e.g. *beauty – beautify*) and the Portuguese morpheme *-ificar*

(e.g., *puro* ‘pure’ – *purificar* ‘purify’). As illustrated in (6), when -化 *hua* attaches to the base root 美 *mei* ‘beautiful, beauty’, the causative meaning ‘to beautify’ is produced. Other combinations include 绿化 *lü-hua* ‘green-*HUA*: to make green’, 现代化 *xiandai-hua* ‘modern-*HUA*: to modernize’ and 国际化 *guoji-hua* ‘international-*HUA*: to internationalize’. In recent years, the causative formation with -化 *hua* has become highly productive. One can literally attach -化 *hua* to any nominal or adjective to produce causative meanings.

(6) a. 美 *mei*, a. ‘beautiful’; n. ‘beauty’

b. 美化 *mei-hua*, v. ‘to beautify’

c. 我们 要 美化 我们的 生活 环境。
Women *yao* *meihua* *womende* *shenghuo* *huanjing*.
we should beautify our life environment
‘We should make our living environment beautiful./We should beautify our living environment.’

Based on the observations above, we can see that both Portuguese and Chinese exhibit some morphemes with causative meanings. However, it’s worth noting that these morphemes can only apply to a non-agentive root to express causation of change of state (e.g., *purificar* ‘to purify’ and 美化 *mei-hua* ‘to beautify’). They can never express the causation of an activity. That contrasts with languages such as Finnish and Turkish, where causation of an agentive event can also be expressed through morphological means (see Comrie, 1976; Montrul, 2001; Pylkkänen, 2002; a.o.).

Nevertheless, verbs that intrinsically express the causation of change of state seem to be more available in Portuguese than in Chinese. Many Portuguese verbs that contain a morphological constituent plus a state base, such as *sujar* ‘to stain’ and *limpar* ‘to clean’, do not have Chinese equivalents in simplex verb forms. For example, the Chinese counterpart of *sujar* ‘to stain’ has to take a V-V form (7b), where the verbal component that denotes the causing activity (with either generic or specific meanings) precedes the result-denoting one, namely 脏 *zang* ‘dirty’. That is an instance of what we call Causative Resultative V-Vs (CR V-Vs) in this study.

(7) a. Stative:

桌子 很 脏。

Zhuozi hen zang.

table very dirty

'The table is dirty.'

b. Causative:

男孩 弄/画 脏 桌子 了。(CR V-V)

Nanhai nong/hua zang zhuozi le.

boy make/paint dirty table ASP

'The boy made the table dirty (by painting on it).

Similarly, the Portuguese verb *limpar* 'to clean' also corresponds to Chinese expressions in CR V-V form, where V1 may have a generic or specific meaning, as illustrated in (8).

(8) a. *O João limpou a roupa*.

the John cleaned the clothes

'John cleaned the clothes.'

b. 他 弄/洗 干净 衣服 了。

Ta nong/xi ganjing yifu le.

he make/wash clean clothes ASP

'He cleaned the clothes (by washing them).'

One may argue that the meaning 'to clean' can be expressed by a single verb in Chinese, namely 打扫 *dasao*. However, note that this verb only denotes the activity of 'doing cleaning' without implying a result. For this reason, the semantic meaning of (9b) is not equivalent to the Portuguese sentence with *limpar* 'to clean' in (9a). To include the result meaning that 'the room became clean', a CR V-V form should be employed with the occurrence of an overt result component, as in (9c).

(9) a. *Ele limpou o quarto*.

he cleaned the room

'He cleaned the room.'

b. 他 打扫 了 房间。

Ta dasao le fangjian.

'He did some cleaning in the room.'

c. 他 打扫 干净 了 房间。

Ta dasao ganjing le fangjian.

he do.cleaning clean ASP room

'He did some cleaning in the room, and the room became clean (i.e., he cleaned the room).'

2.1.2 Lexical causatives

In contrast to morphological causatives, lexical causatives lack any regular and productive causative marker (Kulikov 2001), such as *brown*, *thin*, *smooth*, *dry,* and *narrow* when used as verbs, in sentences like *Mary dried the clothes*.

Lexical causatives may be subdivided into a suppletive type and a labile type (see Comrie 1989; Kulikov 2001). The suppletive subtype consists of verbs that express causative meanings and are in a suppletive relation with their non-causative counterparts. Both Portuguese and Chinese have suppletive verb pairs. They come to have a similar group of meanings (e.g., 'kill' - 'die', 'teach' - 'learn') for metalinguistic reasons (since people's conceptualization and experience are generally the same). However, semantic differences still exist. Taking the pair 'kill'-'die' as an example, the meaning of *matar* 'kill' in Portuguese assumes a completed caused event denoted by *morrer* 'die'. As shown in (10a), the refutation is not allowed because it contradicts the first part of the sentence, i.e., the girl was killed and thus died. In contrast, 杀 *sha* 'kill' in Chinese does not necessarily assume the completion of 死 *si* 'die'; therefore, refutation is possible (10b) (also see Tai 1984; Sybesma 1997; a. o.). The Chinese equivalence of Portuguese *matar* 'to kill' should take a complex form, namely a CR V-V, as illustrated in (10c), where V2 explicitly expresses the result. As expected, this sentence does not allow refutation.

(10) a. *Ele matou a menina, (# mas a menina não morreu).*

He killed the girl (# but the girl not died)

'He killed that girl, (# but the girl did not die).'

b. 他 杀 那 个 女孩 了，(但是 女孩 没有 死)。
Ta sha na ge nühai le, (danshi nühai meiyou si).
he kill that CLF girl ASP (but girl not die)
'He (went to) kill that girl, (but the girl did not die).'

c. 他 杀 死 那 个 女孩 了，(# 但是 女孩 没有 死)。 (CR V-V)
Ta sha si na ge nühai le, (# danshi nühai meiyou si).
he kill die that CLF girl ASP (# but girl not die)
'He killed that girl to death, (# but the girl did not die.)'

In contrast, the labile causatives are not formally indistinguishable from their non-causative (intransitive) counterparts, including but not limited to the so-called alternating verbs (i.e., verbs that allow causative/transitive alternation), such as the English verbs *open* and *break*. Verbs that allow causative alternation are attested in Portuguese, but it is quite common that the unaccusative clitic *-se* is used in the intransitive structure (11). However, there also exist verbs that do not require or disallow the occurrence of the clitic *-se* in the intransitive counterpart, as illustrated in (12) (see Matos, 1999)[5].

(11) a. *O João partiu a garrafa.*
the John break the bottle
'John broke the bottle.'

b. *A garrafa *partiu/partiu-se.*
the bottle *break/break-CL
'The bottle broke.'

(12) a. *A neve derreteu/derreteu-se.*
the snow melted/melted-CL
'The snow melted.'

b. *O leite ferveu/*ferveu-se.*
the milk boiled/*boiled-CL
'The milked boiled.'

[5] The examples in (11)-(12) are from Matos (1999), but the English translation is added by us.

The clitic *-se* here is usually treated as an anticausative marker, which permits the anticausative process, deriving intransitive configurations from a transitive verb. With regard to the instances like (11) and (12), where the occurrence of this clitic is not required or even disallowed, we follow Matos (1999) and assume that the anticausative morpheme is not phonetically realized, being null. Generally speaking, it is the anticausative process that derives non-causative (intransitive) counterparts from the labile causative (transitive) verbs in Portuguese.

The labile lexical causatives were very common in Old Chinese but are much less common in Modern Chinese (see Xu, 1998). In Old Chinese, they could be formed from adjectives, nouns/nominals, or verbs – they are also called "zero causatives" since no overt causative marker is involved. As illustrated in (13), 树 *shu*, a noun with the meaning of 'tree', turns to function as a transitive verb when preceding 之 *zhi* 'it', producing the causative meaning 'to make it have trees, to plant'. 厚 *hou* is an adjective with the meaning 'thick' (14a); when preceding the NP 墙垣 *qiangyuan* 'wall', it comes to have the causative meaning 'to make the wall thick, to thicken' (14b). Similarly, in (15b), the intransitive verbs 进 *jin* 'go forward' and 退 *tui* 'withdraw' obtain causativity when preceding 之 *zhi* 'him', producing the meanings 'make him go forward' and 'make him withdraw'.

(13) a. 树 *shu*, 'tree'

b. 树 之 以 桑

Shu zhi yi sang

tree it with mulberry

'Plant it with mulberry' (from *Mencius*[6], cited in Xu, 2006: 118)

(14) a. 厚 *hou*, 'thick'

b. 厚 其 墙垣

Hou qi qiangyuan

thick the wall

'Make the wall thick.' (from *Zuozhuan*[7], cited in Shen & Huang, 2017)

[6] *Mencius*, in Chinese as 孟子 *Mengzi*, is a collection of anecdotes and conversations of the Confucian philosopher Mengzi (371-288 B.C), probably composed by his disciples (Legge, 1861).

[7] 左传 *Zuozhuan*, generally translated as *The Zuo Tradition* or *The Commentary of Zuo*, is an ancient Chinese

(15) a. 进 *jin*, 'go forward, advance'; 退 *tui*, 'withdraw, go back'

b. … 故 进 之；… 故 退 之。

... *gu* *jin* *zhi;* ... *gu* *tui* *zhi.*

so go-forward him so withdraw him

'… so (I) made him go forward; …so (I) made him withdraw.' (from *Analects*[8], cited in Xu, 1998)

It has been observed that Chinese shifted from a fairly synthetic language to an analytic language (Huang 2006: 25), and the causatives also underwent this shift: the use of morphological and lexical causatives gradually decreased (see Mei, 1991; Shen & Huang 2017; Xu, 2006). However, although not as common as in Old Chinese, some instances of zero causatives can still be found in Modern Chinese (16) (see Wang, 1958; He & Wang, 2002; Shen & Huang, 2017; a. o.).

(16) a. 科技 繁荣 了 市场 经济。

Keji *fanrong* *le* *shichang* *jingji.*

technology prosper ASP market economy

'Technology made the market economy prosper.'

b. 我们 必须 坚定 信念。

Women *bixu* *jianding* *xinnian.*

we must firm faith

'We must make the faith firm.'

In Modern Chinese, the simplex verbs that allow causative alternation are not many, including 开 *kai* 'open' (17) and 关 *guan* 'close, turn off' (18).[9]

narrative history written during 4th Century BC.

[8] *Analects*, in Chinese as 论语 *Lunyu*, is a collection of sayings and ideas from the philosopher Confucius and his contemporaries. It is believed to have been written around 400-200 BC.

[9] Readers can refer to Zhang (2017) for a typological study of Chinese labile verbs. However, some of the simplex labile verbs presented in Zhang (2017) do not belong to the "labile causative verb" category, such as the verbs 吃 *chi* 'eat' and 坐 *zuo* 'sit'. These verbs allow both one-argument and two-argument structures, but it is not a case of causative alternation in our view. We hold that the intransitive use of 吃 *chi* 'eat' is a case of topicalization, and the apparent alternation of 坐 *zuo* 'sit' is related to the position of the Subject, namely being pre-verbal or post-verbal (as in 'Some people are sitting there' and 'There sit some people').

(17) a. 老师　开　了　门。

Laoshi kai le men.

teacher open ASP door

'The teacher opened the door.'

b. 门　开　了。

Men kai le.

door open ASP

'The door opened.'

(18) a. 他 关　了　门。

Ta guan le men.

he close ASP door

'He closed the door.'

b. 门　关　了。

Men guan le.

door close ASP

'The door closed.'

It is observed that the causative and non-causative uses of many alternating Portuguese verbs, such as *partir* 'break' and *derreter* 'melt', may correspond to different verbal expressions in Chinese. For example, the Portuguese verb *partir* 'break' has both causative and non-causative uses, as shown in (11) above. However, the Chinese verb 碎 *sui* 'break' is pure intransitive (19a), as shown by the ungrammaticality of the attempted transitive use in (19b). A CR V-V should be employed to express a causative meaning, with a verb denoting the causing activity preceding 碎 *sui* 'break', as shown in (19c, d).

(19) a. 杯子　碎　了。

Beizi sui le

cup break ASP

'The cup broke.'

b. *他 碎 了 杯子。

*Ta sui le beizi

he break ASP cup

'He broke the cup.'

c. 我 弄 碎 了 花瓶。 (CR V-V)

Wo *nong sui* *le* *huaping*.

I make break ASP vase

'I made the vase break. / I broke the vase.'

d. 我 踢 碎 了 花瓶。 (CR V-V)

Wo *ti sui* *le* *huaping*.

I kick break ASP vase

'I broke the vase by kicking (it).'

One important observation is that in expressing change-of-state events, the anticausation is the major mechanism for Portuguese (with the occurrence of *-se* as evidence), whereas the causation is the main process for Chinese (in many cases, the non-causative member takes a basic form, and the causative counterpart has a complex one, for example, the CR V-V).

There is a group of transitive verbs in Portuguese that encode change-of-state events and can derive state-denoting participles (or deverbal adjectives), such as *avariar* 'to damage' – *avariado* 'damaged', *cansar* 'to make tired' – *cansado* 'tired' and *inclinar* 'to incline' – *inclinado* 'inclined' (see Duarte & Oliveira 2010 for detailed discussions on Portuguese participles). These verb-participle pairs can be considered analogous to the Portuguese causative-anticausative verb pairs discussed above. Similar to labile lexical causatives, the causative member is in a basic form, and the non-causative counterpart (the participle in this case) is further derived. Interestingly, these formally simplex but semantically complex (i.e., involving causative and resultative meanings) verbs may not have Chinese counterparts in simplex forms. For example, the Portuguese verb *avariar* 'to damage' may correspond to the Chinese CR V-Vs in (20b), where a cause-denoting V1 precedes the result-denoting V2 坏 *huai* 'damaged'.

(20) a. 坏 *huai* 'damaged, be damaged'

b. 弄坏 *nong-huai* 'make-damaged: to damage'

损坏 *sun-huai* ‘harm-damaged: to damage’

破坏 *po-huai* ‘break-damaged: to damage’

In (20b), the first expression 弄坏 *nong-huai* ‘make-damaged: to damage’ is considered a CR V-V in our definition. The latter two have lexicalized and are expected to be listed in dictionaries. Regardless of the lexicalization process, all these three are analyzable verb compounds, with V1 denoting the causing eventuality and V2 the result. There is a non-exhaustive list of possible combinations of V1 + *huai* ‘damaged’, producing the meaning of ‘to make something damaged through the activity denoted by V1’.

2.1.3 Syntactic causatives

In syntactic causatives (also as “analytic causatives” or “periphrastic causatives”), the causative marker is a free form (Kulikov, 2001), typically a verb with the meaning ‘cause’, ‘make’, ‘let’, ‘give’, etc.

Portuguese syntactic causatives are formed with causative verbs (Vcaus) such as *fazer*, *mandar,* and *deixar*, among which, *fazer* means ‘to do’ or ‘to make’, *mandar* has closer meaning to ‘to order’ and ‘to make’, while *deixar* has similar interpretation as ‘to let’. It has been observed that these causative verbs can form causatives with four different forms: Vcaus + finite (21a, 22a), Vcaus + inflected infinitive (21b, 22b), the exceptional case marking (ECM) or Raising-to-object type (21c, 22c), and *fazer*-Inf (21d, 22d) (see Barbosa & Raposo, 2013; Gonçalves, 1999a, 1999b; Raposo, 1981; Santos et al., 2016; a. o.):

(21) ‘He made the children run.’

a. Vcaus + finite

Ele mandou que os meninos <u>corressem</u>.

he made CONJ the children run [FIN]

b. Vcaus + inflected infinite

Ele mandou os meninos <u>correrem</u>.

he made the children run [INFL. INF.]

c. Vcaus + non-inflected infinite (ECM/Raising-to-object)

Ele mandou os meninos <u>correr</u>.

he made the children run [NON-INFL. INF.]

d. Vcaus + non-inflected infinitive (*fazer*-Inf)

Ele mandou correr os meninos.

he made run [non-infl. inf.] the children

(22) 'He made the children eat the cake.'

a. Vcaus + finite

Ele mandou/deixou/fez com que os meninos comessem o bolo.

he made prep. conj. the children eat[FIN] the cake

b. Vcaus + inflected infinite

Ele mandou/deixou/fez os meninos comerem o bolo.

he made the children eat[INFL. INF.] the cake

c. Vcaus + non-inflected infinite (ECM/Raising-to-object)

Ele mandou/deixou/fez os meninos comer o bolo.

he made the children eat[NON-INFL. INF.] the cake

d. Vcaus + non-inflected infinitive (*fazer*-Inf)

Ele mandou/deixou/fez comer o bolo aos meninos.

he made eat[non-infl. inf.] the cake to.the children

These causative verbs are selective in terms of the caused event. For example, a caused unaccusative may occur with *fazer* but not *mandar* (23). Nevertheless, the sentence with *mandar* in (23b) may be acceptable in contexts such as children's tale, where the stones are personified and can be ordered to fall.

(23) 'John made the stones fall.'

a. *O João fez cair as pedras.*

the John made fall the stones

b. **O João mandou cair as pedras.*

the John made fall the stones

(Gonçalves 1999b)

In Chinese, the reduced use of morphological/lexical causatives is accompanied by the rise of syntactic causatives (Xu, 2006). Although very rare, it has been observed by Xu (2006) that syntactic causatives co-existed with the morphological and lexical causatives in Old Chinese.

In Modern Chinese, syntactic causatives generally are formed with causative verbs such as 使 *shi* /让 *rang* /令 *ling*, among which 使 *shi* has the generic causative meaning 'to make', 让 *rang* has the meaning 'to let' (similar to Portuguese *deixar*), and 令 *ling* has the meaning 'to order, to make' (similar to Portuguese *mandar*). The Chinese syntactic causatives surface as NP_1 + Vcaus + NP_2 + VP, as illustrated in (24).

(24) 这 件 事 让/令/使 我 感到 非常 高兴。
Zhe jian shi rang/ling/shi wo gandao feichang gaoxing.
this CLF thing make I feel very happy
'This thing makes me feel very happy.'

Besides 让 *rang*, 令 *ling* and 使 *shi*, the causative verbs occurring in Chinese syntactic causatives may also be 叫 *jiao* 'to call, to make' or 害 *hai* 'to harm, to make'. The choice depends on the speaker's presupposition, the intended style of speech, and the nature of the caused event (Huang, 1974). For instance, 使 *shi* tends to causativize a psychological state (24), but not a physical action, as shown in (25).

(25) 爸爸 让/*使 孩子们 出去 了。
*Baba rang/*shi haizimen chuqu le.*
dad make children leave ASP
'Dad made the children leave.'

The causative verbs 使 *shi* /让 *rang* /令 *ling* may also embed an AP, expressing the causation of change of state, surfacing as NP_1 + Vcaus + NP_2 + AP, as shown in (26). However, when 使 *shi* serves as the causative verb, this sentence sounds a bit less natural than that with 让 *rang* or 令 *ling*.

(26) 这 件 事 让/令/使 孩子 非常 开心。
Zhe jian shi rang/ling/shi haizi feichang gaoxing.
this thing make child very happy
'This thing makes the child very happy.'

From the observations above, we can see that both Portuguese and Chinese exhibit causative verbs, which can create causative constructions productively. Semantic variations are observed among the causative verbs, which are language-specific.

2.1.4 Summary

Based on the observations in the previous sections, we can find that both Portuguese and Chinese exhibit syntactic means to express the causation of an activity. However, these two languages exhibit quite a significant variation in the causation of change of state. In particular, Portuguese exhibits plenty of verbs (including morphological and lexical causatives) that intrinsically involve caused-result meanings (e.g., *partir* 'break', *sujar* 'stain', and *avariar* 'damage'), whereas the Chinese correspondents usually appear in complex forms, such as CR V-Vs.[10]

Since the causation of change of state is also semantically related to resultatives, in the next section, we will discuss how Chinese and Portuguese differ in terms of resultative formation.

2.2 Resultatives

2.2.1 Definition and classification

In Williams (2008: 507), resultatives are defined as "single clause constructions comprising two overt predicates, a means predicate M and a result predicate R, neither one introduced by a conjunction or adposition". A definition of resultative constructions is also offered by C. Li (2007: 7): "A resultative is a complex predicate composed of two free components in a single clause, with the eventuality denoted by one component causing a change in a certain entity as a result, a change that is denoted by the other component, but not entailed by the causing component." In a word, resultatives refer to single clause constructions that describe an event of a change of state, involving Manner (the causing eventuality) and Result (the end state), neither one introduced by morphological marker or conjunction. For example, resultatives are attested in English, as shown in (27).

[10] Readers may also refer to Yao (2022a) for a full analysis of Chinese and Portuguese causatives.

(27) a. *I shot John dead*.

b. *I froze the icecream solid*. (Simpson, 1983)

Intransitive resultatives refer to resultatives that contain only a surface Subject, but no Object, as in (28a); if a resultative contains both a Subject and an Object, it is called a transitive resultative, such as those in (27) and (28b). English is very strict in forming intransitive resultatives, as shown by the ungrammaticality of the examples in (29a, b). In fact, these sentences will become more acceptable if we add a reflexive pronoun to "fill up' both the external and internal argument positions (see Rappaport Hovav & Levin, 2001), as shown in (29c, d).

(28) a. *The prisoners froze to death*. (Levin & Rappaport Hovav, 1995)

b. *The joggers ran the pavement thin*. (Randall, 1982)

(29) a. **John ran tired*.

b. **She sang hoarse*.

c. *John ran himself tired*.

d. *She sang herself hoarse*.

Depending on whether the result phrase is predicated of the overt Subject or the Object, resultatives are also classified into Subject-oriented and Object-oriented. Intransitive resultatives are necessarily Subject-oriented since the Subject is the only NP available to control the result predicate. Transitive resultatives are usually Object-oriented, as in the English resultatives in (27) and (28b), where the result phrase is predicated of the Object. However, Chinese resultatives (i.e., the CR V-Vs) can be Subject-oriented transitive, as in (30) and (31), where the result predicate is controlled by the Subject instead of the Object.

(30) a. 他 喝 醉 酒 了。

Ta he zui jiu le.

he drink drunk alcohol ASP

'He got drunk from drinking alcohol.'

b. 他 醉 了。

Ta zui le.

he drunk ASP

'He got drunk.'

c. *酒 醉 了。

**Jiu zui le.*

alcohol drunk ASP

Intended: 'The alcohol got drunk.'

(31) a. 孩子们 吃 饱 饭 了。

Haizimen chi bao fan le.

children eat full rice ASP

'The children got full by eating rice (i.e., meal).'

b. 孩子们 饱 了。

Haizimen bao le.

children full ASP

'The children got full.'

c. *饭 饱 了。

**Fan bao le.*

meal full ASP

Intended: 'The meal got full.'

Washio (1997, 2002) made an important distinction between "strong resultatives" and "weak resultatives". Strong resultatives are those in which "the meaning of the verb and the meaning of the adjective are completely independent of each other" (1997: 7) – the resulted state of the Causee cannot be predicted from the semantics of the verb denoting the causing eventuality, as in (32).

(32) a. *The lion's roar scared him stiff*. (Washio, 1997)

b. *They drank the pub dry*. (Rappaport Hovav & Levin, 2001)

For weak resultatives, the verb responsible for the causing eventuality, though not necessarily implicating or entailing a certain change, has "a disposition toward certain result

without lexically implying such a result" (Washio, 1997: 16). In other words, weak resultatives are those in which the result predicate denotes either the purpose or the conventional result of the activity encoded in V1, as in (33).

(33) a. *He wiped the table clean/dry.*
b. *Mary dyed the dress pink.* (Washio, 1997)

2.2.2 Portuguese-Chinese comparison

Based on the strong-weak resultative distinction, it has been observed that some languages have both strong and weak resultatives (e.g., English, Dutch, German, Norwegian, Swedish; see Hoekstra (1988), Kaufmann & Wunderlich (1998), Kratzer (2005), Müller (2002), a.o.); some allow for weak resultatives but not strong resultatives (e.g., Japanese, Korean, Turkish; see Washio (1997, 2002)); some have only restricted weak resultatives (e.g., French, Italian, Romanian; see Washio (1997)), and some have no resultatives (e.g., Lingala, Javanese; see Snyder (2001)).

In Chinese, both strong and weak resultatives are possible, as illustrated in (34) and (35) respectively.

(34) a. 他 扫 坏 了 扫帚。
Ta sao huai le saozhou.
he sweep broken ASP broom
'He swept the broom into pieces.'
b. 他 哭 瞎 了 眼睛。
Ta ku xia le yanjing.
he cry blind ASP eyes
'He cried his eyes blind.'

(35) a. 那 个 人 射 死 了 他。
Na ge ren she si le ta.
that CL person shot dead ASP he
'That person shot him dead.'

b. 他 切 开 了 肉。

Ta qie kai le rou.

he cut open ASP meat

'He cut the meat open.'

In contrast, it has been observed that Romance languages in general do not exhibit strong resultatives (Washio, 1997), as shown in (36).[11]

(36) a. *John hammered the metal flat*. (English)

b. **Jean a martelé le métal plat*. (French)

John has hammered the metal flat

c. **Gianni ha martellato il metallo piatto*. (Italian)

John has hammered the metal flat

d. **Juan martilleó el metal plano*. (Spanish)

John hammered the metal flat

e. *O *João martelou o metal plano*. (Portuguese)

the John hammered the metal flat

As to weak resultatives, restrictions are also observed in Romance languages. As shown in the Portuguese examples in the following, some weak resultatives are possible (37), while others are not allowed (38).

(37) a. *O João pintou a parede de amarelo*.

the John painted the wall of yellow

'John painted the wall yellow.'

b. *O João cortou a carne em fatias*.

the John cut the meat in slices

'John cut the meat in slices.'

(38) a. #*O João congelou o gelado sólido*[12].

the John froze the ice-cream solid

[11] The examples in (36a-d) are from Washio (1997). The Portuguese example in (36e) is added by us.

[12] The adjective *sólido* 'solid' is not meant to form an NP with the noun *gelado* 'ice-cream', but to serve as a result predicate.

Intended: 'John froze the ice cream solid.'

b. *O João atirou nela morta.
The John shot in-her dead
Intended: 'John shot her dead.'

Duarte & Oliveira (2010) argue that English-type resultatives are also possible in Portuguese, and the main verb has to be factitive ("*verbos factitivos*", 2010: 404) or unaccusative, as in (39)[13].

(39) a. O arquiteto construiu a cisterna oculta.
the architect constructed the cistern hidden
'The architect constructed the cistern hidden.'

b. O pintor pintou a paisagem esfumada.
the painter painted the scenery smoky
'The painter painted the scenery smoky.'

c. O tomateiro cresceu inclinado.
the tomato grew inclined
'The tomato grew inclined.'

(Duarte & Oliveira, 2010)

These examples are resultative-like since they contain both a verb denoting the causing activity (e.g., 'construct', 'paint', 'grow') and a result (e.g., 'hidden', 'smoky', 'inclined'). However, they differ from English resultatives such as *John hammered the metal flat* and Chinese resultatives (i.e., CR V-Vs) in a few ways. First of all, the causing predicate and the result predicate in (39) actually refer to the same event. Taking (39a) as an example, 'constructing the cistern' and 'the cistern being hidden' should not be considered as two separate events: more specifically, 'being hidden' is the way how the cistern was constructed. Rather than indicating the result, the second predicate seems to specify the main activity by indicating how the activity is conducted. We will call the examples in (39) "pseudo-resultatives" (see Carrier & Randall, 1992; in a similar sense as "spurious resultatives" in Washio (1997), or "adverbial resultatives" in Kratzer (2005)). In addition, they do not express the meaning that the activity is performed to such an extent that it causes the result to occur, as in true resultatives.

[13] The English translation is provided by us.

The Portuguese examples in (37) also illustrate pseudo-resultatives, since the prepositional phrase describes the main activity instead of indicating a result brought about by it. We may adopt the "How" test (see Kratzer, 2005; Marcelino, 2014) to see this difference between pseudo-resultatives and true resultatives more clearly: since the result part in pseudo-resultatives are adverbial-like, they normally can be proper answers of the "How" questions in (40), in contrast to the true resultatives in English (41) and Chinese (42).

(40) a. *O João cortou a carne em fatias*.
the John cut the meat in slices
'John cut the meat in slices.'

b. - 'How did he cut the meat?'
- *Em fatias*.
in slices
'In slices.'

(41) a. *He wiped the table clean*.

b. – 'How did he wipe the table?'
– **Clean*.

(42) a. 那 个 人 射 死 了 他。
Na ge ren she si le ta.
that CLF person shot dead ASP he
'That person shot him dead.'

b. – 'How did that person shoot him?'
– *死 了。
**Si le*.
die ASP
*'Dead.'

In addition, since the result part in a pseudo-resultative simply describes the activity involved in the main verb, the sentence would remain acceptable if the result is removed (43). In contrast, true resultatives may become agrammatical when the result predicate is removed (44).

(43) a. *O João cortou a carne (em fatias).*
the John cut the meat (in slices)
'John cut the meat (in slices).'
b. *O João pintou a parede (de amarelo).*
the John painted the wall (of yellow)
'John painted the wall (yellow).'

(44) a. *The joggers ran the pavement *(thin).*
b. 他 哭 *(瞎) 了 眼睛。
*Ta ku *(xia) le yanjing.*
he cry *(blind) ASP eyes
'He cried his eyes *(blind).'

The only productive resultative construction in Portuguese seem to be the ones formed with light verbs such as *fazer* 'do, make', *pôr* 'put' or *tornar* 'turn', as exemplified in (45)[14]. We will call them "simple resultatives" (terminology from Mateu, 2012). The difference between simple resultatives and true resultatives is that simple resultatives do not contain Manner.

(45) a. *O aluno fez a pintura esborratada.*
the student made the painting smudged
'The student made the painting smudged.'
b. *O esforço pôs o João cansado.*
the effort put the John tired
'The effort made John tired.'

(Duarte & Oliveira, 2010)

In contrast to Portuguese, Chinese is very productive in forming resultatives, namely the CR V-Vs. The transitive (46a, c) and intransitive (46b), subject-oriented (46b, c) and object-oriented (46a), strong (46b) and weak (46a, c) resultatives are all attested in Chines (a more detailed presentation of Chinese CR V-Vs can be found in Chapter 3).

[14] The English translation is provided by us.

(46) a. 他 洗 干净 了 衣服。

Ta xi ganjin le yifu.

he wash clean ASP clothes

'He washed the clothes clean.'

b. 他 唱 哭 了。

Ta chang ku le.

he drink drunk ASP

'He got drunk from drinking alcohol.'

c. 他 喝 醉 酒 了。

Ta he zui jiu le.

he drink drunk alcohol ASP

'He got drunk from drinking alcohol.'

2.2.3 Talmy's typology

To explain the contrast between Portuguese and Chinese regarding resultatives, we will first introduce the binary typology established by Talmy (1985, 1991, 2000), which is highly related to motion events and also applies to resultatives.

According to Talmy, an event consists of a framing event and a supporting event, and the latter bears a support relation to the former. The framing event is further composed of some cross-linguistically universal semantic components – figure entity, ground entity, activating process, and association function. For example, in motion events, the framing event is composed of Figure, Ground, Motion, and Path, while Manner and Cause constitute the supporting event. In a motion event, the Figure moves from a certain place via a certain Path and ends in another place denoted by the Ground.

Languages differ in how the different semantic components are encoded in surface verbs: a motion verb can encode Motion + Path, Motion + Manner, and Motion + Figure. Based on the perspective of the motion-actuating typology, when the main verb is held constant, languages can be classified as Path conflated type and Manner conflated type. For example, English corresponds to the Manner conflated type, with the co-event fused with the framing event, as shown in (47a); Spanish belongs to the Path conflated type, with the co-event being an external subordinate unit to the framing event, as shown in (47b). The Manner conflated pattern is restricted in Spanish, as in (47c).

(47) a. *John danced into the room*. (English)
[Figure Motion+Manner Path Ground]

b. *Juan entró en la habitación bailando*. (Spanish)
John entered in the room dancing
[Figure Motion+Path Ground] [Manner]
'Juan danced into the room.'

c. **Juan bailó a la habitación*. (Spanish)
John danced to the room
[Figure Motion+Manner Path Ground]
Intended: 'Juan danced into the room.'

(adapted from Fan, 2013)

From the perspective of the motion-framing typology, according to which the core schema is held constant, languages can be classified as either verb-framed or satellite-framed. In verb-framed languages, the core schema (i.e., the Path), is encoded in the main verb; in satellite-framed languages, Path is syntactically realized by the satellites, which are defined as "certain immediate constituents of a verb root other than inflections, auxiliaries, or nominal arguments" (Talmy, 1985: 102). Romance, Semitic, Japanese, Tamil, Polynesian, most Bantu, most Mayan, Nez Perce, and Caddo are classified as verb-framed languages; satellite-framed languages include Finno-Ugric, Chinese, Ojibwa, Warlpiri, and Indo-European languages except for Romance (Talmy, 1991).[15] In (47a), an example in English, which is a satellite-framed language, the Path component is instantiated by the preposition as the satellites, while Manner is conflated with the Motion. In (47b), an example in Spanish, which is a verb-framed language, Path is conflated with the Motion, while the Manner component is introduced by a subordinate adjunct. As shown in (47c), the satellite frame is not acceptable for Spanish. Talmy (1991) also points out that although English also has Path verbs that can directly gloss the Spanish Path verbs, their use is less colloquial and is mainly borrowed from Romance languages, such as *enter*, *exit*, *ascend*, *descend*, *pass*, *cross*, and *return*.

[15] However, Folli & Harley (2005) presented counterexamples in Italian, arguing that some verbs of motion in Italian can form a goal of motion interpretation, although this possibility does not extend to all verbs of motion, as shown by the contrast in the following:

(i) *Gianni è corso nel bosco in un secondo.*
John is run$_{PAST}$ into.the woods in one second
'John ran into the woods in one second.'

(ii) **Gianni è camminato nel bosco.*
John is walk$_{PAST}$ into.the woods
Intended: 'John walked into the woods.' (Folli & Harley, 2005)

This typological distinction between motion verbs also has an impact on resultatives. In this case, the Ground has an abstract meaning (the end state). For example, in the English example in (48a), the Manner is conflated with Motion, and the core schema (Path + Ground) appears as satellites; contrastingly, in the Spanish example in (48b), the core schema is conflated into the main verb, and Manner appears externally.

(48) a. *I* *kicked* *the door* *shut*. (English)[16]
[Figure Motion+Manner Patient Path+Ground]

b. *Cerré* *la puerta de una patada*. (Spanish)
closed.1SG the door by one kick
[Motion+Path+Ground[17] Patient] [Manner]
'I closed the door with a kick.'

(Talmy, 1991)

Based on Talmy's typology, we can observe that Portuguese is a Path-conflated and verb-framed language (along with Spanish), contrasting to Chinese, which is a Manner-conflated and satellite-framed language (along with English).[18] As illustrated in (49), the Manner-conflated or satellite-frame pattern is possible for motion events in Chinese (49a) but is restricted in Portuguese (49b). In Portuguese, if Manner is present, it tends to appear externally, as in (49c).

(49) a. 孩子 跑 进 了 房间。 (Chinese)
Haizi *pao* *jin* *le* *fangjian.*
child run enter ASP room
[Figure Motion+Manner Path Ground]
'The child ran into the room.'

[16] In English, it is also acceptable to say *I shut the door with a kick.*
[17] The result element is analogous to the Path + Ground of a Motion event since it is "the combination of the transition-type plus the state" (Talmy, 1991: 496).
[18] According to Talmy (1985, 1991, 2000), Chinese is a satellite-framed language. However, Tai (2003) argues that Chinese is "primarily a verb-framed language and only secondarily a satellite-framed language", and the classification depends on whether V1 or V2 is treated as the "main verb" (2003: 311). Slobin (2004) revisited the typology by proposing that there is a third type, namely the equipollently-framed pattern (i.e., Path and Manner are expressed by equivalent grammatical forms), and that the serial-verb languages such Chinese belong to this type. Authors who favor Chinese as a satellite-framed language include Shi (2002), Xu (2008), Zhou (2007), among others.

b. #O *João* *correu* *para* *a* *sala*.[19] (Portuguese)
the John ran to the room
[Figure Motion+Manner Path Ground]
Intended: 'John ran into the room.'

c. O *João* *entrou* *na* *sala* *a* *correr*. (Portuguese)
the John entered in-the room PREP run
[Figure Motion+Path Ground] [Manner]
'John entered the room, running.'

This typological distinction could also explain the contrast between Portuguese and Chinese in resultatives. In the Chinese example in (50a), Manner is conflated with Motion, and the core schema (Path + Ground) appears as satellites. However, this pattern is not available in Portuguese (50b). In Portuguese, the core schema is conflated with Motion, and Manner can only appear externally, as shown in (50c).

(50) a. 孩子 踢 开 了 门。 (Chinese)
Haizi *ti* *kai* *le* *men.*
child kick open ASP door
[Figure Motion+Manner Path+Ground Patient]
'The child kicked the door open.'

b. #O *João* *pontapeou* *a porta* *aberta*[20]. (Portuguese)
the John kicked the door open
[Figure Motion+Manner Patient Path+Ground]
Intended: 'John kicked the door open.'

c. *O João abriu a porta {pontapeando-a}/{com um pontapé}.*
the John opened the door {kicking.it} /{with a kick}
[Figure Motion+Path+Ground Patient] [Manner]
'John opened the door {(by) kicking it}/{with a kick}.'

[19] This sentence is grammatical, but the prepositional phrase only specifies the direction without involving a Ground meaning.
[20] In this case, the adjective *aberta* 'open' is not intended to form an NP with the noun *porta* 'door' (which would be a grammatical and pragmatically adequate sentence) but to function as a result predicate in the sentence.

Chinese shows strong satellite-framed features and regularly uses its satellites to specify Path, aspect, change of state, some action correlation, and realization (Talmy, 1991).[21] Some Portuguese verbs which contain both action and fulfillment in the meaning (e.g., *matar* 'to kill') may have Chinese counterparts that need to employ satellites (e.g., 杀死 *sha si* 'kill-die', see §2.1.2). In §2.1, we presented several cases where Portuguese single verbs correspond to Chinese expressions in complex forms, such as the CR V-Vs. The verb-framed and satellite-framed distinction between Portuguese and Chinese can partly provide an explanation.

In summary, the verb-framed and satellite-framed typology provides us with insights on two cases where Portuguese and Chinese differ: 1) Many Portuguese verbs contain Path, which is usually expressed by satellites in Chinese; as a result, some Portuguese verbs might have Chinese counterparts in complex forms, such as CR V-Vs. 2) Chinese allows Manner to conflate with Motion, whereas this possibility is highly restricted in Portuguese. Consequently, while Chinese can form productive resultatives, Portuguese is very restricted: in Portuguese, only simple resultatives are productive because no Manner in involved; if Manner is overtly expressed, it has to occur externally (e.g., in subordinating adjuncts).

2.3 Summary

In terms of causatives, we have observed that Chinese and Portuguese both exhibit productive syntactic causatives but show quite a significant variation in morphological and lexical causatives – in particular, the causation of change of state. Portuguese exhibits a great deal of verbs (including morphological and lexical causatives) that intrinsically involve caused-result meanings, whereas the Chinese correspondents usually appear in complex forms.

In general, Chinese simplex verbs tend to denote simplex meanings, either an action or a result, but rarely both (also see Sybesma, 1997; Tai, 1984; a. o.).[22] In contrast, in Portuguese, there are quite a lot of verbs that denote an activity with the implication of a result, such as *sujar* 'to stain' and *matar* 'to kill'. The consequence is that these Portuguese verbs may have

[21] Although both Chinese and English are satellite-framed languages, it seems that the satellite-framed feature is even stronger in Chinese, if we assume that this feature is scalar. For example, the English verbs such as *open* and *kill* contain Path meanings, whereas the Chinese verbs which are used to gloss them may not contain Path.

[22] Although the action meaning and result meaning may co-exist in some verb roots, such as 开 *kai* 'open, be open', pure action meaning without implying a result is still possible, as in:

我 开 门 了， 但是 门 开 不 了。
Wo kai men le, danshi men kai bu liao.
I open door ASP but door open not complete
'I (went to) open the door, but the door couldn't be opened.'

Chinese counterparts only in complex forms, such as the CR V-V, where the component denoting the causing eventuality precedes the result-denoting one.

Portuguese is highly restricted in forming resultatives, in contrast to Chinese. Talmy's (1985, 1991, 2000) typology is able to provide an explanation for this difference. Chinese is a strongly satellite language, which often uses its satellites to specify the end meaning. Consequently, the unitary concept of a Portuguese verb might have a Chinese counterpart with a two-phase concept expressed by a complex verb form, such as the CR V-Vs. In other cases, CR V-Vs may correspond to clauses involving coordination/subordination or gerunds in Portuguese. This is because the conflation of Manner into Motion is allowed in Chinese, but not in Portuguese. In Portuguese, the Manner has to appear as an external constituent.

In the following section, we will discuss the Chinese CR V-Vs in more detail and compare them to the Portuguese correspondents.

3 Chinese Causative Resultative V-Vs (CR V-Vs)

3.1 Definition

Chinese Causative-Resultative V-Vs (CR V-Vs) express a complex event consisting of two subevents, a causing subevent, and a result subevent. The verbal component which indicates the causing eventuality and the one denoting the resulted state appear in adjacency. The order of the two components is fixed: the cause-denoting verb (V1) precedes the result-denoting verb (V2), as illustrated in (1).

(1) a. 他 弄 哭 孩子们 了。
Ta nong ku haizimen le.
he make cry children ASP
'He made the children cry.'

b. 他 唱 哭 孩子们 了。
Ta chang ku haizimen le.
he sing cry children ASP
'He sang, and it made the children cry.'

c. 他 唱 累 了。
Ta chang lei le.
he sing tired ASP
'He sang, and it made him tired.'

d. 他 吃 饱 饭 了。
Ta chi bao fan le.
he eat full meal ASP
'He had meal, and it made him full.'

Semantically, a CR V-V entails that some individual, namely the Causee, undergoes changes and enters a result state defined by V2, and this result came about through the eventuality denoted by V1.

In previous studies, different names have been used for the instances of CR V-Vs, such as "resultative (verb) compound", "resultative V-V compound", "V-V resultative", or "resultative verb construction" (e.g., Chang, 2003, 2007; Cheng, 1997; Cheng & Huang, 1994; Cheng, et

al. 1997; Deng, 2010; Gao, 1997; Huang, 1984, 1992; Lee & Ackerman, 2011; C. Li, 2007, 2009; Y. Li, 1990, ff.; Liu, 2019; Lu, 1977; Nishiyama, 1998; Shibata et al, 2009; Thompson, 1973; Yin, 2010; a. o.), usually without a clear explanation about the applied terminology. As already pointed in §1, in this study, we call this construction "causative-resultative V-V" (CR V-V), where the first part, "causative-resultative (CR)", indicates the semantic meaning of this construction, and the second part "V-V" describes the surface form – two verbs are in adjacency.

The term "V(erb)" applied here has a broader sense than the traditional lexical category of verbs – adjectives will also be included. This is because there is not a clear line between verbs and adjectives in Chinese. First of all, Chinese lacks a morphological system to distinguish word classes. Like verbs, Chinese adjectives can directly function as predicates without using any copula. Some linguists include adjectives into verbs (i.e., intransitive change-of-state verbs) (e.g., Li & Thompson, 1981; Y. Li, 1990; Chao, 1968), whereas Chung (2006) excludes stative verbs (also adjectives) from the notion of "pure verbs". Defining whether a word in a sentence functions as an adjective or a verb has been an ongoing topic in Chinese linguistics. Sometimes, the same word in Chinese could function as a verb or as an adjective in different syntactic contexts (2). The functional category of a formative may be tested out by means of reduplication or adverbial modifiers, but neither way is workable for CR V-Vs because this construction itself restricts such operations: reduplication is not allowed, and individual modifiers of V1/V2 are not prohibited (details will be presented in §3.2.5).

(2) a. 我 看 到 了 一 只 死 鸟。
Wo kan dao le yi zhi si niao.
I see reach ASP one CLF dead bird
'I saw a dead bird.'

b. 那 只 鸟 死 了。
Na zhi niao si le.
that CLF bird die/dead ASP
'That bird died./That bird became dead.'

We will simply adopt Chao's (1968) definition of verbs in Chinese, which is "any word which can be modified by the negative 不 *bu* 'not' or 没 *mei* 'have not or did not' and which can serve as the predicate or the center of a predicative expression" (1968: 663). Therefore, our notion of "V(erb)" in this study includes both verbs and adjectives, leaving the distinction

between these two categories a separate issue for future studies. We will assume that when a CR V-V contains an adjective as its component, this adjective is treated as an intransitive change-of-state V. Nevertheless, the ambiguous distinction between verbs and adjectives will not affect the results of this study. As will be presented in §4, we posit that both V1 and V2 enter into the syntactic computation as acategorial roots.

Despite the various names used to refer to this construction in previous studies, another general problem is that no consensus has been reached regarding which groups of examples should be included under a certain name. Before conducting an extended analysis, we first would like to define what constructions are included or excluded in CR V-Vs according to our definition.

The first group of examples which will be excluded from CR V-Vs are examples like V-来 *lai* 'come'/去 *qu* 'go'/到 *dao* 'up to'/回 *hui* 'return'/进 *jin* 'enter'/出 *chu* 'exit'/起 *qi* 'up, rise'/过 *guo* 'surpass'/开 *kai* 'away', in which V2 specifies the direction or path of the motion denoted by V1, as exemplified in (3a, b). Along with authors such as Lu (1977), Williams (2014), and Yin (2010), we will treat these expressions as directional V-Vs, a category separated from CR V-Vs. In contrast to CR V-Vs, the two Vs of directional V-Vs do not enter a causative relation but jointly denote one motion event. Besides, the two types of V-Vs also differ in semantic compositionality. In directional V-Vs, some of the verbs in the V2 position have different meanings when used independently or cannot form a predicate independently at all (they have grammaticalized into bound elements or derivational suffixes) (see C. Li, 2007; Yin, 2010). Taking (3a) as an example, the component in the V2 position, 开 *kai* 'open', cannot express the meaning of 'away' when used independently, as shown by the unacceptability of (3c). In contrast, both components in CR V-Vs are free constituents, can function as independent verbs, and express the same meanings when used individually.

(3) a. 小猫 跑 开 了。 (directional V-V)
Xiao-mao *pao kai* *le*.
small-cat run open ASP
'The small cat ran away.' (Thompson, 1973)

b. 他 回 来 里斯本 了。 (directional V-V)
Ta *hui lai* *lisiben* *le*.
he return come Lisbon ASP
'He came back to Lisbon.'

c. *小猫　　开　　了。

*Xiao-mao　kai　le.

small-cat　open　ASP

Intended: 'The small cat is away.'

Moreover, as also being observed by various authors (e.g., Lu, 1977; Williams, 2014), directional V-Vs may contain more than two components, which is not possible for CR V-Vs, as shown by the contrast in (4).

(4) a. 小猫　　跑　上　来　　了。 (directional V-V)

Xiao-mao　*pao shang lai*　*le*.

small-cat　run up come　ASP

'The small cat ran up here (towards the speaker).'

b. *他　唱　哭 跑　　孩子们　了。 (CR V-V)

**Ta*　*chang ku pao*　*haizimen*　*le*

he　sing cry escape　children　ASP

Intended: 'He sang, and this made the children cry and escape.'

A further difference is regarding the V-V adjacency. In directional V-Vs, it is possible to insert the perfective aspect marker 了 *le* or an Object between the two constituents, as in (5a, b). In contrast, CR V-Vs require V-V adjacency, and none of these constituents can intervene between the two Vs, as shown by the ungrammaticality of (5c).[23]

(5) a. 小猫　　跑　**了**　　上　　来。 (directional V-V)

Xiao-mao　*pao*　***le***　　*shang lai*.

small-cat　run　**ASP**　up　come

'The small cat ran up here (towards the speaker).'

b. 他　拿　书　来　　了。　(directional V-V)

Ta　*na*　*shu*　*lai*　　*le.*

he　take　book come　ASP

[23] The infix 得 *de* or 不 *bu* may occur between the two Vs in CR V-Vs to form "potential forms", but we do not consider it as a violation of the V-V adjacency requirement (see §3.2.5).

'He brought book(s).'

c. *他 唱 了/歌 哭 孩子们 了。 (CR V-V)

*Ta chang **le/ge** ku haizimen le

he sing **ASP/song** cry children ASP

Intended: 'He sang (a song), and this made the children cry.'

Another case that will be excluded from our study are V-Vs such as V-完 *wan*/见 *jian*/到 *dao*/好 *hao*/掉 *diao*/住 *zhu*/成 *cheng*/了 *liao*, in which V2 denotes the completion or achievement of the action denoted by V1, as exemplified in (6). Along with authors such as Chao (1968), Chen (2008) and Williams (2014), we treat these V-Vs as a category separated from CR V-Vs. More specifically, we consider them as phase V-Vs, which express the "phase" and "achievement" meanings. Instead of denoting a result, V2 in phase V-Vs describes the phase of the action denoted by V1, namely, its completion or at what phase it is carried out. In addition, there is only one eventuality involved in phase V-Vs, while CR V-Vs contain a causing subevent and a result subevent.

(6) a. 碗 洗 好 了。 (phrase V-V)

Wan xi hao le.

dish wash done ASP

'Dishes have been washed up.'

b. 房子 卖 掉 了。 (phrase V-V)

Fangzi mai diao le.

house sell drop ASP

'The house was sold out.'

c. 我 跑 完 了。 (phrase V-V)

Wo pao wan le.

I run finish ASP

'I finished running.'

d. 我 接 到 他 了。 (phrase V-V)

Wo jie dao ta le.

I receive arrive he ASP

'I have received him.'

Moreover, the combinations where a verb is followed by an aspect marker (e.g., perfect aspect marker 了 *le*, continuous/progressive aspect marker 着 *zhe*, experiential/perfective aspect marker 过 *guo*), as in (7), are not considered CR V-Vs. There is no cause-result relation involved, and only one eventuality is expressed.

(7) a. 他 看 着 书。
Ta kan zhe shu.
he read ASP book
'He is reading the book.'
b. 书 看 过 了。
Shu kan guo le.
book read ASP ASP
'The book has been read.'

The verb-complement constructions in which the second constituent is a modifier of the VP, such as the one in (8), are also excluded from CR V-Vs. In contrast to CR V-Vs, the two Vs in these structures do not enter in a cause-result relation. For example, the sentence in (8) cannot be paraphrased as 'the children became stable because of the action of standing', but rather, 'the children are standing in a stable manner'. In addition, (8) only contains one event, which cannot be further subdivided into a causing subevent (i.e., "the children stand") and a result subevent (i.e., "the children became stable"), contrasting to CR V-Vs.

(8) 孩子们 站 稳 了。
Haizimen zhan wen le.
children stand stable ASP
'The children are standing stable.'

Another group of instances that will be excluded are the V-Vs where V1 and V2 have a head-complement relation, with V2 specifying the intention of the activity denoted by V1, as exemplified in (9). We consider them pseudo-resultatives (see §2.2.2). Note that these V-Vs

are marginal with the canonical SVO word order N1 V1 V2 N2 (9a) and become more acceptable when 把 *ba* co-occurs, surfacing as N1 *ba* N2 V1 V2 (9b).[24]

(9) a. ?工人　　染　黄　　了　　布。[25]
? *Gongren* *ran huang* *le* *bu*.
worker dye yellow ASP fabric
Intended: 'Workers dyed the fabric yellow.'
b. 工人　　把　布　　染 黄　　了。
Gongren *ba* *bu* *ran huang* *le.*
workers BA fabric dye yellow ASP
'Workers dyed the fabric yellow.'

To summarize, to be classified as CR V-V, a construction has to meet the following requirements:

(10) a. A cause-result relation: the eventuality denoted by V2 is caused by the eventuality denoted by V1.
b. Semantic compositionality: the meaning of each V-V should be compositionally achieved.
c. One complex event: each V-V expresses one complex event which can be subdivided into a causing subevent and a result subevent.
d. V-V adjacency: the two components which denote the causing event and the result appear in adjacency without the occurrence of any conjunction, adposition, or aspect markers.
e. Both components are free elements: each one of them can form a predicate individually with the

[24] Chinese is an SVO language, and the Object typically is in postverbal position. However, in 把 *ba*-construction, the Object is forced to appear in a preverbal position (see §3.2.5), as shown in the following examples. Semantically, the 把 *ba*-construction imposes emphasis on the impact of the Subject on the Object.
i. 他 吃　　那　个　苹果。
Ta chi le *na ge pingguo*.
he eat ASP that CLF apple
'He ate that apple.'
ii. 他 **把**　那　个　苹果　　吃　了。
Ta ***ba*** *na ge pingguo* *chi* *le*.
he **BA** that CLF apple eat ASP
'He ate that apple.'

[25] We consider this sentence as an instance of pseudo-resultatives (see §2.2), in opposition of true resultatives. This example would become more acceptable if V2 is 黑 *hei* 'black, dark'. In this case, the sentence tends to be interpreted to have a strong resultative meaning, namely 'The workers dyed the fabric, and (accidently) stained it', and is a case of true resultatives. Readers can refer to Yao (2022b) for an in-dept comparison of true resultatives and pseudo-resultatives in Chinese.

same meaning as in CR V-Vs.

f. No other syntactic operation (e.g., 把 *ba* construction) is needed to legitimate the V-V.

There are some instances that are not treated as CR V-Vs by some authors (although different names are used to refer to this construction, such as "resultative verb compound"), but will be included in our discussion. For example, Gu (1992) claims that examples like (11) do not contain causative meanings. In our view, it should be treated as an instance of CR V-Vs since the two Vs enter into a cause-result relation, that the action of 'eating' resulted in the end state of 'being full'.

(11) 张三　　吃 饱　了　饭。

Zhangsan chi bao le fan.

Zhangsan eat full ASP rice

'Zhangsan had a meal, and this made him full.'

In C. Li (2007), the example in (12a) is not considered a CR V-V ("resultative verb compound" in this author's terminology) because what the V2 浅 *qian* 'shallow' expresses is "more a deviation from what is expected than a result" (2007: 12). We argue that the deviation meaning in (12a) should not be a counterargument to its CR V-V status. Independently from CR V-Vs, deviation meanings may be produced by the predicate adjective+*le* (ASP) in Chinese. As shown in (12b), the simple predicate formed with 浅 *qian* 'shallow' and the aspect marker 了 *le* can express either a non-deviation meaning 'shallow' or a deviation meaning 'too shallow', and its interpretation depends on the context. We hold that (12a) does not constitute a construction separated from CR V-Vs, and the deviation meaning only comes from V2. Theoretically, the CR V-V in (12a) should allow both deviation and non-deviation meanings. In practice, only the deviation meaning is acceptable because the non-deviation meaning is not pragmatically plausible: the activity of digging cannot make a hole shallower but only deeper.

(12) a. 张三　　挖 浅　　了　那　个　坑。[26]

Zhangsan wa qian le na ge keng.

Zhangsan dig shallow ASP that CLF pit

[26] The translation in this example has been adapted.

‘Zhangsan dug that pit too shallow.’ (C. Li, 2007)

*‘Zhangsan dug that pit, and this made the pit shallow.’

b. 坑 浅 了。

Keng qian le.

pit shallow ASP

‘The pit became shallow.’

‘The pit is too shallow.

Lin (2004) does not treat examples like (13)[27] as true resultatives, claiming that no causal relation is involved between V1 and V2 and that they simply enter a relation of temporal precedence. However, we argue that (13) does express a causative resultative meaning, and it can be paraphrased as ‘he learned that song as a result of him singing it’.

(13)他 唱 会 了 那 首 歌。

Ta chang hui le na shou ge.

he sing know ASP that CLF song

‘He learned the song through singing it.’

3.2 Properties of CR V-Vs

The Chinese CR V-V has attracted a lot of attention in the past decades due to its complex and interesting properties (see Basciano, 2010; Cheng & Huang, 1994; Fan, 2013; Gao, 1997; Her, 2007; Huang, 1984, 1992; C. Li, 2007; Y. Li, 1990, 1995; Lin, 2004; Liu, 2019; Lu, 1977; Sybesma, 1999; Thompson, 1973; a. o.). Based on previous studies and our own observations, we dedicate this section to a presentation of CR V-Vs’ semantic and syntactic properties.

3.2.1 Productivity

CR V-Vs are highly productive. There is a non-exhaustive list of combinations, and new combinations are readily formed subject to semantic and pragmatic well-formedness. However, it has been observed that not every possible combination is equally natural. As pointed out by Williams (2014), a certain combination may be considered unnatural “because the implied

[27] The word-to-word translation has been adapted.

causal relation seems insufficiently direct, or because the stated result is too surprising" (2014: 316). Some combinations may receive different levels of acceptability from different native speakers. For example, the sentences in (14) are considered unacceptable by the correspondingly cited authors, but are quite acceptable from my perspective, as a native speaker of Chinese.[28]

(14) a. 艰苦的 工作 病 倒 了 滔滔 了。
Jianku-de gongzuo bing dao le Taotao le.
tough work sick fall ASP Taotao ASP
'Tough work (conditions) brought Taotao down with sickness.' (Y. Li, 1995)

b. 那 个 噩梦 哭 醒 了 小 宝宝。
Na ge emeng ku xing le xiao baobao.
that CLF nightmare cry awake ASP little baby
'That nightmare caused the little baby to wake up from crying.' (Liu, 2019: 133)

Nevertheless, in general, a CR V-V is acceptable and interpretable as long as this caused-result event is culturally recognized in the real world, and both components (i.e., V1 and V2) meet the basic requirements (e.g., semantic constraints and the number of syllables, which will be discussed in the following sections). The formation of CR V-Vs is productive and active.

3.2.2 Semantic compositionality and telicity

The meanings of CR V-Vs are compositionally achieved. The functions of V1 and V2 are not commutable: V1 always indicates a cause and V2 a result, but not the other way around. Sometimes V2 is used metaphorically (also see Thompson, 1973). For example, 饱 *bao* 'full' in (15) does not mean the Causee is feeling 'physically full', but rather 'mentally fed up', resulted from watching the boring TV.

(15) 无聊的 电视 看 饱 我 了。
Wuliao-de dianshi kan bao wo le.
boring TV watch full I ASP

[28] The English translation in the examples has been adapted. The Chinese characters were not included in the original text.

‘Watching the boring TV made me tired of it.’

According to Vendler’s (1957, 1967) classification of event types – activity, state, achievement, and accomplishment, the event type of a CR V-V is an achievement (i.e., an event that has an instantaneous culmination or endpoint, without duration) since CR V-Vs are universally telic and do not allow durational adjuncts (6a) nor progressive markers (imperfective aspect markers, e.g., 在 *zai* and 着 *zhe*) (16b, c).

(16) a. *他 唱 哭 我 了 一 个 小时。
**Ta chang ku wo le yi ge xiaoshi.*
he sing cry I ASP one CLF hour
Intended: ‘He sang and made me cry, (which lasted) for one hour.’

b. *他 在 唱 哭 孩子们。
**Ta zai chang ku haizimen.*
he prog.ASP sing cry children
Intended: ‘He was singing, and this was making the children cry.’

c. *他 唱 哭 着 孩子们。
**Ta chang ku zhe haizimen.*
he sing cry prog.ASP children
Intended: ‘He was singing, and this was making the children cry.’

3.2.3 Semantics of V1 and V2

V1 can be transitive or intransitive, unergative or unaccusative; it can denote either a generic or specific meaning; its meanings can be eventive or stative. Consider the following examples:

(17) a. V1 has a generic meaning
他 弄 哭 我 了。
Ta nong ku wo le.
he make cry I ASP
‘He (did something and) made me cry.’

b. V1 is eventive

爸爸 骂 哭 了 妹妹。

Baba ma ku le meimei.

dad scold cry ASP sister

'Dad scolded the sister, and it made the sister cry.'

c. V1 is stative

他 累 病 了。

Ta lei bing le.

he tired ill ASP

'He is so tired that he got ill.'

In contrast, V2 is more constrained: it tends to be unaccusative and telic (also see Ma & Lu, 1997; Xu, 2006). Unergative verbs are not allowed to occur in the V2 position in CR V-Vs. As shown in (18), 困 *kun* 'sleepy' and 傻 *sha* 'stunned' can serve as V2, but the unergative verbs 叫 *jiao* 'scream' and 跳 *tiao* 'jump' are not allowed.

(18) a. 他 唱 困/*叫 孩子们 了。

*Ta chang kun/*jiao haizimen le.*

he sing sleepy/*scream children ASP

'He sang, and this made the children sleepy/*scream.'

b. 他 吓 傻/*跳 孩子们 了。

*Ta xia sha/*tiao haizimen le.*

he scare stunned/*jump children ASP

'He scared the children, and this made the children stunned/*jump.'

However, the verbs 跑 *pao* 'run, escape' and 走 *zou* 'walk, go', which are usually considered verbs of action, may serve as V2 in CR V-Vs. We argue that these verbs, when serving as V2 in CR V-Vs, are actually unaccusative. For instance, the verb 跑 *pao* in Chinese has both unergative and unaccusative uses, with the meanings of 'to run' and 'to escape' respectively. When being in the V2 position in a CR V-V, only the unaccusative use is legitimated, as shown in (19).

(19) 他 弄 跑 犯人 了。
ta nong pao fanren le.
he make escape/*run prisoner ASP
'He made the prisoner escape/*run.'

The same applies to the verb 走 *zou*, which has an unergative use with the meaning 'to walk, to go', and an unaccusative meaning 'to disappear, be gone'. When serving as V2 in a CR V-V, only the unaccusative use is acceptable. Other unaccusative verbs which can appear in the V2 position include 飞 *fei* 'to fly', 化 *hua* 'to melt', 醒 *xing* 'to wake up', 倒 *dao* 'to fall', and 死 *si* 'to die'.

Interestingly, the verbs 笑 *xiao* 'to laugh' and 哭 *ku* 'to cry', whose counterparts in English and Portuguese are unergatives, can serve as V2 in CR V-Vs, as shown in (20).

(20) a. 他 唱 哭 我 了。
Ta chang ku wo le.
he sing cry I ASP
'He sang, and this made me cry.'
b. 他 逗 笑 我 了。
Ta dou xiao wo le.
he amuse laugh I ASP
'He amused (me), and this made me laugh.'

This can be explained if we view the restriction on V2 as a semantic constraint. Since V2 denotes a result, it should be telic, expressing the meaning of an end state or a change of state. We agree with Xu (2006) that a verb should include an endpoint [+end] in its semantic meaning to be able to take the V2 position in CR V-Vs. The acceptability of the verbs 笑 *xiao* 'to laugh' and 哭 *ku* 'to cry' in the V2 position is because both verbs can express the meaning of an end state in Chinese. Even though 'crying' and 'laughing' are actions, these two verbs may also imply caused emotional states (e.g., 'sad', 'happy', 'amused'), which involve telicity. This contrasts with the pure action verbs such as 叫 *jiao* 'scream', which do not imply any endpoint and are not legit candidates for V2 in CR V-Vs, as illustrated in (18). We claim that the verbs 笑 *xiao* 'to laugh' and 哭 *ku* 'to cry' have both unergative and unaccusative uses in Chinese.

Their unaccusative use can be evidenced by the possibility of taking the unaccusative marker 给 *gei*, as in (21).

(21) a. 看，孩子 给 笑 了。
Kan, haizi gei xiao le.
look, child UNAC laugh ASP
'Look, the child got to laugh.'

b. 生日 惊喜 让 爸爸 给 哭 了。
Shengri jingxi rang baba gei ku le.
birthday surprise make dad UNAC cry ASP
'The birthday surprise made dad get to cry.'

The very few transitive verbs which can serve as V2 are mostly psych verbs implying an end state, such as 懂 *dong* 'to understand', 明白 *mingbai* 'to understand', 会 *hui* 'to know', 赢 *ying* 'to win', as exemplified in (22). This can also be attributed to the semantic constraint. These psych verbs all imply an end state and therefore are legitimate candidates for V2 in CR V-Vs.

(22) a. 他 听 会 了 那 首 歌。
Ta ting hui le na-shou ge.
he listen know ASP that song
'He mastered the song by listening to it.'

b. 他 跑 赢 了 妹妹。
Ta pao ying le meimei.
he run win ASP sister
'He won the sister in running.'

3.2.4 "Small-size" constraint

In CR V-Vs, both V1 and V2 tend to be monosyllabic. For instance, the monosyllabic verb 跑 *pao* and the disyllabic 逃跑 *taopao* both can have the meaning of 'to escape', but the disyllabic

one is much less acceptable than the monosyllabic one when occurring in the V2 position in CR V-Vs, as shown by the contrast in (23).

(23) 他 唱 跑/??逃跑 孩子们 了。
Ta chang pao/??taopao haizimen le.
he sing escape children ASP
'He sang, and this made the children escape.'

The contrast also occurs between the monosyllabic verb 哭 *ku* and the disyllabic counterpart 哭泣 *kuqi*, both expressing the meaning of 'to cry':

(24) 'He did (something), and this made the children cry.'
a. 他 弄 哭 了 孩子们。 (monosyllabic V2)
Ta nong ku le haizimen.
he make cry ASP children
b. *他 弄 哭泣 了 孩子们。 (disyllabic V2)
**Ta nong kuqi le haizimen.*
he make cry ASP children

Such a size constraint also applies to V1, as shown by the acceptability contrast in (25). The monosyllabic verb 跑 *pao* and the disyllabic verb 跑步 *paobu* both have the meaning of 'to run', but the disyllabic one is not allowed to occur in the V1 position, contrasting with the monosyllabic counterpart.

(25) 他 跑/*跑步 累 了。
*Ta pao/*paobu lei le.*
he run tired ASP
'He got tired by running.'

However, exceptions can be found. The examples in (26) contain a disyllabic V2, but the acceptability is maintained.

(26) a. 他 说 习惯 英语 了。

Ta shuo xiguan yingyu le.

he speak be-used-to English ASP

'He has been speaking English, and this made him used to it.'

b. 我 看 明白 一 个 道理。

Wo kan mingbai yi ge daoli.

I look understand one CLF truth

'I looked (at something), and this made me understand a truth.'

c. 我 听 糊涂 了。

Wo ting hutu le.

I listen confused ASP

'I listened (to something), and this made me confused.'

Nevertheless, these exceptions are limited to only a few words. There is a general tendency that a CR V-V is disyllabic, with each component being monosyllabic. We will name this constraint the "small-size" constraint.

3.2.5 V-V adjacency and V-V integrity

The "V-V adjacency" refers to the requirement that the V1 and the V2 in CR V-Vs occur in adjacency. The "V-V integrity" means each CR V-V functions as one verbal unit with one polarity, and neither V1 nor V2 can be modified or extracted independently.

The V-V adjacency property of CR V-Vs is evidenced by that V1 and V2 cannot be intervened by aspect markers (27a), adverbial modifiers (27b), or nominals (27c).

(27) a. *他 唱 了 哭 孩子们。

**Ta chang le ku haizimen.*

he sing ASP cry children

Intended: 'He sang, and this made the children cry.'

b. *他 唱 大声 哭 孩子们 了。

**Ta chang dasheng ku haizimen le.*

he sing loud cry children ASP

Intended: 'He sang, and this made the children cry loudly.'[29]

c. *他 唱 这 首 歌 哭 孩子们 了。

*Ta chang zhe shou ge ku haizimen le.

he sing this CLF song cry children ASP

Intended: 'He sang this song, and this made the children cry.'

The V-V integrity property is supported by the fact that an adverbial modifier cannot modify only V1 or V2 in CR V-Vs, even if the V-V adjacency is not violated, as in (28a-b). Any adverbial modifier that occurs with a CR V-V should have scope over the whole caused-result event, instead of only the causing eventuality denoted by V1 or the result encoded in V2. For this reason, the adverbial modifiers such as 渐渐地 *jianjiande* 'gradually' and 突然 *turan* 'suddenly', which usually modify an event of achievement or accomplishment, may occur with CR V-Vs, as shown in (28c, d).

(28) a. *菜 太 辣 哭 了 孩子。

*Cai tai la ku le haizi.

dish too spicy cry ASP child

Intended: 'The dish is too spicy, and this made the child cry.'

b. *他 唱 哭 很 久 孩子们 了。

*Ta chang ku hen jiu haizimen le.

he sing cry very long children ASP

Intended: 'He sang, and this made the children cry for a long time.'

c. 衣服 渐渐地 洗 累 了 姐姐。

Yifu jianjiande xi lei le jiejie.

clothes gradually wash tired ASP sister

'Gradually, washing the clothes made the sister tired.'

d. 他 突然 喝 醉 了。

Ta turan he zui le.

he suddenly drink drunk ASP

'He suddenly got drunk from drinking.'

[29] In Chinese, adverbial modifiers normally precede the modified VPs. For this reason, an intervening adverbial modifier in CR V-Vs can only attempt to modify V2. As will be shown later in this section, this sentence also violates the V-V integrity constraint that a VP modifier should have the scope over the whole V-V.

Moreover, neither V1 nor V2 is extractable via *wh*-movement or topicalization, as shown in (29).

(29) a. 他 唱 哭 孩子们 了。
Ta chang ku haizimen le.
he sing cry children ASP
'He made the children cry by singing.'

b. *他 怎么 哭 孩子们 了？
**Ta zenme ku haizimen le?*
he how cry children ASP
'How did he make the children cry?'

Each CR V-V shows tight integrity and can undergo further operations as one verbal unit. For instance, 被 *bei* and 给 *gei* are passive markers in Chinese and can license the movement of an internal argument to the position of the matrix subject (30b). Each CR V-V, as one verbal unit, can also be passivized, as shown in (31b).

(30) a. 我 吃 了 米饭。
Wo chi le mifan.
I eat ASP rice
'I ate rice.'

b. 米饭 被/给 我 吃 了。
Mifan bei/gei wo chi le.
rice BEI/GEI I eat ASP
'The rice was eaten by me.'

(31) a. 他 唱 哭 孩子们 了。
Ta chang ku haizimen le.
he sing cry children ASP
'He sang, and this made the children cry.'

b. 孩子们　被/给　他　唱　哭　了。
Haizimen bei/gei ta chang ku le.
children BEI/GEI he sing cry ASP
'The children were made to cry by his singing.'

In addition, CR V-Vs can also form 把 *ba*-constructions. Chinese is an SVO language, and the Object tends to occur in a post-verbal position. In the 把 *ba*-construction, the morpheme 把 *ba* legitimates the occurrence of the Subject on its left and the Object on its right, surfacing as S *ba* O V, as shown in (32a).[30] Semantically, the 把 *ba*-construction imposes emphasis on the impact of the Subject on the Object. Like single verbs, Chinese CR V-Vs can also undergo this syntactic operation, as shown in (32b).

(32) a. 他　把　米饭　吃　了。
Ta ba mifan chi le.
he BA rice eat ASP
'He ate the rice.'
b. 他　把　孩子们　唱　哭　了。
Ta ba haizimen chang ku le.
he BA children sing cry ASP
'He made the children cry by singing.'

The V-V adjacency and V-V integrity constraints are further supported by the impossible embedded negation in CR V-Vs, as in (33).

(33) *他　唱　<u>没有</u>　哭　孩子们。
**Ta chang <u>meiyou</u> ku haizimen.*
he sing <u>not</u> cry children
Intended: 'He sang, and this made the children not cry (anymore).'

[30] There have been a lot of debates on the nature of 把 *ba*. The existing hypotheses include lexical verb, light verb, preposition, or functional head. Readers may refer to Chao (1968), Gao (1997), Huang (1982), Li & Thompson (1981), Xiong (2003), Zou (1993), among others, for different views. The *ba*-construction also has been analyzed as serial verbs in some studies (e.g., Li, 1997). Here we call it "morpheme' without holding a strong position on this claim.

One apparent violation of the V-V adjacency or integrity might be the "potential forms", where the morpheme 得 *de* or 不 *bu* appears between V1 and V2, producing the meaning of 'the result V2 can/cannot be brought about by the eventuality denoted by V1', as exemplified in (34).

(34) a. 他 唱 得 哭 孩子们。 (positive potential form)
Ta chang de ku haizimen.
he sing DE cry children
'He is able to make the children cry by singing.'

b. 他 唱 不 哭 孩子们。 (negative potential form)
Ta chang bu ku haizimen.
he sing not cry children
'He is not able to make the children cry by singing.'

The potential form has been claimed to have a derivational relation with CR V-Vs (e.g., Anderson, 1985; Thompson, 1973). I follow Shi (2002) and consider 得 *de* and 不 *bu* as infixes. Note that 得 *de* and 不 *bu* may also occur in some lexicalized compound verbs, such as 讲和 *jianghe* 'to become reconciled'. Despite being one verb, it shows semi-compositionality, with one component meaning 'to talk' and the other 'to be in harmony with'. As shown in (35), 得 *de* or 不 *bu*, as infixes, may occur between the two components in this verb.

(35) a. 他们 讲和 了。 (lexicalized compound verb)
Tamen jianghe le.
they reconcile ASP
'They became reconciled.'

b. 他们 讲得和 吗？ (potential form)
Tamen jiang-de-he ma?
they talk-DE-harmony PART
'Are they able to become reconciled?

Therefore, I argue that 得 *de* or 不 *bu* in potential forms are infixes, whose occurrence is not a violation of word hood or word integrity and should not be considered a violation of V-V adjacency or V-V integrity of CR V-Vs.

Besides, the negative potential form with the negation marker 不 *bu*, as in (34b), is not a case of embedded negation. Semantically, the negative potential form in (34b) expressed the meaning 'he tries to make the children cry by singing, but he is not able to make it happen', while an intended embedded negation is supposed to produce the meaning 'he made the children not cry anymore by singing', as in (33).

To sum up, the V-V adjacency in CR V-Vs is evidenced by that no constituent can intervene between V1 and V2 (except for infixes). The V-V integrity is supported by the following facts: there is only one aspect and one polarity; adverbial modifiers can only have scope over the whole V-V, but not over V1 or V2 individually; neither V1 nor V2 can be extracted independently.

3.2.6 Flexibility in thematic relations

The transitivity of a CR V-V is not determined by V1. A CR V-V may be transitive (both Causer and Causee are overt) or intransitive (with overt Causee only) regardless of the transitivity of V1. For example, an intransitive V1 may form transitive CR V-Vs, as in (36a); alternatively, a transitive V1 may form intransitive CR V-Vs, as in (36b).

(36) a. 他 喊 哭 我 了。
Ta han ku wo le.
he scream cry I ASP
'He screamed, and this made me cry.'

b. 手机 用 坏 了。
Shouji yong huai le.
cellphone use broken ASP
'The cellphone got broken from being used.'

In transitive V-Vs, which surface as N1 V1 V2 N2, the thematic relations between the two nominals (N1, N2) and the two verbs (V1, V2) seem to show a certain level of flexibility. According to the data in the literature (e.g., Cheng & Huang, 1994; Fan, 2013; Her, 2007; Y.

Li, 1990, 1995; Lin, 2004; Liu, 2019; a. o.) and our observations, the possible theta-relations in transitive and intransitive CR V-Vs are summarized in Table 1.

Transitivity		θ-relations	Type	Examples
Transitive	Object-oriented (N2 is Causee)	V1 {N1} V2 {N2}	I	(i) a. 她 哭 湿 了 衣服。 *Ta ku shi le yifu.* she cry wet ASP clothes 'She cried, and this made the clothes wet.' b. 他 唱 哭 妹妹 了。 *Ta chang ku meimei le.* he sing cry sister ASP 'He sang, and this made the sister cry.'
		V1 {N1, N2} V2 {N2}	II	(ii) a. 他 踢 开 了 门。 *Ta ti kai le men.* he kick open ASP door 'He kicked the door open.' b. 他 教 会 妹妹 了。 *Ta jiao hui meimei le.* he teach know sister ASP 'He taught the sister, and this made the sister know (how to do it).'
		V1 {N2, N1} V2 {N2}	III	(iii) a. 这 本 书 看 累 他了。 *Zhe ben shu kan lei ta le.* this CLF book read tired he ASP 'Reading this book made him tired.' b. 电影 看 哭 她 了。 *Dianying kan ku ta le.* movie watch cry she ASP 'Watching the movie made her cry.'
		V1 {*pro*, N1} V2 {N2}	IV	(iv) a. 这 首 歌 唱 哭 她 了。 (someone else is singing) *Zhe shou ge chang ku ta le.* this CLF song sing cry she ASP 'This song's singing (by someone else) made her cry.' b. 这 个 演讲 说 晕 她 了。 (someone else is speaking) *Zhe ge yanjiang shuo yun ta le.* this CLF speech say confused she ASP 'This said speech (by someone else) made her confused.'
		V1 {N2} V2 {N2}	V	(v) a. 噩梦 哭 醒 她 了。 *Emeng ku xing ta le.* nightmare cry wake she ASP 'The nightmare made her wake up from crying.' b. 这 瓶 酒 醉 晕 他 了。 *Zhe ping jiu zui yun ta le.* this bottle alcohol drunk dizzy he ASP 'This bottle of alcohol made him dizzy from being drunk.'
	Subject-oriented	V1 {N1, N2} V2 {N1, N2}	VI	(vi) a. 他 看 懂 这 本 书 了 *Ta kan dong zhe ben shu le.*

	(N1 is Causee)			he read understand this CLF book ASP 'He got to understood this book from reading it.' b. 他 学 会 英语 了 *Ta xue hui yingyu le.* he learn know English ASP 'He got to know English from learning it.'
		V1 {N1} V2 {N1, N2}	VII	(vii) a. 他 跑 赢 妹妹 了 *Ta pao ying meimei le.* he run win sister ASP 'He won the sister by running.' b. 他 躺 赢 了 比赛 *Ta tang ying le bisai.* he lie win ASP competition 'He won the competition by being lying down (i.e., by doing nothing).'
		V1 {N1, N2} V2 {N1}	VIII	(viii) a. 他 吃 饱 饭 了 *Ta chi bao fan le.* he eat full rice ASP 'He got full from eating (rice).' b. 他 喝 醉 酒 了 *Ta he zui jiu le.* he drink drunk alcohol ASP 'He got drunk from drinking alcohol.'
Intransitive		V1 {N1} V2 {N1}	IX	(ix) a. 她 唱 哭 了 *Ta chang ku le.* she sing cry ASP 'Singing made her cry.' b. 他 累 晕 了 *Ta lei yun le.* he tired dizzy ASP 'Being tired made him dizzy.'
		V1 {*pro*, N1} V2 {N1}	X	(x) a. 手机 用 坏 了 *Shouji yong huai le.* cellphone use broken ASP 'The cellphone got broken from being used.' b. 门 踢 开 了 *Men ti kai le.* door kick open ASP 'The door was kicked open.'
		V1 {*pro*} V2 {N1}	XI	(xi) a. 门 弄 开 了 *Men nong kai le.* door make open ASP 'The door got open (by someone).' b. 衣服 哭 湿 了 *Yifu ku shi le.* clothes cry wet ASP 'The clothes got wet from (someone's) crying'

Table 1 - Possible theta relations between N1, N2, V1, V2

It can be observed that in many transitive CR V-Vs, N1 is interpreted as the Subject of V1 (the types I, II, VI, VII, VIII). However, sometimes N1 is interpreted as the Object of V1 (the types III, IV), and in other cases, N1 may not have any theta-relation with V1 (the type V).

With respect to V2, which denotes the result, at least one argument of it is overt in the sentence – it is interpreted as the Causee. In intransitive CR V-Vs, V2 is predicated of N1 since N1 is the only overt nominal in the sentence (the types IX, X, XI). When a CR V-V is transitive, in most cases, N2 is interpreted as an argument of V2, namely the Causee (the types I, II, III, IV, V) – these V-Vs are Object-oriented resultatives. However, in other transitive CR V-Vs, N1 is interpreted as the Causee (the types VI, VII, VIII) – they are Subject-oriented resultatives.

Nevertheless, although the theta-relations in CR V-Vs show a certain level of flexibility, constraints still exist. In other words, the thematic patterns in Table 1 are not always possible even if such relations are accessible to a certain set of N1, N2, V1, and V2. For example, although the thematic patterns of Type II and VIII are both semantically compatible with the NPs and Vs in (37a, b), the CR V-V in (37a) allows the interpretation of Type VIII but not Type II, whereas the CR V-V in (37b) allows Type II but not Type VIII. Interestingly, no matter the V-V is 'fight-win' or 'fight-lose', the meaning remains to be 'N1 won over N2, and N2 lost'. We hypothesize that these CR V-Vs are undergoing a lexicalization process, which makes the possible thematic patterns more "fixed".

(37) a. 他 打 贏 我 了。
Ta da ying wo le.
he fight win I ASP
*'He fought with me and I won.' (Type II)
'He fought with me and he won.' (Type VIII)

b. 他 打 败 我 了。
Ta da bai wo le.
he fight lose I ASP
'He fought with me and I lost.' (Type II)
*'He fought with me and he lost.' (Type VIII)

Due to the flexibility in thematic relations between N1, N2, V1, V2, some CR V-Vs might be interpretated in several ways, and the possible interpretations might show different degrees of acceptability. Consider the following examples:

(38)这 女孩 追 累 我 了。

Zhe nvhai zhui lei wo le.

this girl chase tired I ASP

a. ??‘This girl chased me, and this made her tired.’ (Type VIII)

b. ‘This girl chased me, and this made me tired.’ (Type II)

c. *‘I chased this girl, and this made her tired.’ (inaccessible type)[31]

d. ‘I chased this girl, and this made me tired.’ (Type III)

(39)医生 等 急 我 了。

Yisheng deng ji wo le.

doctor wait anxious I ASP

a. ‘The doctor waited for me, and this made the doctor anxious.’ (Type VIII)

b. *‘The doctor waited for me, and this made me anxious.’ (Type II)

c. *‘I waited for the doctor, and this made the doctor anxious.’ (inaccessible type)

d. ‘I waited for the doctor, and this made me anxious.’ (Type III)

(40)他 骑 累 马 了。

Ta qi lei ma le.

he ride tired horse ASP

a. ‘He rode a horse, and this made him tired.’ (Type VIII)

b. ‘He rode a horse, and this made the horse tired.’ (Type II)

(41)女儿 想 哭 妈妈 了。

Nv’er xiang ku mama le.

daughter miss cry mom ASP

a. ?The daugher missed (her) mom, and this made the daughter cry. (Type VIII)

b. *The daugher missed (her) mom, and this made the mom cry. (Type II)

c. *The mom missed (her) daughter, and this made the daughter cry. (inaccessible type)

d. The mom missed (her) daughter, and this made the mom cry. (Type III)

[31] The intended thematic pattern is not attested in any acceptable CR V-Vs and thus is not found in Table 1.

3.2.7 Causative alternation

The phenomenon of causative alternation in CR V-Vs has been noted by some authors (e.g., Basciano, 2010; Cheng & Huang, 1994; Huang, 1988, 1992, 2006; Liu, 2019; Tang, 2002; Yin, 2011). As shown in the following examples, some CR V-Vs allow causative alternation (42), but others do not (43).

(42) a. 妈妈 打 碎 杯子 了。
Mama da sui beizi le.
mom hit break cup ASP
'Mom broke the cup.'

b. 杯子 打 碎 了。
Beizi da sui le.
cup hit break ASP.
'The cup got broken.'

(43) a. 张三 杀 死 了 李四。
Zhangsan sha si le Lisi.
Zhangsan kill die ASP Lisi
'Zhangsan killed Lisi, and Lisi died.'

b. *李四 杀 死 了。
**Lisi sha si le.*
Lisi kill die ASP
Intended: 'Lisi got killed and died.'

There are also cases in which some intransitive CR V-Vs have marginal transitive forms, whose level of acceptability varies among Chinese native speakers. In (44) and (45), the transitive forms (the "b" sentences) are considered unacceptable by the respectively cited authors but are quite acceptable to me, as a Chinese native speaker.

(44) a. 滔滔 病 倒 了。
Taotao bing dao le.
Taotao sick fall ASP

'Taotao was brought down with sickness.'

b. 艰苦的 工作 病 倒 了 滔滔 了。 (Y. Li, 1995)

Jianku-de gongzuo bing dao le Taotao le.

tough work sick fall ASP Taotao ASP

'Tough work (conditions) brought Taotao down with sickness.'

(45) a. 小 宝宝 哭 醒 了。

Xiao baobao ku xing le.

little baby cry awake ASP

'The little baby woke up from crying.'

b. 那 个 噩梦 哭 醒 了 小 宝宝。 (Liu, 2019)

Na ge emeng ku xing le xiao baobao.

that CLF nightmare cry awake ASP little baby

'That nightmare caused the little baby to wake up from crying.'

To the best of our knowledge, we have not found any Inchoative CR V-V that does not have causative counterparts. Liu (2019) claims the CR V-Vs *zou-lei* 'walk tired' and *ku-yun* 'cry dizzy' do not have transitive uses. We argue that transitive use is possible, as shown in (46).

(46) a. 这 段 路 走 累 我 了。

Zhe duan lu zou lei wo le.

this CLF road walk tired I ASP

'This part of the road made me tired from walking (on it).'

b. 那 件 事 哭 晕 我 了。

Na jian shi ku yun wo le.

that CLF thing cry dizzy I ASP

'That thing made me dizzy from crying.'

Like single verbs, the causative alternation in CR V-Vs is also subject to Direct Causation Condition (see Rappaport Hovav and Levin, 2012), which imposes constraint on the Causers, as illustrated by the contrast between (47a) and (47b).

(47) a. 这 瓶 酒 喝 醉 他 了。

Zhe ping jiu he zui ta le.

this bottle alcohol drink drunk he ASP

'Drinking this bottle of alcohol made him drunk.'

b. *哥哥 喝 醉 他 了。

**Gege he zui ta le.*

brother drink drunk he ASP

'The brother made him get drunk by drinking.'

In summary, it is observed that intransitive CR V-Vs can all undergo causative alternation and have transitive counterparts, where the Causer is subject to semantic constraints. However, not all transitive CR V-Vs can have intransitive counterparts.

3.2.8 The constraints in type VIII of CR V-Vs

It has been observed that in the type VIII of CR V-Vs in Table 1 above, N2 is subject to constraints. As shown in (48) and (49), the sentences are acceptable when N2 is 酒 *jiu* 'alcohol' (48a) or 饭 *fan* 'rice/meal' (49a), but become unacceptable when N2 is 这瓶酒 *zhe ping jiu* 'this bottle of alcohol' (48b) or 这碗饭 *zhe wan fan* 'this bowl of rice' (49b).

(48) a. 他 喝 醉 酒 了。

Ta he zui jiu le.

he drink drunk alcohol ASP

'He got drunk by drinking alcohol.'

b. *他 喝 醉 这 瓶 酒 了。

**Ta he zui zhe ping jiu le.*

he drink drunk this bottle alcohol ASP

'He got drunk by drinking this bottle of alcohol.'

(49) a. 他 吃 饱 了 饭。

Ta chi bao le fan.

he eat full ASP rice

‘He got full by eating rice (i.e., eating a meal).’

b. *他 吃 饱 了 这 碗 饭。

*Ta chi bao le zhe wan fan.

he eat full ASP this bowl rice

‘He got full by eating this bowl of rice.’

It may appear to be a constraint related to definiteness, allowing a non-definite NP while disallowing a definite one. However, that is not exactly the case. As shown in (50), where N2 is indefinite, unacceptability also occurs.

(50) a. *他 喝 醉 葡萄酒 了。

*Ta he zui putaojiu le.

he drink drunk wine ASP

‘He got drunk by drinking wine.’

b. *他 吃 饱 了 面包。

*Ta chi bao le mianbao.

he eat full ASP bread

‘He got full by eating bread.’

We can describe the constraint as that the N2 in this type of CR V-Vs should be more or less “dummy”. Therefore, when N2 is removed from (48a) and (49a), the sentences remain acceptable, as shown in (51). More importantly, the semantic meanings of these sentences maintain the same. This is because ‘drinking’ can have the same semantic reference as ‘drinking alcohol’ does, and ‘eating rice’ in Chinese conveys the same meaning as ‘eating’ does.[32]

(51) a. 他 喝 醉 了。

Ta he zui le.

he drink drunk ASP

‘He got drunk by drinking.’

[32] Since rice is regarded as an essential part of a meal in traditional Chinese culture, 吃饭 *chifan*, which literally means ‘eating rice’, expresses the meaning of ‘having a meal’. In actual use, 吃饭 *chifan* denotes the generic meaning of ‘eating’, regardless of whether rice is involved.

b. 他 吃 饱 了。

Ta chi bao le.

he eat full ASP

'He got full by eating.'

3.3 The nature of CR V-Vs

Based on the CR V-Vs' properties presented above, in particular, the productivity, the small-size constraint, the V-V adjacency, and the V-V integrity, we posit that CR V-Vs are syntactically formed compounds. On one hand, they constitute a syntactic construction and thus can generate a non-exhaustive list of possible V-V combinations. On the other hand, each CR V-V shows tight integrity and functions as one verbal unit.

The CR V-Vs might be also considered a subtype of "serial verbs", under the assumption that serial verbs include a multi-word subtype and a one-word subtype (Aikhenvald, 2006, 2018). However, considering CR V-Vs as serial verbs faces challenges.

First of all, the loose application of the term serial verbs and the lack of agreed-upon criteria for this classification have been pointed out by several authors (e.g., Haspelmath, 2016; Paul, 2008; Yin, 2007; Zwicky, 1990). So far, the general consensus is that the serial verbs contain multiple Vs, have one tense, and express a single proposition, without the occurrence of any overt marker of coordination or subordination. However, this definition does not help very much to determine whether an expression is serial verbs or not. The question is, do serial verbs refer to a unique construction with a predictable set of semantic and syntactic properties? Some early works such as Baker (1989) and Collins (1997) attempted to propose a structure universally applicable to serial verbs, but later on, the crosslinguistic data provided by numerous authors shows that the range of examples in the earlier works were too limited to provide compelling evidence. It has been observed that the so-called serial verbs express a wide range of semantic meanings and may correspond to different syntactic constructions such as asymmetric coordination, verbal predicates with prepositions, and secondary predication, which can equally be found in non-serializing languages (see Muysken & Veenstra, 2006; Paul, 2008). That is to say, knowing that a particular expression is serial verbs provides no information regarding either the semantic relationship between the verbs or the syntactic structure.

With respect to Chinese, as pointed out by Paul (2008), in Chinese linguistics, the term serial verbs may simply refer to any surface string with more than one verb, covering a large

variety of completely different phenomena. By reflecting on the works on Chinese serial verbs (e.g., Fan, 2016; Jiang & Anderson, 2017; Li & Thompson, 1981; Y. Li, 2007; Müller & Lipenkova, 2009; Yin, 2007; Zhu, 1982), we will find that there are no agreed-upon criteria for Chinese serial verbs, and different ranges of examples are included in different works. For example, in Li & Thompson (1981), all Chinese sentences containing two or more verb predicates without any marker indicating their relationships are considered serial verbs, covering a wide range of structures. In Yin (2007), the Chinese sentences that involve complex events (i.e., at least two event phases) are considered serial verbs, including the purposive 'go'+V, periphrastic causative 'make'+NP+V and perceptive 'see'+NP+V. Contrastingly, authors such as Müller & Lipenkova (2009) and Jiang & Anderson (2017) only consider those with shared grammatical subject in their account of serial verbs. Due to the fact that Chinese normally does not use overt syntactic constituent to express the semantic relations between the verbs, a big majority of Chinese sentences have the apparent form of serial verbs – sequences of verbs without any overt marker of coordination or subordination. Indeed, we can see that almost all types of Chinese multi-verb sentences without overt syntactic marker have entered serial verb analysis in the literature, in one work or another. In this sense, classifying a given Chinese expression as serial verbs is not that meaningful anymore since such classification does not have any explanatory or predictive power, either semantically or syntactically.

Another challenge is the unclear distinction of verbs and adjectives in Chinese. We use "V" in our terminology for convenience, but it is unknown whether a particular component in CR V-Vs (especially the result-denoting ones), should be classified as verbs or adjectives. In the literature of serial verbs, the notion of "verbs" is limited to the traditionally defined verbs and does not include adjectives. Considering the unclear distinction between verbs and adjectives in Chinese, we now have two options: 1) Assume the strict sense of "verbs" and only include the CR V-Vs that are formed with the traditionally defined verbs into serial verbs; 2) Assume a broad sense of "verbs" to also cover adjectives, and consequently, all CR V-Vs as well as similar constructions in other languages, such as the English resultatives, will be included into serial verbs. However, both options face problems.

Following a strict sense of "verbs", the legitimacy of a CR V-V as serial verbs will highly depend on the word class of its components. Consequently, there would be an endless debate on whether a particular V2 is a verb or an adjective to confirm or reject the serial verb status of this V-V. Even if such debate could achieve a certain consensus, another consequence would be that example pairs like those in (52) would be treated differently: while (52a) is considered an instance of serial verbs, (52b) might not be because the V2 is adjective-like. Given the

similarity between these two examples both semantically and syntactically, we do not find it plausible to consider them distinct types of constructions.

(52) a. 他 唱 哭 孩子们 了。
Ta chang ku haizimen le.
he sing cry children ASP
'He sang, and this made the children cry.'

b. 他 唱 累 孩子们 了。
Ta chang lei haizimen le.
he sing tired children ASP
'He sang, and this made the children tired.'

One the other hand, if we assume a broader sense of V, i.e., with adjectives included, problems will also occur. This option makes it theoretically possible to maintain the SVC status of all Chinese CR V-Vs. However, it would also open a door for other expressions which have not been considered serial verbs, for example, the English resultatives. In the literature on serial verbs, there is a subtype with resultative meanings (see Aikhenvald, 2006, 2018). In an analysis on serial verbs in Edo and Nupe, Baker & Stewart (2002) stated that the only salient difference between the resultative serial verbs and English resultatives is the syntactic category of the resultative predicate – i.e., a verb or an adjective/PP. In particular, the resultative serial verbs in Edo and Nupe, such as (53a), are very much like English resultatives with APs and PPs like *Ozo shot the goat dead* or *Ozo beat the goat to death*. In an analysis on Ewe SVCs, Collins (1997) shares a similar view and indicates that the only difference between Ewe resultative SVCs such as (53b) and English resultatives such as *John watered the tulips all flat* is the syntactic category of the resultative predicate. Now, if we fuse the verb category and adjective category together, this only difference between English resultatives and resultative serial verbs would disappear. Then, there would be no reason to exclude English resultatives from serial verbs. Consequently, the current serializing typology will face challenges because many of the commonly considered non-serializing languages, such as the Germanic languages, exhibit resultatives.

(53) a. *Òzó ghá gbé èwé wù.* (Edo)
Ozo FUT hit goat die

'Ozo will strike the goat dead.' (Baker & Stewart, 2002)

b. *Me nya ɖevi-ɛ dzo*. (Ewe)
I chase child-DEF leave
'I chased the child away.' (Colllins, 1997: 482)

Therefore, no matter we assume a strict or broad sense of "verbs", problems remain. We do not attempt to provide an immediate solution to this problem, but we believe it is worthwhile to note that the definition of serial verbs needs further clarification. Only then could we have a clearer picture of the serial verb status of CR V-Vs. We maintain that Chinese CR V-Vs are syntactically formed compounds (a syntactic structure will be proposed in Chapter 4), which show properties similar to those of single verbs but are productive.

3.4 Corresponding structures in Portuguese

As presented earlier in §2, there are quite a few (typological) differences between Portuguese and Chinese: a) Portuguese is a verb-framed language, while Chinese is a satellite-framed language; many Portuguese verbs involve both activity and result meanings, but Chinese simplex verbs usually denote either a pure activity or a pure state (see Tai, 1984; Sybesma, 1997; a. o.) – to express both, the result meaning has to be expressed by satellites. b) Portuguese is a Path conflated language, while Chinese is a Manner conflated language; since the Manner conflation pattern is not allowed in Portuguese, the Manner has to occur externally if it is present. c) In general, Chinese is more restricted in expressing a complex meaning by a simplex verb, while Portuguese is restricted in forming resultative constructions.

Partly driven by these differences, the Chinese CR V-Vs do not have equivalent structures in Portuguese. Chinese CR V-Vs may correspond to different Portuguese forms depending on the nature of the causing event and the result. Such differences are the reason why we pick Chinese CR V-Vs' acquisition by L1 Portuguese learners as our research target in this study.

For CR V-Vs with V1 denoting generic meanings (i.e., it does not denote any specific action or activity, but rather a generic meaning of 'do' or 'make'), the Portuguese counterparts may employ syntactic causatives (54b-e) or simple resultatives without Manner (55b).

(54) a. 他 弄 哭 孩子们 了。

Ta nong ku haizimen le.

he make cry children ASP

'He made the children cry.'

b. *Ele fez com que os meninos chorassem.*

he made with that the children cry[3.PLUR.PAST.SUBJ.]

'He made the children cry.'

c. *Ele fez os meninos chorarem.*

he made the children cry[3.PLUR.INF]

'He made the children cry.'

d. *Ele fez os meninos chorar.*

he made the children cry[NON-INFL. INF.]

'He made the children cry.'

e. *Ele fez chorar os meninos.*

he made cry[NON-INFL. INF] the children

'He made the children cry.'

(55) a. 那 个 问题 搞 糊涂 我 了。

Na ge wenti gao hutu wo le.

that CLF question make confused I ASP

'That question made me confused.'

b. *Essa pergunta deixou-me confuso.*

that question made.me confused

'That question made me confused.'

However, there are many cases where the Portuguese counterparts of Chinese CR V-Vs may involve predicates formed by single verbs which intrinsically express complex meanings containing causative and resultative meanings, such as *partir* 'break', *abrir* 'open', *sujar* 'make dirty', and *limpar* 'to clean', as exemplified in (56)-(57).

(56) a. 他 弄 碎 花瓶 了。

Ta *nong sui huaping le.*

he make break vase ASP

'He made the vase break./He broke the vase.'

b. *Ele partiu o vaso*.
he broke the vase
'He broke the vase.'

(57) a. 他 弄 脏 衣服 了。
Ta nong zang yifu le.
he make dirty clothes ASP
'He made the clothes dirty./He stained the clothes.'

b. *Ele sujou a roupa*.
he stained the clothes
'He stained the clothes.'

When V1 in Chinese CR V-Vs conveys a specific meaning (i.e., non-causative V1), the causing eventuality is specified. In this case, the Portuguese correspondence usually needs to employ clauses in coordination/subordination, as in (58b). In some cases, gerunds or PPs may be employed, as in (59b).

(58) a. 他 唱 哭 孩子们 了。
Ta chang ku haizimen le.
he sing cry children ASP
'He made the children cry by singing.'

b. *Ele cantou, o que fez os meninos chorar(em).*
he sang which made the children cry(3PLUR)
'He sang, which made the children cry.'

(59) a. 他 踢 断 那 条 木板 了。
Ta ti duan na tiao muban le.
he kick snap that CLF plank ASP
'He made that plank snap by kicking (it).'

b. *Ele partiu a tábua {pontapeando-a}/{com um pontapé}*.
he broke the plank {kicking.it} /{with a kick}
'He snapped the plank {by kicking it}/{with a kick}.'

There are also cases where a Chinese CR V-V with a non-causative V1 can be expressed by a single verb in Portuguese, as illustrated in (60)-(61). These Portuguese verbs intrinsically contain both an action and a result meaning.

(60) a. 他 杀 死 了 一 只 虫子。[33]
Ta sha si le yi zhi chongzi.
he kill die ASP one CLF insect
'He killed an insect to death.'

b. *Ele matou um inseto.*
he killed one insect
'He killed an insect (with the implication that the insect died).'

(61) a. 他 切 断 了 树枝。[34]
Ta qie duan le shuzhi.
he cut snap ASP branch
'He cut the branch (into pieces).'

b. *Ele cortou o ramo.*
he cut the branch
'He cut the branch (with the implication that the branch was in pieces).'

In summary, Portuguese does not exhibit structures that are equivalent to Chinese CR V-Vs. CR V-Vs describe situations that may be conveyed by (i) single verbs, (ii) syntactic causatives, (iii) coordinate/subordinate clauses, (iv) predicates with gerunds or PPs, or (v) simple resultatives (without Manner) in Portuguese.

Among these forms, the syntactic causative *fazer*-Inf structure has a surface word order similar to that of CR V-Vs, with two verbs in adjacency. This construction is a common

[33] The verb 杀 *sha* can form a predicate independently, but the semantic meaning does not necessarily involve the result (see §2.1.2).
[34] The verb 切 *qie* can form a predicate independently, but the semantic meaning does not necessarily contain a result, as shown by the possible refutation in the following example:
他 切 树枝 了， 但是 树枝 没 断。
Ta qie shuzhi le, danshi shuzhi mei duan.
he cut branch ASP, but branch not break
'He cut the branch, but the branch did not turn into pieces.'

phenomenon shared by Romance languages, and the name *faire*-Inf was first proposed by Kayne (1975) for the French construction. It has been in the center of attention for its "interesting" features such as the adjacency of Vcaus (V1) to the embedded verb (V2), the accusative/dative (instead of the nominative) Case on the Causee, and the Clitic Climbing (see Kayne (1975) for French; Folli & Harley (2007) and Guasti (1996) for Italian; Tubino Blanco (2011) and Torrego (2010) for Spanish; Barbosa & Raposo (2013), Gonçalves (1999a), and Raposo (1981) for Portuguese). Despite the similar surface, we posit that *fazer*-Inf is distinct from Chinese CR V-Vs both syntactically and semantically.

First of all, in *fazer*-Inf, the V1 position can only be occupied by a causative verb, namely *fazer*, *mandar,* or *deixar*. For instance, if the causative verb *fazer* in (62a) is replaced by a non-causative verb such as *cantar* ('to sing'), the sentence becomes unacceptable, as shown in (62b). In contrast, CR V-Vs do not require the verb in the V1 position to be a verb with causative meaning, as shown by most of the CR V-Vs examples presented throughout this chapter.

(62) a. *O João fez chorar os meninos.*
the John made cry the children
'John made the children cry.'
b. **O João cantou chorar os meninos.*
the John sang cry the children
Intended: 'John made the children cry by singing.'

More importantly, in *fazer*-Inf, a verb can occur in the V2 position as long as it is compatible with V1. It may be transitive (63a), unergative (63b), or unaccusative (63c). That contrasts with Chinese CR V-Vs, where verbs in the V2 position tend to be unaccusative but not unergative, and transitive V2 is very restricted (see §3.2.3). The contrast between the two languages can be interpreted semantically, that *fazer*-Inf is a causative construction, whereas the CR V-V is both causative and resultative. In other words, *fazer*-Inf tends to express the causation of the initiation of an activity, whereas the CR V-V expresses the causation of a change of state.[35]

[35] However, the caused activity in *fazer*-Inf may intrinsically involve a result meaning, for example, when V2 is unaccusative.

(63) a. *O João fez comer o bolo às meninas*. (transitive)
the John made eat the cake to.the girls
'John made the girls eat the cake.'

b. *O João fez correr as meninas.* (unergative)
the John made run the girls
'John made the girls run.'

c. *O João fez cair as pedras*. (unaccusative)
the John made fall the stones
'John made the stones fall.'

Some CR V-Vs can alternate, having both transitive and intransitive uses, as exemplified in (64). However, causative alternation is not allowed in *fazer*-Inf, as in (65).

(64) a. 这 瓶 酒 喝 醉 他了。
Zhe ping jiu he zui ta le.
this bottle alcohol drink drunk he ASP
'Drinking this bottle of alcohol made him drunk.'

b. 他 喝 醉 了。
Ta he zui le.
he drink drunk ASP
'He got drunk by drinking.'

(65) a. *O filme fez chorar a menina.*
the movie made cry the girl
'The movie made the girl cry.'

b. **A menina fez chorar.*
the girl made cry
Intended: 'The girl was made to cry.'

In *fazer*-Inf, the positions of N1 and N2 define the roles of Causer and Causee respectively, and non-exceptionally, N1 is in a θ-relation with V1, as shown in all the *fazer*-Inf examples above. In contrast, Chinese CR V-Vs exhibit more "flexibility", as presented previously in §3.2.6 (see Table 1). For example, in (66a), it is the N1 'he', instead of the N2 'alcohol', that

takes the role of Causee; in (66b), the N1 'this bottle of alcohol' does not have any θ-relation with V1 'drunk'.

(66) a. 他 喝 醉 酒 了。
Ta he zui jiu le.
he drink drunk alcohol ASP
'He got drunk by drinking alcohol.'

b. 这 瓶 酒 醉 晕 他 了。
Zhe ping jiu zui yun ta le.
this bottle alcohol drunk dizzy he ASP
'This bottle of alcohol made him dizzy from being drunk.'

In both Chinese CR V-Vs and Portuguese *fazer*-Inf, adverbial modifiers may occur to modify the whole verbal predicate. However, as shown previously in §3.2.5, in Chinese CR V-Vs, an adverbial modifier is not allowed to modify V1 or V2 only. In contrast, *fazer*-Inf allows adverbial modifiers to have the scope on V2 only. As shown in (67), the PP *com uma pistola* 'with a gun' can have scope over the whole *fazer*-Inf or only V2. It seems that the two Vs in CR V-Vs show higher integrity than those in *fazer*-Inf.

(67) *O Mário fez abrir a porta ao porteiro com uma pistola.*
the Mario made open the door to.the janitor with one gun
a. 'Mario used a gun to make the janitor open the door.'
b. 'Mario made the janitor use a gun to open the door.'
(adapted from an Italian example in Guasti, 1996)

Furthermore, in *fazer*-Inf, the long movement of the Causee is restricted, and only the embedded object is allowed to undergo long movement, as shown in (68). In contrast, Chinese CR V-Vs allow the Causee to move to a higher position, forming 被 *bei*/给 *gei*/把 *ba* constructions (see §3.2.5), as shown in (69).[36]

[36] Both *bei* and *gei* are considered passive markers in Chinese; in the *ba*-construction, the morpheme *ba* legitimates the occurrence of the Subject on its left and the Object on its right, surfacing as S *ba* O V (see §3.2.5).

(68) a. *O rei mandou construir o castelo a um arquiteto famoso.*
the king made build the castle to one architect famous
'The king made a famous architect build the castle.'

b. *O castelo foi mandado constuir (pelo rei) a um arquiteto famoso.*
the castle was made build (by.the king) to one architect famous
'The castle was made to be built by a famous architect (by the king).'

c. **Um arquiteto famoso foi mandado construir o castelo.*
one architect famous was made build the castle
Intended: 'A famous architect was made to build the castle.'

(69) a. 他 唱 哭 孩子们 了。
Ta chang ku haizimen le.
he sing cry children ASP
'He sang, and this made the children cry.'

b. 孩子们 被 他 唱 哭 了。
Haizimen bei ta chang ku le.
children BEI he sing cry ASP
'The children were made to cry by his singing.'

c. 孩子们 给 他 唱 哭 了。
Haizimen gei ta chang ku le.
children GEI he sing cry ASP
'The children were made to cry by his singing.'

d. 他 把 孩子们 唱 哭 了。
Ta ba haizimen chang ku le.
he BA children sing cry ASP
'He made the children cry by singing.'

Given the syntactic and semantic differences presented above, we posit that Portuguese *fazer*-Inf and Chinese CR V-Vs are not related constructions. The claim that Portuguese does not have structures equivalent to Chinese CR V-Vs thus can be maintained. Therefore, it is interesting to investigate whether L1 Portuguese learners can successfully acquire Chinese CR V-Vs, a construction that is absent in the L1 grammar.

4 The syntactic account

4.1 Distributed Morphology

Distributed Morphology (DM, henceforth; Halle & Marantz, 1993, 1994; Harley & Hoyer, 1999; Marantz, 1997, 2013) is a framework that proposes an architecture of grammar in which the syntax is the only generative system responsible for both word structure and phrase structure. According to DM, the "Narrow Lexicon" consists of two classes of units: the "atomic roots" and the "atomic bundles of grammatical features" (Marantz, 1997). The lexical roots are category-neutral and contain encyclopedic semantic content; by merging with a categorizing functional head little x, such as *v*, *n,* or *a*, they can get categorized into a verb, noun, or adjective respectively, as illustrated in (1).[37] The function of the roots is to provide encyclopedic meaning to the syntactic structures.

(1) a. *dance* (v.)

b. *dance* (n.)

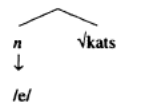
In the DM framework, the "Encyclopedia" lists special meanings of the roots, in relation to the syntactic context, within local domains[38], whereas the "Vocabulary", containing Vocabulary Items (VIs), provides the phonological forms for both the roots and the bundles of grammatical features (Marantz, 1997: 204). DM assumes Late Insertion: the phonological features of terminal nodes are supplied by the insertion of VIs post-syntactically, at Morphological Structure (Halle & Marantz, 1993, 1994).

In particular, the core structure of a verb phrase contains a little *v* head and a root, as illustrated in (1a): the little *v* semantically introduces an eventuality, and the root modifies this event by contributing semantic content. According to Folli & Harley (2005), the different nature of events (e.g., causative, unaccusative, stative, unergative) is not determined by the

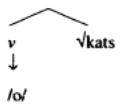
[37] The functional heads *v* and *n* are phonologically indistinguishable in English but may be distinguishable in other languages, such as Finnish (Pylkkänen, 2002):

FINNISH

a. *katse* 'look' (n.)



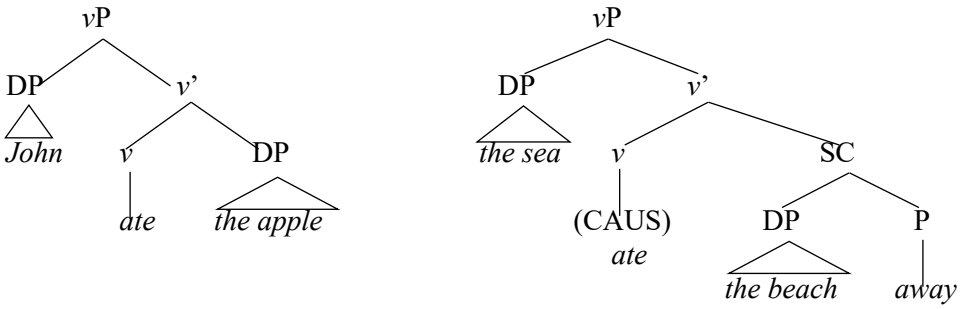
b. *katso* 'look' (v.)



[38] The syntactic head that projects agents defines a locality domain for special meanings (Marantz, 1997).

semantic information contained in the lexical roots, but rather, by the different "flavors" of *v* heads that contain specific event-semantic content, such as v_{CAUSE}, v_{BECOME}, v_{DO}. In particular, v_{DO} is an agentive *v*, which requires an animate Agent subject; v_{DO} can take a straightforward Incremental Theme as its complement, and is a true verb of creation, as exemplified in (2a). In contrast, v_{CAUSE} is a causative *v*, which only requires that the subject be a possible Cause; v_{CAUSE} takes a state as its complement, creating essentially a resultative structure, as in (2b).

(2) a. *John ate the apple*. b. *The sea ate the beach away*.



(Folli & Harley, 2005)

4.2 Root-selecting CAUSE

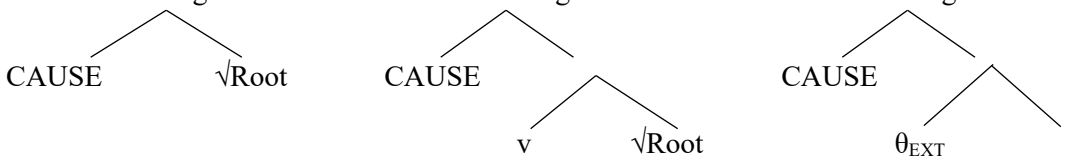
Pylkkänen (2002) argues that causative constructions essentially "involve the head CAUSE which combines with noncausative predicates and introduces a causing event to their semantics" (2002: 75). According to Pylkkänen, crosslinguistic variation in causative constructions is attributed to two sources: Voice-bundling and Selection.

Pylkkänen assumes with Marantz's (1997) DM and proposed that causative heads are divided into three types: Phase-selecting, Verb-selecting, or Root-selecting.

In root-selecting, CAUSE composes directly with an acategorial root (√), as illustrated in (3a). According to Pylkkänen, English zero causatives or Japanese lexical causatives belong to this type.[39] In Verb-selecting, CAUSE composes with VPs lacking an external argument (3b). In Phase-selecting, CAUSE composes with a phase, which, according to Pylkkänen, is a syntactic unit that contains an external argument (3c).

[39] In Pylkkänen (2002), Japanese lexical causatives are claimed to be different from its productive causatives in that any intervening material between CAUSE and the root is prohibited.

(3) a. Root-selecting CAUSE b. Verb-selecting CAUSE c. Phase-selecting CAUSE



(Pylkkänen, 2002)

Assuming with Pylkkänen's proposal on CAUSE selection, we propose that Chinese CR V-Vs, together with the lexical causatives in Old Chinese and the few existing ones in Modern Chinese, involve root-selecting CAUSE. The Old Chinese lexical causative in (4a), which repeats (13b) in §2.1.2, is partially represented in (4b), where the root 树 *shu* 'tree' is merged with the head v_{CAUSE}, and the structure conveys the causative meaning 'to make trees, to plant'.

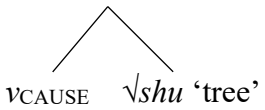
(4) a. 树 之 以 桑

Shu zhi yi sang

tree it with mulberry

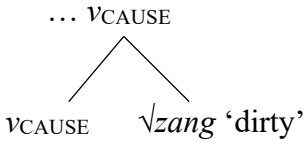
'Plant it with mulberry' (from *Mencius*, cited in Xu, 2006: 118)

b. v_{CAUSE}P



Chinese CR V-Vs differ from the lexical causatives such as (4) in that both the cause-denoting root and the result-denoting root are present in CR V-Vs, whereas lexical causatives only contain the result-denoting root. We leave this matter to be discussed in the next section. For now, we claim that CR V-Vs also involve the root-selecting structure in (3a). For example, the CR V-V 弄脏 *nong zang* 'make dirty: to stain' contains the structure in (5).

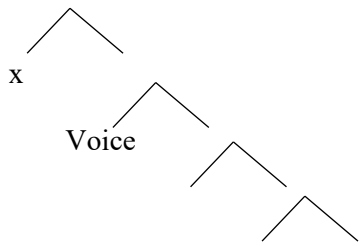
(5)



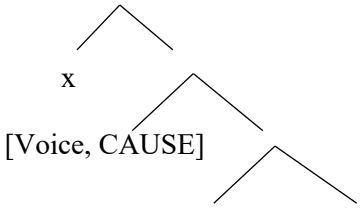
Another important proposal made by Pylkkänen is the Voice-bundling parameter. Assuming with Kratzer (1996) that external arguments are syntactically introduced by Voice, Pylkkänen proposed that "while CAUSE and Voice are separate pieces in the universal

inventory of functional heads, they can be grouped together into a morpheme in the lexicon of a particular language" (2002: 90). For example, English is claimed to be a voice-bundling language, in which the causative relation and the external theta-role are bundled into one syntactic head and one morpheme. In contrast, in Japanese and Finnish, CAUSE and Voice are not bundled together. The contrast between non-Voice-bundling and Voice-bundling is illustrated in (6).

(6) a. Non-Voice-bundling causative (e.g., Japanese, Finnish)



b. Voice-bundling causative (e.g., English)



(Pylkkänen, 2002)

Pylkkänen further hypothesizes that a causativized unergative structure should be impossible with the English-type zero causative head due to the root-selecting and Voice-bundling properties, since there is not any possible position for the Causee (the agent of the unergative) to be realized. According to Pylkkänen, causativized unergative in root-selecting causatives should then be allowed in a language where Cause and Voice do not bundle together, because the separation of Voice and CAUSE into two different functional heads leaves more syntactic positions for argument licensing. For example, Japanese is a language that exhibits root-selecting causatives and non-Voice-bundling, and Pylkkänen uses examples such as the one in (7) to show that causativization of unergatives is possible in Japanese root-selecting causatives.

(7) *John-ga* *kodomo-o* *nak-asi-ta*.
John-NOM child-ACC cry-CAUSE-PAST
'John made the child cry.' (Pylkkänen, 2002)

However, Tubino Blanco (2011: §3) argues that 'cry' in Japanese is unaccusative, by presenting data from Tomioka (2006), which shows that *nak* 'cry' exhibits unaccusative properties. Furthermore, Tubino Blanco shows that unergatives do not root causativize in Hiaki,

a language similar to Japanese in terms of Voice Bundling. This author further points out that in many studies (e.g., Burzio, 1986; Levin & Rappaport-Hovav, 1995; Rosen, 1989), it has been observed that verbs with similar semantic meanings might be unergatives in some languages but unaccusatives in other languages; therefore, the fact that *cry* is unergative in languages like English does not imply that roots with similar encyclopedic meaning in Japanese need to exhibit the same thematic properties. Tubino Blanco argues that any apparently unergative root that allows root-selecting causativization has unaccusative properties, as the case with Japanese root *nak* 'cry' in (7) above. This author adds that such ability is idiosyncratic, and this is why this phenomenon is not productive. That is to say, the acceptability of Japanese root *nak* 'cry' being causativized by a root-selecting v_{CAUSE} is not related to the feature on (non) Voice-bundling, but that the internal structure of the root is compatible with unaccusative syntax.

On the other hand, not all unaccusative verbs can undergo root-selecting causativization, as illustrated in (8). Tubino Blanco attempts to explain this by employing the telicity test for unaccusatives proposed by Sanz (2000): the verbs which can be root-selecting causativized are telic unaccusatives – an end state is implied.

(8) English (Tubino Blanco, 2011)
a. **John arrived Mary to the station*.
b. **John died Mary*.
c. **John appeared a picture on the screen*.

The above observation on root-selecting causatives is also borne out in Chinese CR V-Vs. As presented earlier in §3.2.3, the result-denoting root (i.e., V2) cannot be unergative and is rarely transitive. Assuming with the structure of root-selecting v_{CAUSE} in (3a), this restriction can be easily explained – there is no position for the agent of the causativized unergative/transitive to appear. Consequently, for verbs that have both unergative and unaccusative uses, only the unaccusative one is allowed in the V2 position of CR V-Vs. Interestingly, similar to Japanese lexical causatives, the Chinese verb 哭 *ku* 'cry' can also be causativized by a root-selecting v_{CAUSE} since it can occur in the V2 position in CR V-Vs (see §3.2.3). We follow Tubino Blanco (2011) and assume that this root is compatible with unaccusative syntax in both Chinese and Japanese. When causativized by a root-selecting v_{CAUSE}, they have unaccusative properties. Moreover, 哭 *ku* 'cry' may denote an end state

meaning of 'being sad/emotional', making it legit to be merged with a root-selecting v_{CAUSE}, since telicity is required according to Tubino Blanco's observation. Although some transitive verbs are found to serve as V2 in CR V-Vs, these verbs all denote telic meanings, such as 懂 *dong* 'understand' (see §3.2.3). Building on these, we can summarize the constraints with a root-selecting v_{CAUSE} as follows:

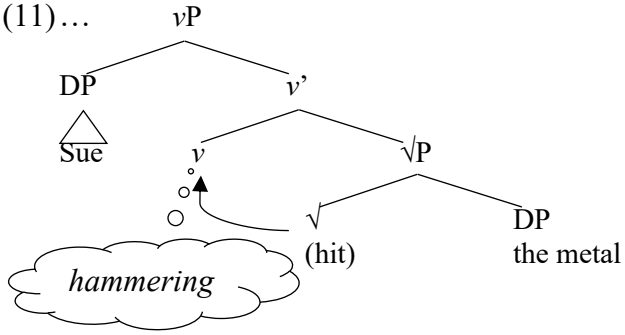
(9) In root-selecting causativization, the merged root:
  a. should not involve agentivity
  b. should involve telicity

4.3 Manner Conflation

Assuming Hale & Keyser's (1993, 1999) l-syntactic approach, Harley (2005) proposed that instrumental denominal verbs, such as those in (10), involve Manner Incorporation applying to the little *v*, which takes a complement headed by an Event-denoting Root, as shown in (11), a representation of (10a). According to Harley, through Manner Incorporation, a *v* is named by a Root describing the Manner in which it is accomplished.

(10) a. *John <u>hammered</u> the metal*.
  b. *Sue <u>brushed</u> the dog*.
  c. *Jill <u>raked</u> the leaves*.

(11) …

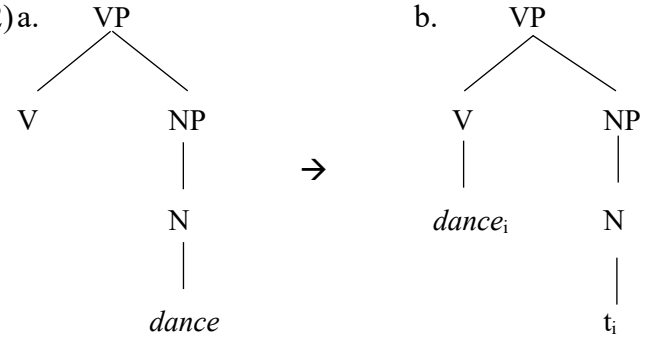


(Harley, 2005)

The essential idea in Harley (2005) is further fine-grained by Haugen (2009). Under a Minimalist view of movement (i.e., the Copy Theory of Chomsky (1995)) and adopting the theoretical tenets of DM, Haugen (2009) revised Hale & Keyser's (2002) distinction between Incorporation (à la Baker, 1988) and Conflation. According to Haugen, Incorporation involves

head-movement, accounted for by Move (i.e., Copy), whereas Conflation is simply the equivalent of compounding (< Merge). Following Hale & Keyser (1993), Haugen claims that denominal verbs such as *dance* involve Incorporation, as illustrated in (12).

(12) a. b.



(Haugen, 2009)

In contrast, instrumental denominal verbs such as *hammer* in (13) are claimed to involve Manner Conflation (in opposition to Incorporation): the root of *hammer* is merged (or conflated) as an adverbial directly into *v*. Other verbs of this type include *brush*, *paddle*, *string*, *whistle*, *saw*, *anchor,* and *comb* in verb use. The root does not come from a complement position (i.e., Incorporation), but rather, is adjoined to *v* directly, in a similar sense to Harley's (2005) proposal but under the notion of Conflation instead of Incorporation.

(13) a. *Lola hammered the metal*.

b. *Lola hammered the metal with her shoes*.

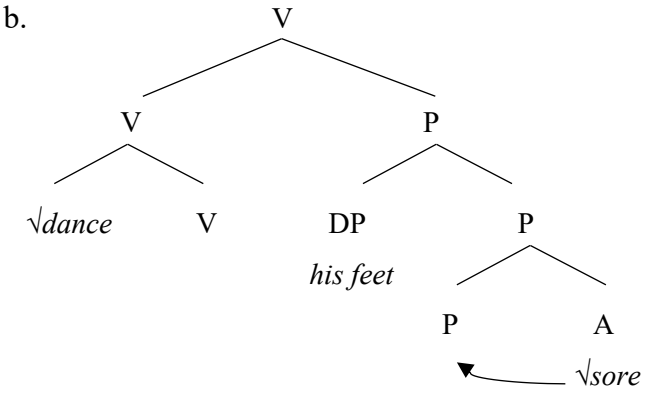
(Haugen, 2009)

Mateu (2012) shows that Haugen's (2009) distinction between Incorporation and Conflation can also apply to resultative constructions, accounting for Talmy's (1985) typology and Washio's (1997) distinction between strong and weak resultatives.

According to Mateu (2012), Talmy's Manner conflation pattern corresponds to the resultative constructions that involve the Conflation of a root with a null light verb, which is possible in Germanic languages and Chinese, but impossible in Romance languages. As illustrated in (14), the root of *dance* is conflated with the null functional head. Mateu claims that since there is no structural relation between the conflated root *dance* and the adjective *sore*, Washio's (1997) notion of strong resultatives can be accounted for – the meaning of the verb and the meaning of the adjective are independent of each other.

(14) a. *The boy danced his feet sore*.

b.

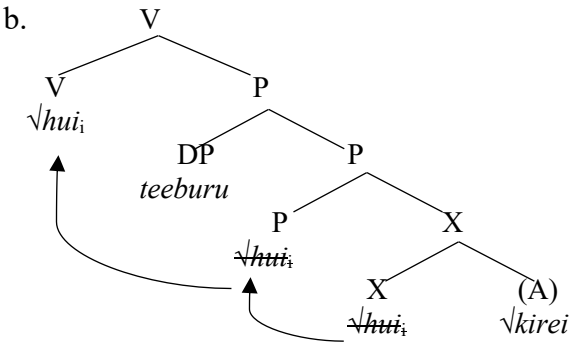


(Mateu, 2012)

On the other hand, the structures with Incorporation of a result root are claimed to account for Talmy's (1991, 2000) Path incorporation pattern. In such a structure, no Conflation is involved, but rather, the verbal root comes from the complement position of the P(ath) head and is incorporated into the null verb head. According to Mateu (2012), they account for Washio's (1997) weak resultatives: the resultative adjective specifies the state encoded in the verb. Following Baker's (2003) syntactic analysis of resultatives, Mateu (2012) proposed that the Japanese weak resultative in (15a) has the syntactic structure in (15b). This pattern (in opposition to the previous pattern) is possible in Romance languages and Japanese because no Manner Conflation is involved.

(15) a. *kare-wa teeburu-o kirei-ni hui-ta* (Japanese)
he-top table-acc clean wipe-past
'He wiped the table clean.'

b.



(Mateu, 2012)

Mateu (2012) further claims that Chinese CR V-Vs ("V-V compound" in Mateu's terminology) involve the same Manner Conflation process which has also been argued for the English strong resultatives such as (14). For the sentence in (16a), Mateu claims that the result/path is encoded in the subordinate/complement V, while the root encoding Manner is conflated/compounded with the main null light verb, as illustrated in (16b).

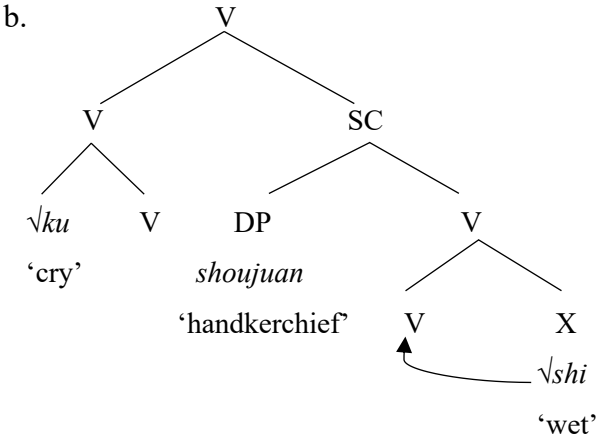
(16) a. 李四 把 手绢 哭 湿 了。

Lisi ba shoujuan ku shi le.

Lisi BA handkerchief cry wet ASP

'Lisi cried the handkerchief wet.'

b.

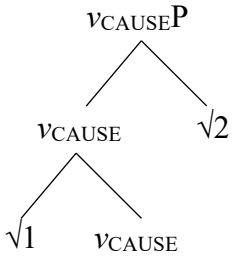


(Mateu, 2012)

In Mateu's structure for Chinese CR V-Vs, word order details are claimed to have been omitted for the sake of clarity. However, one essential property of CR V-Vs is its word order – the two Vs are in adjacency. While assuming that Chinese CR V-Vs also involve Manner Conflation, we argue that they do not derive from the same structure as English strong resultatives. In particular, while English resultatives involve an embedded Small Clause containing a DP and a root, in Chinese CR V-Vs, the head v_{CAUSE} directly embeds a root. As we have argued in §4.2, the structure with root-selecting v_{CAUSE} can account for the semantic constraint on V2 in CR V-Vs.

Therefore, we propose that a Chinese CR V-V involves at least the structure in (17): the Manner-denoting root √1 is conflated with the head v_{CAUSE} as an adjunct to specify the Manner of the causing eventuality; the result-denoting root √2 is incorporated to the v_{CAUSE} as its complement, denoting the caused result. Given this structure, the V-V adjacency is yielded, since √1 and √2 are directly conflated/incorporated to the same functional head v_{CAUSE}.

(17)



This proposal can correctly predict the possible scope of adverbial modifiers. Despite being a syntactic structure, (17) represents just one V^0, in a way similar to how *dance* (v.) in (1a) is derived: the head *v* bears verbal features and derives a V^0 from the category-neutral root. Consequently, there is only one place to locate an adverbial modifier (after the conflation/incorporation of the roots into v_{CAUSE} to turn into a verb compound). That is, in CR V-Vs, an adverbial modifier can only have the scope over the whole cause-result event. As presented previously in §3.2.5, CR V-Vs do not allow individual modifiers of V1/V2, and any occurring adverbial modifier should have the scope over the whole cause-result event. Our proposal can well account for this constraint.

According to the Minimalist Program (Chomsky, 1995), the syntactic derivation and transfer to Phonological Form (PF) and Logical Form (LF) are conducted cyclically, based on the phase domain. That is, once a phase head is merged, its complement domain is shipped to PF and LF for phonological and semantic interpretation. If we assume that the categorizing head little *v* also functions as a phase head (see Marantz, 2007), after the merge of the roots into the little *v* is completed, any further operation would have no access to the individual root, but only the derived constituent headed by little *v.* In the context of Chinese CR V-Vs, this means that any further operation in the syntax will not have access to either √1 or √2, but rather, the whole V-V as a single unit. This can well explain the "compound" properties of CR V-Vs: for example, no constituent can intervene between V1 and V2 (except for infixes) (see §3.2.5), and neither V1 nor V2 is extractable via *wh*-movement or topicalization, as shown in (18).

(18) a. 他 唱 哭 孩子们 了。
Ta chang ku haizimen le.
he sing cry children ASP
'He sang, and this made the children cry.'

b. *他 唱 怎么 孩子们 了？

*Ta chang zenme haizimen le?

he sing how children ASP

'What happened to the children due to his singing?'

Another argument in favor of this structure is the tendency that each V in CR V-Vs contains one syllable only (see the "small-size" constraint in §3.2.4). It has been observed that Chinese words, in general, tend to be disyllabic, and the disyllable is regarded as the preferred word form in Modern Chinese (Shi, 2002). If CR V-Vs are V^0s, it is easy to understand that these V-Vs also follow this tendency. That means each V-V tends to be disyllabic, with each V being monosyllabic. Diachronic studies have shown that Chinese CR V-Vs did not exist from the beginning of the language history. They emerged and increased rapidly during A.D. 600-1300 (Zhu, 1990, cited in Shi, 2002). It has been argued that the disyllabification process that was established around 200 B.C. was essential in CR V-V creation (Shi, 2002).[40] While morphological causatives and lexical causatives faded away in Chinese language development (see Shi, 2002; Xu, 2006; Xu, 1998), the CR V-Vs started to rise. Due to the disyllabification tendency, two roots adjoined each other to form a cause-result construction – besides the result-denoting root, which is also involved in morphological/lexical causatives, a cause-denoting root (i.e., the Manner-denoting √1 in our proposed structure) became required. In other words, the obligatory Manner conflation in CR V-Vs is driven by the disyllabification tendency in the language's development. As pointed out by Shi (2002), only when fully established as an independent syntactic pattern, were CR V-Vs allowed to contain more than two syllables. Nevertheless, it is still canonical and preferred that a V-V is disyllabic, with each root realized by one syllable.

Chinese CR V-Vs constitute an interesting construction since it exhibits both lexical and syntactic properties. This is why previous studies diverge in opinions regarding the nature of CR V-Vs – in particular, whether they are generated in the lexicon or the syntax (see related review in §1). Our account can account for the properties of CR V-Vs in a holistic manner. We claim that CR V-Vs are formed syntactically with two roots conflated/incorporated into the same functional head, and therefore, the syntactic properties such as the high productivity and the semantic compositionality of CR V-Vs are explained. On the other hand, each formed CR

[40] As reviewed by Shi (2002), before 200 BC, disyllabic words represented only approximately 20% of the Chinese lexicon (Guo, 1997), but in modern Chinese more than 80% of the words are disyllabic (Hu, 1981).

V-V is a V^0 and thus follows the general rules and constraints of single verbs. In this way, the lexical properties such as the integrity and the "small-size" constraint are explained. In the following sections (§4.4 and §4.5), we will present one further advantage of our account – its explanatory power of the thematic flexibility and the semantic ambiguity in CR V-Vs.

4.4 Argument realization

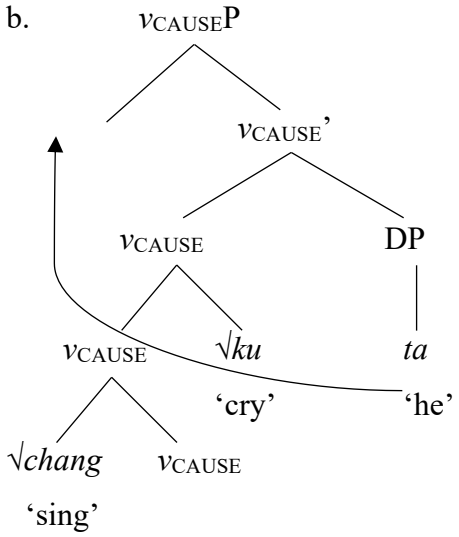
We hypothesize that the Causee of a CR V-V is always generated at the internal argument position of the predicate formed by V-V, regardless of whether the CR V-V is transitive (with overt Causer) or intransitive.

By the structure in (17), a CR V-V denotes a caused change of state: the causing eventuality is denoted by √1, and the resulted state is denoted by √2. When a CR V-V takes only one argument, this is an internal argument that receives the role of Causee. This internal argument may move to the matrix subject position (if it is empty), surfacing as a Subject.[41] In this case, the structure is very similar to the "unaccusative" (Perlmutter, 1978; Burzio, 1986) such as the English verb *melt*, which denotes a change-of-state event and takes an internal argument that occurs in the Subject position when the verb is in intransitive use (e.g., *The ice melted*). We will call the intransitive CR V-Vs the "Inchoative" type, echoing the intransitive use of the *melt*-type of verbs. An example of Inchoative CR V-V and its (partial) structure is presented in (19).

(19) a. 他 唱 哭 了。
Tai chang ku le.
he sing cry ASP
'He got to cry by singing.'

[41] However, it is also possible for the Causee to stay *in situ*, since Chinese allows null Subject (i.e., being a small *pro*), as illustrated in the following example:
唱 哭 他了。
chang ku ta le.
sing cry he ASP
'He was made to cry by (his own or someone's) singing.'

b.



The Inchoative CR V-Vs can have transitive counterparts with an overt Causer (see §3.2.7). For example, (20) presents a possible transitive counterpart of (19). We will call these transitive instances "Causative CR V-Vs", echoing the transitive use of the *melt*-type of verbs (e.g., *The heat melted the ice*). Following Krazter (1996), we assume that the Causer is generated at Spec, VoiceP. In this case, the Causee stays *in situ*.

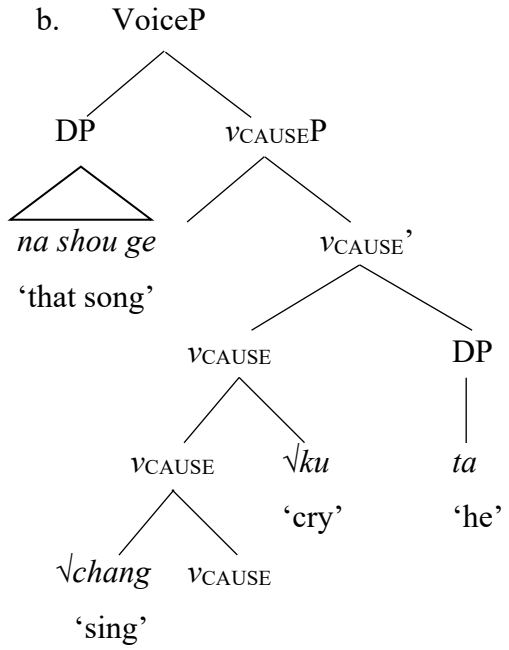
(20) a. 那 首 歌 唱 哭 他 了。

Na shou ge chang ku ta le.

that CLF song sing cry he ASP

'That song's singing made him cry.'

b.



We would like to highlight that the sentence in (20) is semantically ambiguous. As illustrated in the structure in (20b), the conveyed meaning is that the Causee 'he' underwent a change of state into 'crying' due to the eventuality of 'singing', and the change-of-state event was caused by the Causer 'that song'. What is unclear is who sang that song to make him cry – whether it was someone else or himself. In the structure, the DP 'that song' does not have thematic relation with the root √sing. Through world knowledge, we can infer that 'that song' is a plausible Causer because it is a legit participant in the causing eventuality 'singing'. However, that is all that we know about the causing eventuality from the structure. The Agent of the activity 'singing' is suppressed, and that is why ambiguity occurs.

To the best of our knowledge, we have not found any Inchoative CR V-V that does not have causative counterparts (see §3.2.7). Liu (2019) claims the CR V-Vs *zou-lei* 'walk tired' and *ku-yun* 'cry dizzy' do not have transitive uses. We argue that their transitive use is possible, as shown in (21), which repeats (46) in §3.2.7. We maintain that Inchoative CR V-Vs can all undergo causative alternation into Causative CR V-Vs.

(21) a. 这 段 路 走 累 我 了。
Zhe duan lu zou lei wo le.
this CLF road walk tired I ASP
'This part of the road made me tired from walking (on it).'

b. 那 件 事 哭 晕 我 了。
Na jian shi ku yun wo le.
that CLF thing cry dizzy I ASP
'That thing made me dizzy from crying.'

However, among the unaccusative verbs, it has been observed that some do not allow causative uses, such as the English verbs *arrive* and *appear*[42], as in (22).

(22) a. **John arrived a group of people.*
Intended: 'John made a group of people arrive.'

[42] Note that both *arrive* and *appear* allows transitive uses with a locative at the Subject position, for example:
There arrived a group of people.
There appeared a letter.
However, these transitive uses do not involve causative meanings and therefore are not related to our discussion here.

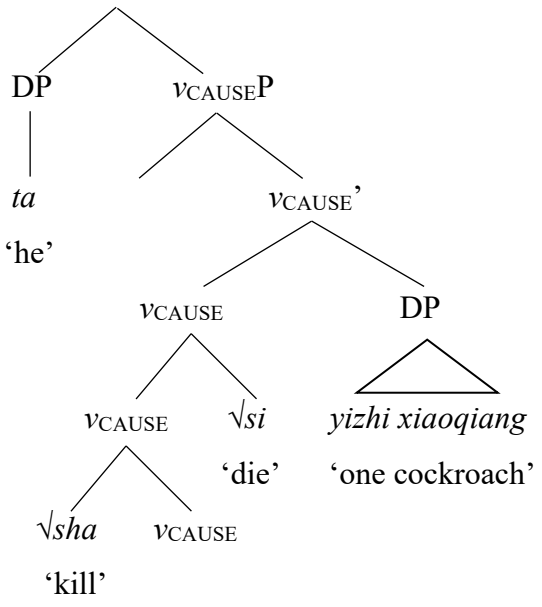
b. **John appeared his parents*.
Intended: 'John made his parents appear.'

We hypothesize that the Inchoative and Causative CR V-Vs echo only a subtype of unaccusative verbs. In particular, this subtype of verbs should denote "inherently externally caused" eventuality, the essential idea in Levin & Rappaport Hovav (1994) on what is required for causative alternation.

Nevertheless, not all transitive CR V-Vs belong to the Causative type. There are some transitive CR V-Vs that do not have intransitive counterparts (see §3.2.7). These CR V-V instances echo the telic action verbs such as the English verbs *kill* and *cut*, which convey the meaning of an agentive activity with a result. We call this type of CR V-Vs the "Accusative" type. Consider the following example:

(23) a. 他 杀 死 了 一 只 小强。
Ta sha si le yi zhi xiaoqiang.
he kill die ASP one CLF cockroach
'He killed one cockroach to death.'

b. VoiceP



This sentence does not have an intransitive counterpart, as (24) shows.[43] The Accusative CR V-Vs are agentive and always require a Causer (Agent). For this reason, the Accusative type of CR V-Vs should always surface in transitive forms, just as the verb *kill* does.

(24) *一 只 小强 杀 死 了。
**yi zhi xiaoqiang sha si le.*
one CLF cockroach kill die ASP
'*One cockroach killed to death.'

We attribute the (im)possibility of causative alternation to semantic reasons, following Levin & Rappaport (1994 ff.). Each CR V-V combination is a V^o, and in line with single verbs, their encyclopedic meanings (partially) determine the possible participants and the (im)possibility of causative alternation. Due to the limited space of this study, we do not address in detail the exact rules that connect encyclopedic meanings with argument realization. Readers may refer to Levin and Rappaport's works for their insights on this matter. The implication is that any CR V-V would behave either like *melt* or *kill*, depending on its encyclopedic meanings. This seems to be correct, because as a Chinese native speaker myself, I "know" whether a particular CR V-V can alternate or not, being either a conventional V-V or a novel V-V. For example, if we define a novel verb *di* as a verb denoting the action of 'honking a car horn', and a novel verb *pa* with the meaning of 'falling face down', I would be able to tell that the novel CR V-V *di-pa* can only have the transitive use, such as (25a), and the intransitive counterpart is not acceptable (25b). These two combining verbs are inexistent in Chinese, and for sure I have never heard of such a V-V combination. However, as a Chinese native speaker, I have the intuition that this V-V does not allow causative alternation. This is

[43] However, (24) would become more acceptable if the NP is definite, especially if we insert a pause following it, as (i) shows. The topicalization strategy is commonly used in Chinese, and it is pragmatic-motivated. With the simplex verb 杀 *sha* 'kill', topicalization also works, as in (ii). Given the focus of this study, we will not include topicalization in our discussion. From the syntactic perspective, the Accusative CR V-Vs and the *kill*-type of verbs do not allow intransitive uses. The examples in (i)-(ii) are not cases of causative alternation.

(i) 那 只 小强, 杀 死 了。
Na zhi xiaoqiang, sha si le.
that CLF cockroach kill die ASP
'That cockroach, got killed to death.'

(ii) 那 只 小强, 杀 了。
Na zhi xiaoqiang, sha le.
that CLF cockroach kill ASP
'That cockroach, got killed.'

possible only if we assume that it is the encyclopedic meaning that (partially) determines whether a particular verb or verb compound can alternate or not.

(25) a. 他 DI PA 了 孩子。
Ta di pa le haizi.
he DI PA ASP child
'He made the child fall face down by honking the car horn.'

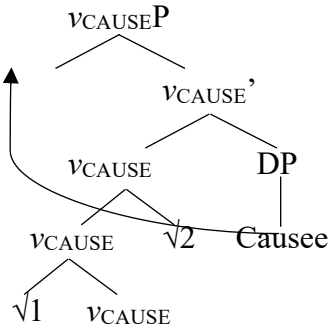
b. *孩子 DI PA 了。
**Haizi di pa le.*
child DI PA ASP
Intended: 'The child fell face down due to car horn's honking.'

To sum up, we have shown that Chinese CR V-Vs can be subcategorized into three types: the Inchoative type, the Causative type, and the Accusative type. The Inchoative CR V-Vs are in intransitive form, echoing the intransitive use of the *melt*-type of verbs. They all allow causative alternation, and their transitive counterparts are the Causative CR V-Vs, in parallel with the transitive use of the *melt*-type of verbs. The Accusative CR V-Vs are similar to the *kill*-type of verbs, disallowing intransitive uses. Although CR V-Vs are syntactically generated, they are in fact V^os and follow general rules of single verbs, including the semantic rules of causative alternation.

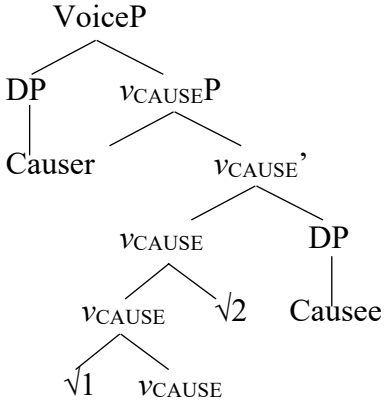
4.5 Semantic ambiguity

As shown previously in §3.2.6, Chinese CR V-Vs show "thematic flexibility", and sometimes semantic ambiguity may occur. We argue that complex semantic matters come from the simplicity of their syntactic structures. All CR V-Vs are formed by the structure in (17), and the only variation is the occurrence or absence of a Causer. Therefore, there are only two scenarios, one with only one internal argument (the Causee), as in (26a), and the other with two arguments (both Causer and Causee are present), as in (26b).

(26) a. Inchoative CR V-V



b. Causative/Accusative CR V-V



The semantic meanings expressed by the structures in (26) are:

(27) Semantics of CR V-Vs:

a. The Causee enters into the result denoted by √2 via the eventuality denoted by √1.

b. When the Causer is overtly expressed, the whole caused-result event is brought about by it.

Note that the Causer is not necessarily an Agent of the causing eventuality denoted by √1. The only requirement is that it is a possible Causer to trigger the whole caused-result event described in (27a). It may be a participant (e.g., Agent, Theme, Instrument) or a non-participant of the eventuality denoted by √1. As will be shown later, this is a main reason why semantic ambiguity may occur.

We claim that a possible interpretation of a CR V-V should meet the requirements in (28).

(28) Requirements for possible interpretations of CR V-Vs

a. It should be compatible with one of the structures in (26). For instance, when a CR V-V takes two NPs, which we name N1 (the surface Subject) and N2 (the surface Object), the interpretation of N1 being the Causee and N2 being the Causer will be ruled out.

b. The caused-result event should be culturally recognized. In other words, such an event should be possible according to people's world knowledge and experience.

In the following, we will present a few cases to showcase how our account can explain the semantic ambiguity and semantic constraints in CR V-Vs.

A. 骑累 *qi-lei* 'ride -tired'

As shown in (29), the CR V-V 骑累 *qi-lei* 'ride-tired' in (29) is semantically ambiguous, allowing two interpretations, which correspond to the type VIII and the type II of thematic patterns (see Table 1 in §3.2.6 of Chapter 3).

(29) 他 骑 累 马 了。
Ta qi lei ma le.
he ride tired horse ASP
a. 'He rode a horse, and this made him tired.' (Type VIII)
b. 'He rode a horse, and this made the horse tired.' (Type II)

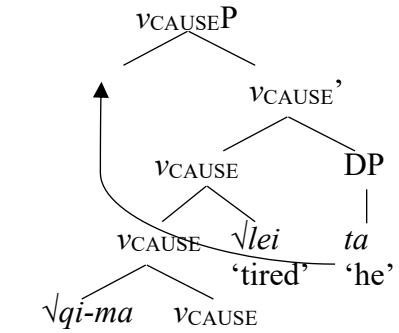
The difference between the two interpretations exists in whether N1 or N2 takes the role of Causee (i.e., whether 他 *ta* 'he' or 马 *ma* 'horse' became tired). According to the proposed structures in (26), when the Causee appears in the N1 position, the sentence has an Inchoative structure; when the Causee occurs in the N2 position, and the N1 position is filled by another NP, the sentence has a Causative/Accusative structure. Therefore, the interpretation (29a), where the Causee 他 *ta* 'he' is in the N1 position, should have an Inchoative structure, whereas the interpretation (29b), with the Causee 马 *ma* 'horse' in the N2 position, corresponds to the two-argument structure.

For (29a), which has an inchoative structure, we hypothesize that the bare noun 马 *ma* 'horse' is a part of the Manner-denoting root. As shown in (30a), in this case, the root that conflates to v_{CAUSE} is a complex root.[44] Note that the root √*ma* 'horse' here is not a syntactic argument of √*qi* 'ride', but a Cognate Object (see Badan, 2013).

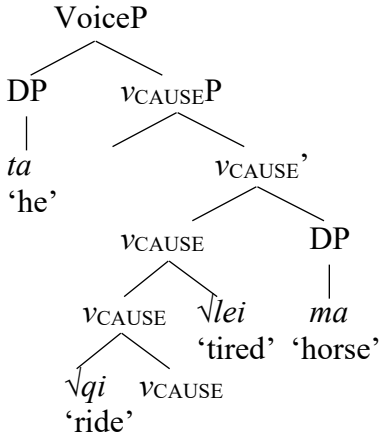
[44] This proposal faces a challenge regarding the word order. From the structure in (30a), it is unknown how V-V adjacency is achieved since the complex Manner-denoting root contains a nominal root. We hypothesize the correct linear order can be achieved post-syntactically during phonetic realization, driven by some Chinese-specific constraints. Evidence can be found in the duplication patterns in Chinese. For example, 跳舞 *tiaowu* 'to dance' is a verb that contains two morphemes, where 跳 *tiao* has a verbal meaning, 'to jump, to dance', and 舞 *wu* denotes the nominal meaning of 'dance'. In this sense, the structure of 跳舞 *tiaowu* is quite similar to that of 骑马 *qi ma* 'ride a horse'. In duplication, 跳舞 *tiaowu* does not allow either the VNV (i) or the VNVN pattern (ii), but only the VVN pattern (iii), where the verbal morphemes are in adjacency.
'dance a bit'
(i) *跳舞跳 *tiao wu tiao* (*VNV)
(ii) *跳舞跳舞 *tiao wu tiao wu* (*VNVN)
(iii) 跳跳舞 *tiao tiao wu* (VVN)
Although a systematic analysis is needed to make the observation a generalized rule, we hypothesize that there exists such a general constraint that forces the two verbal components in (30a) to adjoin on the phonetic level,

The interpretation (29b) corresponds to the structure in (30b), where there are two argument positions. In this case, the bare noun 马 *ma* 'horse' has a reference, being interpreted as 'the horse'. This is possible because definiteness and non-definiteness may not be formally distinguished in Chinese.

(30) a. Structure of (29a)



b. Structure of (29b)



However, if we replace 马 *ma* 'horse' with 那匹马 *na pi ma* 'that horse', as shown in (31), the thematic type VIII with Subject-oriented interpretation (i.e., 'he' is the Causee and became tired) is not acceptable anymore.

(31) 他 骑 累 那 匹 马 了。

Ta qi lei na pi ma le.

he ride tired that CL horse ASP

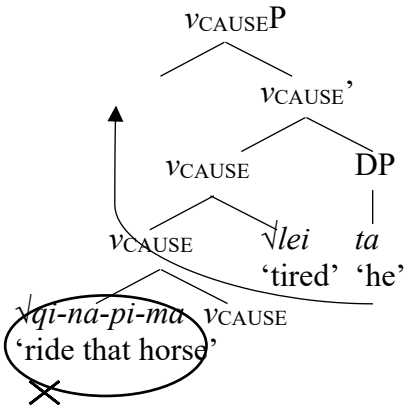
a. *'He rode that horse, and this made him tired.' (Type VIII)

b. 'He rode that horse, and this made that horse tired.' (Type VII)

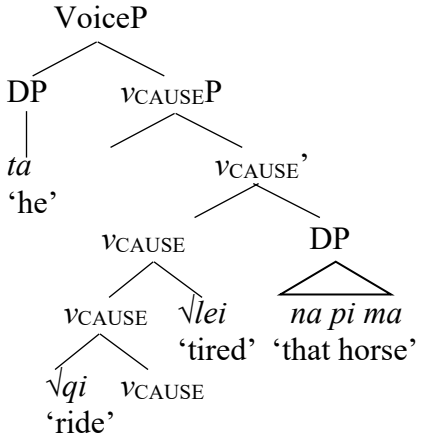
That is to say, the Inchoative structure, as presented in (32a), is not acceptable. For this sentence, only the Object-oriented interpretation in (31b) is possible, corresponding to the two-argument structure, as illustrated in (32b).

yielding V-V adjacency, as is case with the duplication of 跳舞 *tiaowu*.

(32) a. Structure of *(31a)



b. Structure of (31b)



The reason why the thematic type VIII is acceptable with (29a) but not with (31a) is because 'that horse' in (31a) is not a Cognate Object of 'ride'. While 'ride a horse' in (29a) denotes the generic meaning of a human activity and can function as a complex root, 'ride that horse' in (31a) specifies the object and cannot enter syntax as a complex root.

For a similar reason, the CR V-Vs such as 吃饱 *chi bao* 'eat full' and 喝醉 *he zui* 'drink drunk', which belong to the type VIII (see Table 1 in §3.2.6 of Chapter 3), are also subject to such constraint because their Inchoative structures conotain complex Manner-denoting roots (similar to (30a)). As presented earlier in §3.2.8, the N2 of 吃饱 *chi bao* 'eat full' or 喝醉 *he zui* 'drink drunk' is required to be a "dummy" object. That is because their syntactic structures require that N2 forms a complex root with V1.

For instance, among the sentences with 吃饱 *chi bao* 'eat full' in (33), only the one in (33a) is acceptable. As shown in the syntactic structure presented in (34), the only possible position for N2 is inside the Manner-denoting root. The sentence is acceptable when N2 is 饭 *fan* 'rice' because it can be a Cognate Object of 吃 *chi* 'eat' – in Chinese, 吃饭 *chi fan* 'eat rice' denotes a generic meaning and basically means 'to eat'. However, when N2 is 'that/a bowl of rice' or 'bread' (33b, c), it can no longer be treated as a Cognate Object and cannot form a complex root with V1. Consequently, the structure will crush, making the sentences in (33b, c) unacceptable.

(33) a. 他 吃 饱 饭 了。
Ta chi bao fan le.
he eat full rice ASP
'He got full by eating (rice).'

b. *他 吃 饱 {那/一} 碗 饭 了。

*Ta chi bao {na/yi} wan fan le.

he eat full {that/one} bowl rice ASP

Intended: 'He got full by eating {that/a} bowl of rice.'

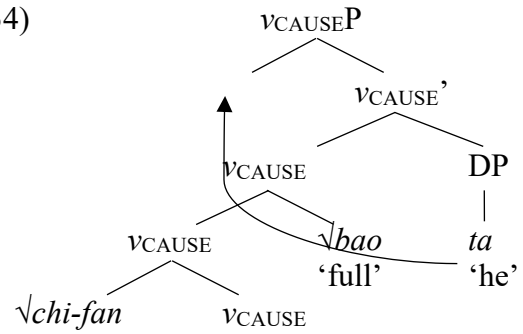
c. *他 吃 饱 面包 了。

*Ta chi bao mianbao le.

he eat full bread ASP

Intended: 'He got full by eating bread.'

(34)



*'eat that/a bowl of rice'
*'eat bread'

B. 追累 *Zhui-lei* 'chase-tired'

The semantic ambiguity of the CR V-V 追累 *Zhui-lei* 'chase-tired' has attracted a lot of attention in previous studies (e.g., Y. Li, 1995; Her, 2007; a.o.). As shown in (35), which repeats (38) in §3.2.6, two of the four interpretations are acceptable (35b, d), one is marginal (35a), and one is unacceptable (35c).

(35) 这 女孩 追 累 我 了。

Zhe nühai zhui lei wo le.

this girl chase tired I ASP

a. ??'This girl chased me, and this made her tired.'

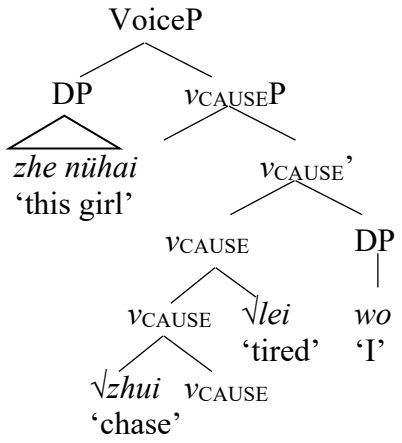
b. 'This girl chased me, and this made me tired.'

c. *'I chased this girl, and this made her tired.'

d. 'I chased this girl, and this made me tired.'

Let's first look at the two acceptable ones, (35b) and (35d). They should correspond to the two-argument structure since the Causee 我 *wo* 'I' occurs in the N2 position. Their syntactic structure, which is represented in (36), expresses the semantic meaning that 'I became tired due to the activity of chasing, and the whole event is brought about by this girl'. As highlighted above in (27), the Causer does not have to be an Agent of the causing activity, but rather, is required to be a possible trigger of the whole caused-result event. Therefore, the structure in (36) yields two possible interpretations: first, the girl is interpreted as the Agent of the activity 'chasing', corresponding to (35b); second, the girl is not an Agent, but the Theme of the activity 'chasing', corresponding to (35d). The second case is possible because according to our world knowledge and experience, the girl, being the Theme of 'chasing', is also a possible Causer: the scenario that a girl is chased by me, and that it makes me tired, is possible in reality.[45]

(36) Structure of (35b, d)

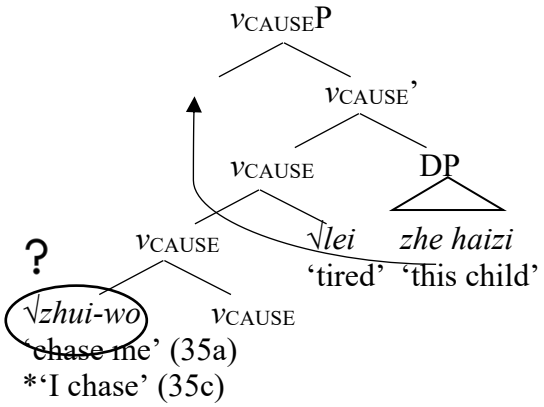


In contrast, the interpretations (35a, c) imply an Inchoative structure since the Causee 这女孩 *zhe nühai* 'this girl' occurs in the N1 position. In this case, since the surface Subject is actually an internal argument, the surface Object can only occur in the Manner-denoting complex root, as presented in (37), as is the case with 吃饱 *chi bao* 'eat-full' above in (34). Marginality occurs because N2 *wo* 'I, me' cannot be considered a Cognate Object of *zhui* 'chase', and thus *zhui wo* 'chase me' can hardly function as a complex root (contrasting to 吃饭 *chi fan* 'eat rice: eat' or 喝酒 *he jiu* 'drink alcohol: drink'). For this reason, the interpretation

[45] Note that if it is a *pro* at the position Spec, VoiceP, this sentences is still ambiguous: one interpretation is 'chasing made me tired', and the other is 'being chased made me tired.' However, if 我 *wo* 'I' moves up to the position of Spec, VoiceP, native speakers prefer the first interpretation; both interpretations can be equally produced if the accusative marker 给 *gei* occurs.

in (35a), where the causing eventuality is supposed to be 'chasing me', is marginal or even unacceptable to some Chinese native speakers. A worse case is the interpretation (35c), which is completely unacceptable. Even if we assume that 追我 *zhui wo* could form a complex root, the interpretation (35c) would imply that this complex root conveys the meaning of 'I chase', which is impossible with the linear order of 追 *zhui* 'chase' preceding 我 *wo* 'I, me'. Nevertheless, whether 追我 *zhui wo* can serve as a complex root is already problematic, as in (35a). For these reasons, the interpretation (35c) is ruled out.

(37) Structure of (35a, c)



In this way, the different degrees of acceptability between the four interpretations in (35) are well explained. Other syntactic accounts of CR V-Vs in previous studies, especially the event-decomposition accounts (e.g., Fan, 2013; Lin, 2004; Basciano, 2010; Liu 2019), have to propose different syntactic structures for interpretations with different thematic patterns.[46] That means the 11 types of CR V-Vs in Table 1 of §3.2.6 may all correspond to different syntactic structures. Then the mystery is, if all these structures are possible in Chinese, why CR V-Vs like (35) do not accept all the theoretically possible structures? We argue that complex semantics do not necessarily come from complex syntax. It is actually the simplicity of CR V-Vs' syntactic structure that allows for thematic flexibility, which may cause semantic ambiguity. The syntactic structures set a basic frame for theoretically possible semantics, and then it is the world knowledge and people's experience that determine if a particular interpretation is acceptable or not in reality.

[46] According to Liu (2019), the two roots in V-Vs such as 砍倒 *kan dao* 'cut fall' are generated under different heads, v_{CAUSE} and v_{BECOME} but the two roots in instances such as 喝醉 *he zui* 'drink drunk' are both generated under the head v_{BECOME}.

4.6 How Portuguese and Chinese differ

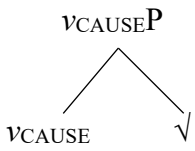
We have proposed that CR V-Vs involve root-selecting v_{CAUSE} and Manner Conflation. In the following, we will show that Portuguese disallows both.

4.6.1 CAUSE feature

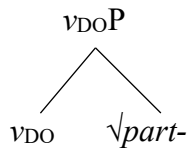
First of all, regarding what is the Complement of v_{CAUSE}, we find that the root-selecting option for v_{CAUSE} is not available in Portuguese, contrasting to Chinese.

In Portuguese there are quite a few verbs that allow causative alternation, such as *partir* 'to break', but it is worth noting that the intransitive uses of these verbs usually require an unaccusative morpheme *-se* (with exceptions, see §2.1.2). That means, verbs such as *partir* 'to break' are intrinsically transitive and may undergo an anticausative process to produce intransitive uses. Therefore, while lexical causatives in languages such as Japanese and Hiaki involve the merge of the root into the functional head v_{CAUSE} (see Pylkkänen, 2002, 2008), as illustrated in (38a), Portuguese verbs such as *partir* 'to break' do not involve such a causativization process. We posit that *partir* 'to break' involves the merge of the root into the functional head v_{DO}, which categorizes the root into a verb and introduces an eventuality, as illustrated in (38b). The head v_{DO} itself does not involve any causative meaning. Rather, the conveyed causative and resultative meaning in *partir* 'to break' comes from the joint force of the encyclopedic meaning of the root and the event-introducing head v_{DO}. The resulted verb may further undergo anticausation, a process that is available in Portuguese, to derive intransitive counterparts.

(38) a. lexical causatives



b. *partir* 'to break'



There is a group of Portuguese verbs that may appear to be instances of root-selecting causation, such as *sujar* 'to stain' and *limpar* 'to clean', whose adjective counterparts take the same roots, as *sujo/a* 'dirty' and *limpo/a* 'clean'. We argue that these verbs are not derived through v_{CAUSE}, but v_{DO}. Like other verbs, *sujar* 'to stain' and *limpar* 'to clean' are derived by the merge of the root into the v_{DO} head. The morphemes *-ir, -er*, and *-ar* are not causative

markers. Note that not all verbs with *-ir, -er*, or *-ar* in Portuguese contain causative meanings (see §2.1.1). As suggested by Matos (1999), the causative meanings involved in verbs such as *sujar* 'to make dirty' and *adoçar* 'to sweeten' do not come from the suffix, but the semantic properties of the base roots. For example, the verb *almoçar*, whose noun counterpart is *almoço* 'lunch', simply means 'to have lunch', instead of *'to make (into) lunch'. We posit that the causative meanings in verbs such as *sujar* 'to stain', *limpar* 'to clean', *purificar* 'purify', *branquear* 'to whiten' are not motivated by any functional head with a causative feature, but the joint force of the semantics of the root and the event-introducing v_{DO}. As presented in §2.1.1, Portuguese does not have productive morphological causatives, contrasting to languages such as Turkish and Japanese, where a morphological causative marker can productively produce causatives by attaching to a root (see Montrul, 2001; Pylkkänen, 2002).

The "zero causative", where the root-selecting v_{CAUSE} head is null, is attested in English and Chinese (more in Old Chinese than in Modern Chinese; see §2.1.2), but is unavailable or very marginal in Portuguese, as illustrated in (39).

(39) a. **Produtos inflamáveis perigam Baixa de Coimbra* (Diário Popular, 25 de Junho de 1986, p.11)
products inflammable at-risk downtown of Coimbra
'Inflammable products make Coimbra downtown at risk.'

b. *Baixa de Coimbra periga devido a produtos inflamáveis*.
downtown of Coimbra at-risk due to products inflammable
'The Coimbra downtown is at risk due to inflammable products.'
(Peres & Móia, 1995)[47]

Therefore, the root-selecting v_{CAUSE}, either being phonetically realized or null, is not attested in Portuguese. In Portuguese, the v_{CAUSE} head can only be verb-selecting or phase-selecting. For example, *fazer*-Inf (*faire*-Inf), as exemplified in (40a), is an instance of verb-selecting causativization (41a). The sentence in (40b), where the Agent of the embedded verb is an embedded Subject, is an example of phase-selecting causativization (41b).

(40) 'He made the children leave.'
a. *Ele mandou sair os meninos.*

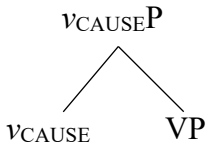
[47] The English translation is provided by us.

he made leave [non-infl. inf.] the children

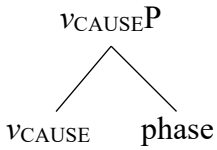
b. *Ele mandou os meninos <u>saírem</u>.*

He made the children leave [infl. inf.]

(41) a. V-selecting



b. phase-selecting

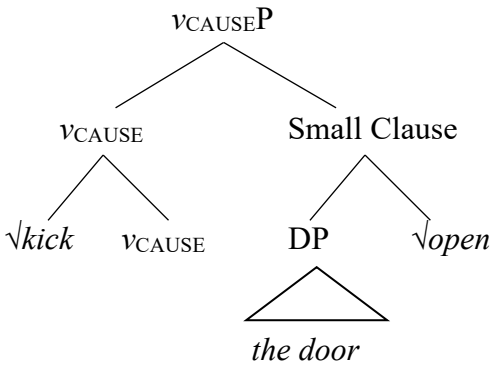


4.6.2 Manner Conflation on/off

In §2.2.3, we presented Talmy's (1985, ff.) typology regarding Manner and Path. Romance languages, including Portuguese, are Path conflated languages, whereas English and Chinese are Manner conflated languages. In §4.3, we presented how this typological variation is represented in syntax.

It has been claimed that English resultatives involves embedded Small Clause and Manner Conflation (Mateus, 2012). For instance, the structure of an English resultative example is presented in (42), where the head v_{CAUSE} takes as complement a Small Clause that contains a DP and a result-denoting root √*open*. The Manner-denoting root √*kick* is conflated as an adjunct to the head v_{CAUSE}, modifying the causing eventuality.

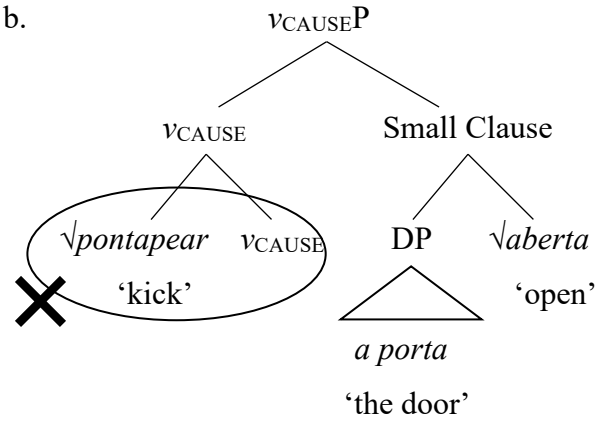
(42) *John kicked the door open*.



In contrast, the Manner Conflation option is "off" in Romance languages. For this reason, in Portuguese, it is impossible to form resultatives like (42), as illustrated in (43).

(43) a. #O *João pontapeou a porta aberta.*[48] (Portuguese)
the John kicked the door open
Intended: 'John kicked the door open.'

b.



Romance languages only allow "simple resultatives" with light verbs (see §2.2.2), where Manner Conflation is not involved. For instance, the Portuguese simple resultative in (44), which repeats (45a) in §2.2.2, is acceptable, contrasting to (43).

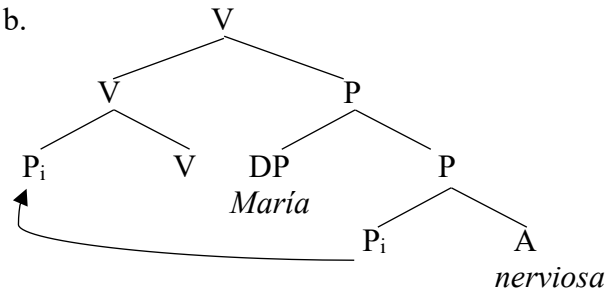
(44) *O aluno fez a pintura esborratada.*
the student made the painting smudged
'The student made the painting smudged.' (Duarte & Oliveira, 2010)

Mateu (2012) claims that the Spanish simple resultative in (45a) has the structure in (45b), where the verb *poner* 'put' is moved from the embedded Small Clause.

(45) a. *Juan puso a María nerviosa*. (Spanish)
John put to María nervous
'John got María nervous.'

[48] The adjective *aberta* 'open' is not intended to form an NP with the noun *porta* 'door', but rather to function as a result predicate.

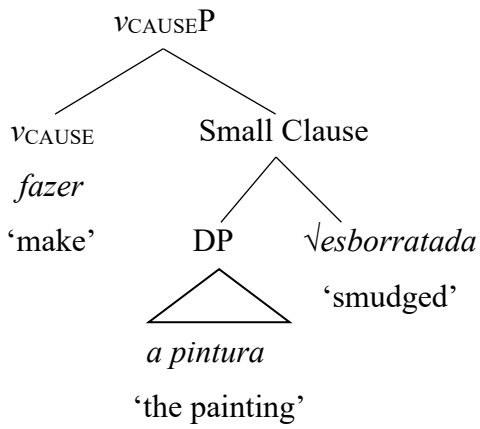
b.



(Mateu, 2012)

However, we argue that Romance causative verbs like Spanish *poner* 'put', represented by *faire* in French, *hacer* in Spanish, *fare* in Italian, and *fazer* in Portuguese, are phonetic realizations of the head v_{CAUSE}. The advantage of our proposal is that it can also account for the causative constructions such as those in (40) since it is roughly the same set of verbs that can serve as the main verbs in both causatives and simple resultatives.[49] Assuming that *fazer* 'make' is a phonetic realization of the head v_{CAUSE} in Portuguese, we propose that the simple resultative in (44) involves the following structure.

(46)



4.7 Summary

Based on our analysis in the previous sections in this chapter, a comparison between English, Romance, and Chinese resultatives is presented in Table 2. Since Manner Conflation is possible in English and Chinese but not in Romance, true resultatives are attested in the first two but not in Romance. Although English and Chinese both exhibit true resultatives, they differ in the embedded domain – v_{CAUSE} embeds a Small Clause in English but a root in Chinese. A direct

[49] In Portuguese, the causative verbs include *fazer*, *deixar* and *mandar* (see §2.1.3).

consequence is that English resultatives show a non-contiguous word order, but Chinese resultatives (the CR V-Vs) show V-V adjacency.

	Manner Conflation	**Selection of** v_{CAUSE}	**Outcome**
English	Possible	Small Clause	True resultative (non-contiguous)
Romance	No	Small Clause	Simple resultative
Chinese	Possible	root	True resultative (compound)

Table 2 - English, Romance, and Chinese resultatives

We have shown that Chinese CR V-Vs involve root-selecting v_{CAUSE} and Manner Conflation. However, Portuguese does not allow either one. Therefore, for L1 Portuguese learners to successfully acquire L2 Chinese CR V-Vs, the feature values of the functional head v_{CAUSE} need to be reset. In particular, they have to "switch on" the root-selecting option and Manner Conflation possibility for v_{CAUSE}.

5 The L2 acquisition of CR V-Vs

5.1 Previous studies

5.1.1 Previous L1 studies

Data of Chinese-speaking children's acquisition of CR V-Vs can be found in Chao (1968), Chen (2006, 2008, 2016), Deng (2010), Erbaugh (1982, 1992), Hsu (2017), Xiao et al. (2006), and Yang (2006).

Chao (1968, cited in Chen, 2008) observed early productions of overgeneralized compounding through a longitudinal study of his Mandarin-speaking granddaughter Canta, who started creating innovative but odd compounds as early as 28 months. At this age, the overgeneralization in verb compounding included the production of compound verbs with an intervening NP, which violates the V-V adjacency constraint.

Erbaugh (1982, 1992) investigated the development of children's Mandarin learning through a longitudinal study of 4 Mandarin-speaking children aged 1:10 through 3:10. Erbaugh divided the development into four stages. It was found that the "resultative complement constructions", which include CR V-Vs, were relatively rare at Stage II but became frequent at Stage III. However, children still often incorrectly produced zero causatives where V-Vs should be used (e.g., **Wo yao gao zhe ge* 'I want to tall this') (1982: 600). In addition, while producing many conventional V-Vs (e.g., *ca-ganjing* 'wipe clean') (1982: 602), the children also created V-Vs that sound odd to adult native-speakers (e.g., *pengfang* 'bump-put down' to describe an unsuccessful attempt to smash a balloon) (1992: 404), showing overgeneralization. At Stage IV, no increase of frequency is observed, but there is developmental trend towards adult-like productions. Another observed non-target-like production is the stacking of too many verbs (1992).

Xiao et al. (2006) examined the longitudinal grammatical development of two children with 1-2 years of age acquiring a southern variety of Chinese as their native language. The results showed early production of "V-V compounds" (terminology used by the authors), which include both directional V-Vs and CR V-Vs. Some examples of the early CR V-Vs are *qie-kai* 'cut-open' and *da-po* 'beat-broken'. According to Xiao et al., around 70% of the verbs at V2 position in the V-V compounds of the two children were also used as independent predicates in other utterances. According to the authors, the fact that children before two can form syntactic categories in conformity with adult language properties is compatible with a

bootstrapping account that regards syntactic categories as substantive universals of Universal Grammar.

Yang (2006) analyzed children's early verb usages through the transcripts of two Mandarin-speaking children. It is found that CR V-Vs were not uncommon before two years of age (e.g., 踢倒 *ti-dao* 'kick-fall' was produced at 1;8). The results of this study suggest children's early knowledge of many aspects of Chinese basic grammar. According to Yang, this might be better explained by a very early parameter setting.

Chen's (2006, 2008) investigated Chinese-speaking children's acquisition of directional V-Vs and CR V-Vs. Results show that the children produced both types of V-Vs from an early age (as young as 1;4 – 1;7). The early uses may be restricted to the V-Vs that they heard in the input, but from at least 2;6 they started using V-Vs productively. They are aware of the compositionality of the V-Vs and know the function of each component – for CR V-Vs, they know which component expresses the cause and which the result. However, overgeneralization is observed in children of age 2;6 to 6;1, creating non-target-like V-Vs. For example, a 3;6 year-old produced **che-bai* 'pull-bend' in describing an event of cutting spring onions by moving them against a static knife. In addition, they also produced V-Vs with V2 position occupied by verbs that are not allowed in the adult grammar, such as 坐 *zuo* 'sit', *zhan* 'stand', 蹲 *dun* 'squat', 滚 *gun* 'roll', 转 *zhuan* 'spin', 滑 *hua* 'slide', 晃 *huang* 'shake', 关 *guan* 'close', showing incomplete knowledge of the construction. It is claimed that children do not learn the full constraints of CR V-Vs until an older age – beyond age 6. According to this author, such a learning pattern offers support to the usage-based learning approach where learning is seen as a constructive process from an item-based schema to pivot-like structures, which eventually arrive at the target grammar driven by the frequency of the forms in the input. For the CR V-V type with ambiguous thematic structures, it has been found that the children's responses were even more "correct" than that of the adults – they accepted more interpretations than the adults did for every CR V-V type. In a later work, Chen (2016) further investigated children's interpretation of CR V-Vs and found that while children were able to interpret the state-change meaning of CR V-Vs, they also incorrectly treated V1 as entailing a state change. This author thus concluded that although transparency in form facilitates children's learning of CR V-Vs, the children have difficulties in unpacking the meanings of individual verbs, revealing language-specific learning issues.

Deng (2010) investigated Chinese-speaking children's acquisition of directional V-Vs, phrase V-Vs, and CR V-Vs, which are called "resultative verb compounds" (RVC) altogether

by this author. The study comprises a longitudinal study of two children from 1;6 to 2;6 and a novel-verb experiment on 32 children aged between 2;9 and 4;0. The results of the longitudinal study show very early spontaneous RVC production, at around 1;7. Moreover, the distribution of the RVC types in children differed from that of the adults in the first observational period – around one-fifth to one-quarter of the children's RVCs was not found in the adult input prior to their use. The novel-verb experiment shows that children can comprehend and produce some novel RVCs. However, intransitive directional V-Vs seem to be easier than the transitive CR V-Vs in both comprehension and production. It is also observed that the 3-year-olds have not fully acquired the event structure of RVCs: in the comprehension task, they tend to ignore the activity subevent in CR V-Vs; in the production task, they made non-adultlike zero causatives. It is concluded that young children use RVCs productively, they can decompose and form novel RVCs, and their RVC productions are not confined to adult input. According to the author, the findings lend support to the rule-based learning of the RVC by children and challenge the usage-based account. Regarding the failure of comprehending or producing some novel RVCs, Deng claims that this is understandable if it is assumed that the rules governing the RVC formation are lexical rules instead of syntactic rules.

Hsu (2017) investigated children's development of productivity in "Resultative Verb Compounds" (RVC), which includes CR V-Vs, directional V-Vs and phase V-Vs, and pivotal constructions. The earliest RVC observed in the sample emerged at age 1;2. Children's RVC use started to flourish at age 2;2 and continued to expand to age 3. The children younger than age 5 varied in their ability to produce RVCs with novel words. The author concluded that children's vocabulary knowledge and the strength of the RVC representation were the two significant predictors of their productivity in forming novel RVCs.

All these L1 studies revealed early use of CR V-Vs by children. Overgeneralization of CR V-Vs is observed (e.g., Chao, 1968; Erbaugh, 1982, 1992; Chen, 2006, 2008), and incorrect use of zero causatives is detected (e.g., Erbaugh, 1982, 1992; Deng, 2010). However, while Yang (2006), Xiao et al. (2006), and Deng (2010) claim that children show productivity in CR V-Vs at an early age, Chen (2006, 2008) argues that children's early CR V-Vs are item-based and input-driven, and productivity did not occur until 6 years old. Concerning the comprehension of CR V-Vs, children accept multi-interpretations of ambiguous CR V-Vs (Chen, 2006, 2008) but may have incomplete knowledge of the semantic compositionality, which is manifested by their unfamiliarity of the activity subevent (Deng, 2010) or incorrect interpretation of the activity-denoting V1 as encoding a change-of-state event (Chen, 2016).

5.1.2 Previous L2 studies

There are a few studies on L2 acquisition of Chinese CR V-Vs, and the participants are mostly L1 English learners (e.g., Qiao, 2008; Xiao, 2010; Yuan & Zhao, 2010; Zhang, 2014; Zhao, 2006). Although there exist some studies with a focus on other L1s, such as Thai and Vietnamese, they are mostly framed by error analysis, describing the error types and providing pedagogical suggestions. Studies on L2 acquisition of Chinese CR V-Vs within the theoretical framework of Universal Grammar are very few. Reference on CR V-V acquisition by learners of L1 Romance languages, including Portuguese, has not yet been found. In fact, it is a common problem in studies on L2 Chinese acquisition that there is a limited number of L1s. As pointed out by Zhao (2011), L2 learners with English, Korean, and Japanese as their L1s have received the most attention, and learners' L1 backgrounds are on the whole typologically restricted. With that said, our investigation on Chinese CR V-Vs' acquisition by L1 Portuguese learners makes a good contribution to fill the current research gap. More importantly, as presented in §2.2 of Chapter 2 and §4.6 of Chapter 4, Portuguese is typologically different from both Chinese and English in terms of resultative formation. English and Chinese are satellite-framed languages, allow Manner Conflation, and can form resultatives. Contrastingly, Portuguese is a verb-framed language, does not allow Manner Conflation, and is highly restricted in forming resultatives. Given that previous works on L2 Chinese CR V-V acquisition have mostly focused on learners of L1 English, our data from learners of L1 Portuguese, which is typologically different from both Chinese and English, can bring great value to the understanding of L2 acquisition, more specifically, the role of UG and L1. In the following, we will review some of the previous works.

5.1.2.1 Zhao (2006)

Zhao (2006) investigated the acquisition of L2 Chinese psych verbs, unaccusative verbs, resultative V-*de* ("resultative construction"), and CR V-Vs ("compound causative construction") by 55 L1 English, 56 L1 Japanese, and 73 L1 Korean learners. The participants also included 28 Chinese native speakers as a control group. Based on the scores in a cloze test, each L1 group was classified into low-intermediate, intermediate, and high-intermediate subgroups. The study includes three tasks, a production test, an acceptability judgment test, and a comprehension test. The production test only covers the psych and unaccusative verbs,

the acceptability judgment test covers all the target structures, and the comprehension test targets the resultative V-*de* and CR V-Vs.

The CR V-V items in the acceptability judgment fall into 6 categories (3 items in each) by the nature of V1/V2 (i.e., unaccusative, unergative, adjective, psych verb, transitive). Results suggest that the L2 learners can acquire the syntactic structure of CR V-Vs, as the high-intermediate groups accept the type of CR V-Vs where V1 is transitive and V2 is unaccusative (e.g., *da-sui* 'hit-break'), showing native-like (L1 English and Japanese) or near-native (L1 Korean) responses. This type of CR V-V is considered "the prototype" of CR V-Vs by Zhao. In contrast, the CR V-Vs formed with unergative V1 and psych V2 (e.g., *ku-fan* 'cry-bore') is the least accepted, followed by those with transitive V1 and unergative V2 (e.g., *ma-ku* 'scold-cry').[50] According to Zhao, the native-like or near-native judgment of certain type of CR V-Vs by the L2 learners indicates that the learners can acquire the syntactic structure of CR V-Vs; the variation among different types of CR V-Vs is due to the L2 learners' failure of accommodating certain θ-role assignment patterns, which implies an independent development path of the L2 syntactic structure from the L2 thematic structure. Based on Zhao's proposal, Japanese and Korean, but not English, exhibit compound causatives, but the results of this test show that learners from the three L1s do not show much variation in their responses to the six types of CR V-Vs on the whole. The L1 transfer seems to be detected only in L1 Japanese learners' responses to the CR V-Vs with transitive V1 and psych verb V2 (*ting-fan* 'listen-bore').

In the comprehension test, only three CR V-V items were included, namely *zhui-lei* 'chase-tire', *ma-fan* 'scold-tire', and *qi-lei* 'ride-tire'[51], each of which occurred three times: once without any context, once in a pictorial context that is biased toward the reading of N1 as Causee, and once in a pictorial context oriented to the reading of N2 as Causee. Five options were provided for the participants to choose: "The sentence is ungrammatical", the reading of N1 as Causee, the reading of N2 as Causee, either N1 or N2 is the Causee, and "I don't know".

[50] However, we find this categorization a bit problematic. First, 笑 *xiao* 'laugh' and 哭 *ku* 'cry' are treated as unergative verbs by Zhao (2006), but unergative verbs generally cannot occur at V2 position (see §3.2.3). We argue that these two verbs have unaccusative uses when serving as V2 in CR V-Vs, denoting a change of state. For the second, while considering 湿 *shi* 'wet' as an adjective, Zhao treats 累 *lei* 'tired' (translated as 'tire' by Zhao) as a psych verb. The ambiguous distinction between adjectives and verbs in Chinese (see §3.1) makes this classification unconvincing. It is not explained why 湿 *shi* 'wet' cannot be treated as a verb meaning 'be/become wet' or why 累 *lei* 'tired' cannot be treated as an adjective. Furthermore, the notion of "psych verb" comes from a different categorization scheme from 'unaccusative/unergative/transitive verbs', and psych verbs may be simultaneously unaccusative or transitive.

[51] The translation is from Zhao (2006).

Results show that the L2 learners cannot yield native-like interpretation and that the learners' L1 plays a role.

Therefore, Zhao concluded that the syntax of Chinese CR V-Vs can be projected in L2 grammars, which supports the claim that functional categories can be acquired by L2 learners, independently from their L1 (see Slabakova, 2003). According to Zhao, the successful acquisition is achieved through "robust, unambiguous positive evidence" due to the high frequency of CR V-Vs in Chinese (2006: 286). However, difficulty occurs regarding the θ-role assignments. In particular, the L2 grammar cannot accommodate when N2 is not an internal argument of V1 or if V2 has θ-relation with N1; a CR V-V is easier to acquire if V2 has θ-relation with N2, and N2 is coindexed with the internal argument of V1. As to L1 transfer, it does not occur in all aspects of the study. Zhao explains that L1 transfer may occur in the early stage but it is difficult to define how early exactly it should be. Another problem is that if low-proficiency learners are examined, their L2 data may not be reliable.

In Zhao's study, only a small number of CR V-Vs were included, and their acquisition can hardly be interpreted as successful acquisition of CR V-Vs a productive syntactic construction. As Zhao also realized, some types of CR V-Vs were not covered in the tests, for example, the CR V-Vs where N1 is not an Agent of V1 (2006: 288). Moreover, the CR V-V items in the Grammaticality Judgment Task were all grammatical ones. It is unknown whether their acquisition is merely a result of chunk learning.

5.1.2.2 Qiao (2008)

Qiao (2008) investigated the acquisition of directional V-Vs, phase V-Vs and CR V-Vs (all these V-Vs are called "resultative verb compounds" in the study) by L1 English learners, with a focus on the learning of telicity, assuming that English marks telicity either lexically (1a) or through the direct object (1b), while Chinese change-of-state meaning is lexically realized by the combination of two verbs (1c).

(1) a. *Josh noticed the girl behind him.*

b. *Josh ate a whole pizza by himself.*

c. 张三 摘 下 了 苹果。

Zhangsan zhai xia le pingguo.

Zhangsan do.picking.action descend ASP apple

'Zhangsan picked the apple.' (Qiao, 2008)

The participants include 6 advanced L2 learners, 6 intermediate learners, 6 beginners, and 6 native speakers. A story comprehension task was conducted, containing 15 stories written in English, 8 of which describe change-of-state events and 7 no-change-of-state events. Each story was followed by a few sentences. One sentence involves a V-V compound, and the other only contains the V1 component (the activity verb) of that compound. The participants were asked to rate each sentence from 1 to 3 based on semantic appropriateness.

The results show that for change-of-state stories, high proficiency learners correctly preferred V-V compounds over the activity verbs, but the beginners did not show such a distinction. For no-change-of-state events, the advanced group exhibited a strong preference for the activity verbs over the compounds, but the responses of the beginners and the intermediate learners were random, showing their incapability of differentiating these two categories. The overall results show that L1 transfer of the telicity parameter is evident in the initial state of L2 acquisition. According to Qiao, this is consistent with the view that a certain amount of exposure to the target language is needed for L2 learners to restructure their parameters towards L2 settings. In addition, a developmental trend was observed among the L2 learners, with the more advanced learners performing better than the less advanced ones, suggesting the possibility of parameter resetting of telicity.

5.1.2.3 Xiao (2010)

Xiao (2010) investigated L2 acquisition of Chinese causatives by L1 English learners. A total of 67 L1 English learners participated in the study, but only 56 learners (31 intermediate and 25 advanced learners) were counted.

The study was conducted through an English to Chinese translation task, which contains 20 English sentences with causative meanings.

Results show that the L2 learners were able to produce Chinese syntactic causatives, some verb compounds (including CR V-Vs), and some morphological causatives (i.e., -化 *hua* '-ify'). Errors of ungrammatical causative use of some psych verbs were observed, which, according to this author, is evidence of L1 transfer since these verbs' counterparts in English allow causative alternation.

However, although the results show that the L2 learners can produce some Chinese CR V-Vs, we do not know from this study whether these learners have full knowledge of this construction. The CR V-Vs produced by these learners may have been acquired as lexical chunks.

5.1.2.4 Yuan & Zhao (2010)

Yuan & Zhao (2010) investigated the reconstruction of thematic structures in L1 English learners' L2 Chinese CR V-Vs ("resultative compound constructions" in their terminology). The participants include 55 L1 English learners of L2 Chinese and 28 native speakers. Based on the results of a cloze test, the L2 learners were divided into low-intermediate, high-intermediate and advanced groups.

An acceptability judgment test was conducted. The items included 15 target sentences containing CR V-Vs of 5 types (Type A, B, C, D, and E, with 3 tokens each), which differentiate from each other in their thematic patterns, namely, the θ-relations between N1, N2, and V1, V2. The participants were asked to rate each sentence by circling a number on the continuum scale between -2 and +2.

Results show that high-intermediate and advanced groups accepted the Type A sentences, in which N2 serves as a patient/theme of V1 and V2 simultaneously. In contrast, none of the L2 learner groups accepted Type B, C, and D sentences, and there was a significant difference between the learner groups (including the advanced group) and the native control group. For Type E sentences, where N1 is interpreted as the Causee, while the low and high intermediate groups showed indeterminacy, the advanced group showed acceptance, and there was no significant difference between the advanced group and the native control group. According to Yuan & Zhao, it is likely that the acceptance of the Type E sentences is due to L1 transfer since the Subject-as-Causee thematic structure also exists in the learners' L1 English (e.g., *Peter received the news of his mother's death, utterly shocked*).

Yuan & Zhao concluded that there is an asymmetry between the reconstruction of the syntactic structure and that of thematic structures in L1 English learners' acquisition of Chinese CR V-Vs. Their L2 Chinese grammar seems to be able to accommodate thematic structures that exist in the learners' L1 but cannot implement necessary reconstruction. However, as recognized by these authors, it is not clear whether native-like thematic structures can be successfully acquired in the final states of L1 English learners' L2 Chinese grammars.

5.1.2.5 Zhang (2014)

Through a corpus study, Zhang (2014) investigated L2 development of Chinese "resultative verb compounds" (RVCs), which include directional V-Vs, phase V-Vs, CR V-Vs, and

lexicalized resultative compound verbs. The corpus consists of 784 essays written by L1 English L2 Chinese learners at the intermediate-low, intermediate-high, and advanced levels, as well as 100 essays written by Chinese native speakers.

Results show that compared to other types of RVCs, CR V-Vs had the lowest frequencies in both L2 learners' and native speakers' data. The token and type of CR V-Vs showed a linear positive relationship to the L2 learners' language proficiency. The intermediate-high group, advanced group, and native group produced significantly more CR V-Vs than the intermediate-low group. However, due to the relatively low frequencies of CR V-Vs in the L2 learner corpus, no significant difference was observed between these groups. This author concluded that the study revealed a three-phase development of RVC acquisition: the whole-word formula phase (RVCs are acquired as non-compositional chunks with fixed meanings), the emergence of compound awareness phase, and the solidified compound awareness and lexical development phase.

5.1.2.6 Summary

Previous L2 studies on Chinese CR V-Vs are summarized in Table 3 below. In Yuan & Zhao (2010) and Zhao (2006), successful acquisition of the syntactic structure is observed, but the thematic structures seem to impose difficulties. The L1 transfer is observed in CR V-Vs' comprehension (Qiao, 2008; Yuan & Zhao, 2010; Zhao, 2006). A developmental trend is observed in Qiao (2008) and Zhang (2014).

Studies	Focus	L1	Participants	Methodology	Main findings
Zhao (2006)	Psych and unaccusative verbs, resultative V-de, CR V-Vs	English, Japanese, Korean	55 L1 English learners, 56 L1 Japanese learners, 73 L1 Korean learners, and 28 native speakers.	Production test (unaccusative and psych verbs); acceptability judgment test; comprehension test (resultative V-de and CR V-Vs)	L2 learners from all L1s have native-like responses on the prototypical CR V-Vs but show uncertainty or optionality on the other types. L2 functional categories can be acquired, but **difficulty exists in the θ-role assignment** in non-prototypical CR V-Vs. **L1 transfer** is observed in the comprehension test.
Qiao (2008)	Telicity of phase V-Vs, directional V-Vs, and CR V-Vs	English	6 advanced learners, 6 intermediate learners, 6 beginners, and 6 native speakers	Story comprehension task	**L1 transfer** of telicity parameter is still operational in the initial state of L2 acquisition (a certain amount of exposure to the target language is needed before parameter resetting); **a developmental trend** is found among the L2 learners (the possibility of parameter resetting of telicity).
Xiao (2010)	Causatives	English	56 L1 English learners	Translation task	The L2 learners are **able to produce** Chinese syntactic causatives, some verb compounds (including CR V-Vs), and some morphological causatives.

Yuan & Zhao (2010)	Thematic structures of CR V-Vs	English	55 L1 English learners and 28 native speakers	Acceptability judgment test	There is an asymmetry between the reconstruction of the syntactic structure and that of thematic structures. The L2 Chinese grammars can **accommodate thematic structures that exist in learners' L1 but cannot reconstruct**.
Zhang (2014)	Directional V-Vs, phase V-Vs, CR V-Vs, and lexicalized resultative compounds	English		Corpus study	The token and types of CR V-Vs showed a linear positive relationship to the learners' language proficiency. The L2 acquisition of CR V-Vs showed a **three-phase development**, with a developing understanding of the compositionality and capability of forming new compounds productively.

Table 3 - Summary of previous L2 studies of Chinese CR V-Vs

Capitalizing on the outcomes of the previous studies and on what we described both for Portuguese and Chinese, as well as on what we proposed for the Chinese CR V-Vs construction, in the following, we will present the relevant hypotheses in §5.2 and the empirical study in §5.3.

5.2 L2 acquisition hypotheses

5.2.1 UG access

In terms of what role UG plays in L2 acquisition, some early studies proposed that UG was inaccessible, and there was a fundamental difference between L1 acquisition and L2 acquisition (e.g., Bley-Vroman, 1990; Clahsen & Muysken, 1986; Schachter 1988). For instance, the Fundamental Difference Hypothesis (Bley-Vroman, 1990) claims that UG does not survive L1 acquisition, and L2 grammatical properties which depend on UG are only available via the L1 grammar.

Contrastingly, some other researchers argue for a full access view of UG in L2 acquisition (e.g., Epstein et al., 1996; Flynn, 1996; Schwartz & Sprouse, 1994, 1996; White, 2003), although the L2 learners may initially transfer L1 properties due to lack of enough L2 exposure. That leads us to the following section, about L1 transfer.

5.2.2 L1 transfer

Since L2 learners already possess a fully developed L1 grammar with parameters fixed to L1 settings, researchers divide in what role L1 plays when the learners attempt to acquire L2.

According to some scholars, there is no L1 transfer in the acquisition of an L2 grammar. A representative of the no transfer view is the Full Access (without Transfer) Hypothesis (Epstein et al., 1996, 1998; Flynn & Martohardjono, 1994; Flynn, 1996), which implies that the initial state of L2 is not L1 grammar, but UG. Based on L2 input, the L2 learners are able to acquire L2 grammars via direct access to UG. According to this hypothesis, L2 acquisition is very similar to L1 acquisition, which is constrained by UG at all stages. It implies that in L2 acquisition there is parameter setting but no need for parameter resetting.

A partial transfer view has been argued for by several researchers. Vainikka & Young-Schoulten's (1994, 1996a, b) Minimal Trees Hypothesis claims that only lexical categories constitute the initial stage of L2 acquisition. The initial L2 grammar lacks functional categories altogether, and thus there is no L1 transfer in functional categories. However, this hypothesis assumes that the full inventory of functional categories in UG remains accessible. Based on L2 input, L2 learners gradually add functional categories to their interlanguage grammar. Eubank (1993/1994, 1994, 1996)'s Valueless Feature Hypothesis claims that lexical and functional categories of the L1 are both present in the earliest interlanguage grammar, but the feature values of the functional categories are not present – they are valueless or "inert". Therefore, there is no transfer of L1 feature values in L2 acquisition. The Processability Theory (Pienemann, 1998, Pienemann & Håkansson 1999) claims that the L2 learners are building a new grammar with the gradual development of the L2 lexicon from scratch; only if the L1 and the L2 share the same lexicon and are very closely related (e.g., Swedish and Norwegian) can the learners be considered to make use of the L1 in processing L2. As argued by Håkansson (2001), structures that seem to be transfer on the surface are actually parts of universal developmental stages.

As a proponent of the full transfer view, the Full Transfer Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996) proposes that the entire L1 grammar constitutes the L2 initial stage, and parameters are initially set at L1 values. In response to L2 input, UG-constrained restructuring will take place in order to accommodate properties of the L2 input, and parameters can be reset to values more appropriate to the L2. On this view, parameter resetting is attainable in L2 acquisition. It also predicts that learners with different L1s may have different developmental trends, showing properties of their respective L1 grammars. However, some other full transfer proponents argue that parameter resetting is unavailable. The Failed Functional Feature Hypothesis (Hawkins & Chan, 1997) is one of such proposals. It claims that the interlanguage grammar only has recourse to the L1 parameter settings, and the functional features that are not realized in L1 cannot be acquired.

5.2.3 More considerations in L2 acquisition

Under the assumption of UG access and L1 transfer in L2 acquisition, it can be inferred that theoretically, L2 learners should be able to reset the parameters and attain the target grammar at the end stage. However, in practice, it has been observed that even advanced L2 learners encounter difficulties, and the L2 acquisition may not be a linearly progressive development. In recent years, it has been proposed that more factors play an important role in L2 acquisition development, such as the Feature Reassembly Hypothesis (Lardiere, 2005, 2008, 2009a, b) and the Bottleneck Hypothesis (Slabakova, 2009, 2014, 2016, 2019).

The Feature Reassembly Hypothesis (Lardiere, 2005, 2008, 2009a, b) argues that L2 acquisition necessarily involves acquiring formal features (e.g., [+/-Q] and [+/- definite]) and assembling the lexical items of the target language. According to Lardiere, the parameter "selection" part seems easy, but the feature "assembly" part may impose difficulty, as it requires that "the learner reconfigure features from the way these are represented in the first language (L1) into new formal configurations on possibly quite different types of lexical items in the L2" (Lardiere 2009a: 173).

According to the Bottleneck Hypothesis (Slabakova, 2009, 2014, 2016, 2019), the functional morphology is the bottleneck of L2 acquisition. Here, the functional morphology refers to the set of morphosyntactic features that drives syntax and semantics and that may or may not be overtly expressed by a morpheme (Slabakova, 2019). "Without it, sentences would sound unacceptable to native speakers of the language. Without integrating functional morphology in comprehension, we will be reduced to shallow processing" (Slabakova, 2016: 402). Slabakova (2019) put forward a parametric hierarchy, indicating that the acquisition of microparameters is more difficult than that of the macroparameters. According to Slabakova, the core syntax and semantics come easily, while the functional morphology is responsible for the most difficulties.

In addition, Chomksy (2005) suggests three factors that interact to determine language acquisition: genetic endowment, experience, and principles that are language- or even organism-independent. It draws our attention to not only the language faculty (the first factor), but also experience and principles of data processing and of architectural/computational-developmental constraints. Building on this, Yang (2010) further claims that a parameter supported with abundant and unambiguous evidence in the input will be learned earlier than a parameter for which the supporting evidence is scarce. That means, ambiguous or scarce evidence in the input may impose difficulty for efficient acquisition.

5.3 The experimental study

5.3.1 Research questions

As presented in Chapter 4, Chinese CR V-Vs involve Manner Conflation and root-selecting v_{CAUSE}. Contrastingly, in Portuguese, Manner Conflation is not allowed, and the root-selecting option for v_{CAUSE} is not available. Therefore, for L1 Portuguese L2 Chinese learners, successful acquisition of CR V-Vs requires the setting of the related feature values of the parameters.

Our empirical study aims to find out if L1 Portuguese learners are able to acquire L2 Chinese CR V-Vs, a structure that is absent in their L1, and how CR V-Vs are acquired by them. Under the assumption of the Full Transfer Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996), our research questions (RQ) are the following ones, corresponding to the questions 2-4 raised in Chapter 1.

RQ1: What is the role of UG in the acquisition of L2 Chinese CR V-Vs by L1 Portuguese learners: Is UG accessible?

RQ2: What is the role of L1 in the acquisition of L2 Chinese CR V-Vs by L1 Portuguese learners: Is L1 transfer evident?

RQ3: Is there a proficiency effect in the acquisition of all the CR V-V constraints? If not, what can account for the difficulties?

Regarding RQ1, if UG is accessible, we predict that the learners' L2 grammars converge towards the relevant properties of L2. That means, there will be an increase of L2 learners' knowledge of CR V-Vs across proficiency levels, and high proficiency learners' performance will be closer to that of native speakers. For RQ2, under the assumption of UG access and given that the L1 and L2 exhibit distinct properties, if there is L1 transfer, we predict L1-like properties in the learners' interlanguage grammars. As to RQ3, considering that the acquisition of CR V-Vs involves functional morphology and requires the reassembly of features, we predict that the L2 learners (including the advanced ones) may face some difficulties and do not exhibit target-like productions at the same level of native speakers.

5.3.2 Participants

The participants of the empirical study include 27 L1 Portuguese L2 Chinese learners (aged 22-31, Mean=25.8), and 27 Chinese native speakers as a control group (aged 25-33, Mean=30). A summary of the participants' demographic information can be found in Table 4.

	N	Female	Male	Age range	Mean age
L2 learners	27	11	16	22-31	25.8
Control group	27	20	7	25-33	30.0

Table 4 - Demographic information of participants

Due to the complexity of the target construction, and the fact that this construction is barely explicitly instructed either in the classroom or in the existing L2 Chinese textbooks (except for some particular V-V combinations, which might be taught as chunks) to the best of our knowledge, we set the criteria that the L1 Portuguese L2 Chinese learner participants should have studied Chinese for at least three years or have the minimum proficiency level of Chinese Proficiency Test (HSK) level III, which corresponds to B1 level according to the Common European Framework of Reference for Languages.[52]

A sample of the questionnaire form of personal information and language profile can be found in Appendix 4. A summary of the L2 learners' language profile is presented in Figure 1.

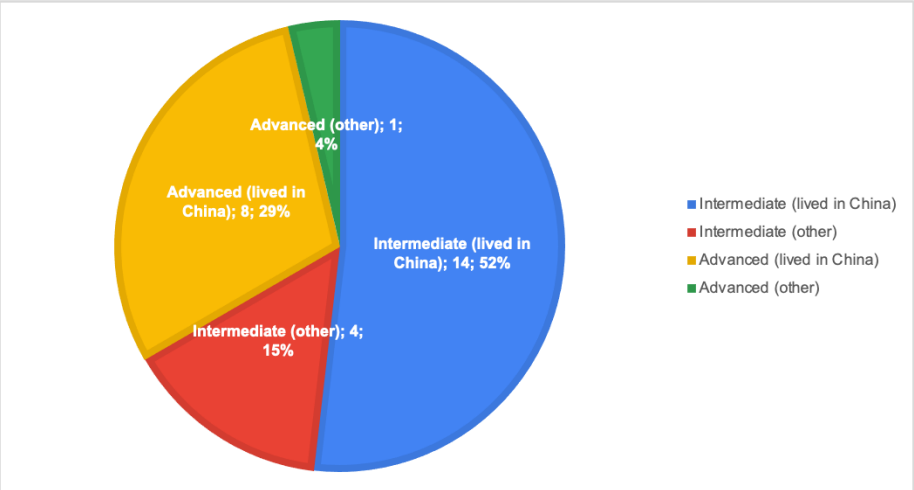


Figure 1 - Language profile of L2 learner participants

[52] Information regarding the correspondence between the levels of Chinese Proficiency Test (HSK) and those of Common European Framework of Reference for Languages (CEF) can be found on the official website of Han Ban (Confucius Institute Headquarters), at http://english.hanban.org/node_8002.htm.

Among the L2 learner participants, 18 (66.7%) are intermediate Chinese learners (HSK III/IV), and 9 are advanced learners (HSK V/VI). Their Chinese study length ranges between 3 and 10 years (Mean=5.07 years). Twenty-two of them (81.5%) lived or have been living in China for at least 3 months, one has only taken a one-month trip to China, and four have never been to any Chinese-speaking region.[53] The mean length of their stay in China is 1.31 years, and the maximum length is 4 years.

5.3.3 Materials and procedures

The experimental study consists of 3 tests in total: Test 1 is a Semi-elicited Production Task (SPT) to find out whether L1 Portuguese learners can produce Chinese CR V-Vs; Test 2 is a Grammaticality Judgment Task (GJT), which is designed to investigate L1 Portuguese learners' knowledge of Chinese CR V-V – more specifically, whether they show acceptance to the grammatical ones and rejection to the ungrammatical ones; Test 3 is a Comprehension Task (CT), through which we attempt to find out how L1 Portuguese learners interpret Chinese CR V-Vs and whether their interpretation is similar to that of the Chinese native speakers. Both the L2 learners and the native speakers are required to complete the three tests.

All materials were pilot-tested prior to the actual gathering of the data. The pilot test was conducted to make sure that the instructions are clear and that the video clips and pictures are understood by the participants in the expected way.

Each participant first completed Test 1 (SPT) through video conferencing with the author, where their oral output was recorded. Upon the completion of this test, the participants were provided with a weblink to the online questionnaire, where they should fill in their personal information and language profile, and complete Test 2 (GJT) and Test 3 (CT).

The participants were required to complete the tasks independently, without consulting a dictionary or any other resource. All the instructions were given in the participants' mother tongues. This means, the L2 learners were given instructions in their L1 Portuguese, whereas the native speakers were instructed in Chinese. For internet accessibility reasons, the Portuguese version and the Chinese version of the questionnaires were designed via different platforms (Google Forms for L2 learners, and wenjuan.com for Chinese native speakers). The

[53] Although we consider the language immersion as an important factor in the L2 acquisition, the results of this study will not be sufficient to make a statistic comparison between the immersion group and the non-immersion group due to the unbalanced proportion (23 vs. 4).

author dedicatedly selected the platforms which were able to generate very similar layouts of questionnaires to prevent any possibly unwanted interference of results.

A detailed description of the three tests is presented in the following sections. All the CR V-V items in the tests were chosen according to the descriptions presented in the literature and our observations (see Chapters 2 and 3).

5.3.3.1 Test 1 – Semi-elicited Production Task (SPT)

Through the Semi-elicited Production Task (SPT), we attempt to find out whether and in what contexts L1 Portuguese L2 Chinese learners produce Chinese CR V-Vs, and compare the strategies that they use to those of the Chinese native speakers.

This test was conducted via Zoom (https://zoom.us), with the presence of the author and one participant each time. After a warm-up period in which the task was explained, the participant was asked to complete a practice trial before the start of the actual test. The stimulus set is composed of 30 video clips, including 20 target clips and 10 distracting clips. Each target video clip depicts a caused-result event (see Table 6, 8, 10 below). Through screen sharing, the video clips were presented one by one to the participant. Each time only one video clip was shown on the screen, accompanied by a set of keywords as cues. After watching each video clip, the participants were asked to say a sentence in Chinese using the provided keywords to describe the clip. For L2 learners, all the keywords were presented together with their Pinyin[54] and meaning in Portuguese. The Pinyin was provided to prevent possible difficulties caused by the Chinese characters; the meanings were presented to elevate the validity in reading the data (errors caused by misunderstanding of the words would be reduced). An additional viewing was provided if a participant could not recall the details or did not understand the clip.[55] After describing all the video clips in Chinese, the L2 learners were also asked to produce sentences in their L1 Portuguese to describe the same videos, from which we attempted to acknowledge what constructions are used in their L1. The Chinese native speakers were only asked to produce sentences in Chinese, and the keywords were presented in Chinese characters only. There was no limitation of time for the test completion.

Examples of the screen display for L2 learners and native speakers are presented in Figure 2 and 3, respectively.

[54] Pinyin is the Romanization of the Chinese characters based on their pronunciation.
[55] In the native speaker group, 6 additional viewings were provided (6 different clips; 6 different participants). In the L2 learner group, 6 additional viewings were also provided (4 different clips; 3 different participants – 2 intermediate and 1 advanced learners).

Figure 2 – Test 1 screen display for L2 learners

Figure 3 – Test 1 screen display for native speakers

The keyword list for each clip always includes two nominals and one or two Vs, attempting to elicit a description of a caused-result event with two overt arguments. Among the 20 target items, 6 items gave only the result denoting V (which is supposed to take the V2 position in Chinese CR V-Vs), and 14 items gave both the cause denoting V (V1 in CR V-Vs) and the result denoting V (V2 in CR V-Vs). A total of 14 different V1s and 18 different V2s were used. The full list of clip descriptions and keywords in this test can be found in Appendix 1. We randomized the items through random.org and double-checked the list to make sure that items involving the same Vs are not adjacent to each other.

The target items consist of the following:

A. Chinese CR V-Vs which may correspond to Portuguese single verbs

The CR V-Vs belonging to this subgroup include those in Table 5. The target sentences are presented in Table 6.

L2 Chinese	L1 Portuguese
V1 + 脏 *zang* 'dirty'	*sujar* 'to stain'
V1 + 干净 *ganjing* 'be.clean'	*limpar* 'to clean'
V1 + 碎 *sui* 'break (intransitive), broken'	*partir* 'to break'
V1 + 开 *kai* 'open'	*abrir* 'to open'
杀死 *sha si* 'kill die'	*matar* 'to kill'
煮熟 *zhu shu* 'cook cooked'	*cozer* 'to cook'
切断 *qie duan* 'cut snap'	*cortar* 'to cut'

Table 5 - CR V-Vs corresponding to L1 single verbs in Test 1

L2 Chinese	L1 Portuguese
她 弄/搞 脏 了 桌子。 *Ta nong/gao zang le zhuozi.* she make dirty ASP table 'She stained the table.'	*Ela sujou a mesa.* she stained the table 'She stained the table.'

她 弄/擦 干净 了 桌子。 *Ta nong/ca ganjing le zhuozi.* she make/wipe clean ASP table 'She made/wiped the table clean.'	*Ela limpou a mesa.* she cleaned the table 'She cleaned the table.'
她 弄/打 碎 了 杯子。 *Ta nong/da sui le beizi.* she make/hit break ASP cup 'She broke the cup.'	*Ela partiu o copo.* she broke the cup 'She broke the cup.'
她 打/弄 开 了 盒子。 *Ta da/nong kai le hezi.* she hit/make open ASP box 'She opened the box.'	*Ela abriu a caixa.* she opened the box 'She opened the box.'
她 杀 死 了 虫子。 *Ta sha si le chongzi.* she kill die ASP insect 'She killed the insect to death.'	*Ela matou o inseto.* she killed the insect 'She killed the insect.'
她 煮 熟 了 大米。 *Ta zhu shu le dami.* she cook cooked ASP rice 'She cooked the rice.'	*Ela cozeu arroz.* she cooked rice 'She cooked rice.'
她 切 断 了 树枝。 *Ta qie duan le shuzhi.* she cut snap ASP branch 'She cut the branch.'	*Ela cortou o ramo.* she cut the branch 'She cut the branch.'

Table 6 - Target sentences corresponding to L1 single verbs in Test 1

B. Chinese CR V-Vs which correspond to Portuguese syntactic causatives

This subgroup includes the CR V-Vs in Table 7. The target sentences are presented in Table 8.

L2 Chinese	L1 Portuguese
V1 + 哭 *ku* 'to cry'	*fazer chorar* 'make cry'
V1 + 掉 *diao* 'to fall'	*fazer cair* 'make fall'

Table 7 - CR V-Vs corresponding to L1 syntactic causatives in Test 1

L2 Chinese	L1 Portuguese
哥哥 弄/欺负 哭 妹妹 了。 *Gege nong/qifu ku meimei le.* brother make/bully cry sister ASP 'The brother made the sister cry.'	*O irmão fez a irmã chorar. / O irmão fez chorar a irmã.* the brother made the sister cry / the brother made cry the sister 'The brother made the sister cry.'

她 弄/碰 掉 盒子 了。 *Ta nong/peng diao hezi le.* she make/touch drop box ASP 'She made the box drop.'	*Ela deixou a caixa cair. / Ela deixou cair a caixa.* she made the box drop / she made drop the box 'She made the box drop.'

Table 8 - Target sentences corresponding to L1 syntactic causatives in Test 1

C. Chinese CR V-Vs which correspond to clauses in subordination/coordination or with gerunds in Portuguese

The V1-V2 pairs include the ones in Table 9. The target sentences are presented in Table 10.

Cause denoting V1	Result denoting V2
玩 *wan* 'to play'	坏 *huai* 'damaged'
晒 *shai* 'to shine'	化 *hua* 'to melt (intransitive)'
逗 *dou* 'to tease'	笑 *xiao* 'to laugh'
唱 *chang* 'to sing'	哭 *ku* 'to cry'
喝 *he* 'to drink'	醉 *zui* 'drunk'
听 *ting* 'to listen'	懂 *dong* 'to understand'
踢 *ti* 'to kick'	开 *kai* 'open'
哭 *ku* 'to cry'	湿 *shi* 'wet'
跑 *pao* 'to run'	累 *lei* 'tired'
教 *jiao* 'to teach'	会 *hui* 'to know, to be able to'
吃 *chi* 'to eat'	饱 *bao* 'full'

Table 9 - CR V-Vs corresponding to L1 clauses with coordination/subordination/gerunds in Test 1

L2 Chinese	L1 Portuguese
她 玩 坏 了 洗衣机。 *Ta wan huai le xiyiji.* She play damaged ASP washing.machine 'She made the washing machine damaged by playing (with it).'	*Ela brincou com a máquina de lavar que depois ficou avariada.* she played with the machine of washing that then got broken 'She played with the washing machine, which then got broken.'
太阳 晒 化 了 冰块。 *Taiyang shai hua le bingkuai.* sun shine melt ASP ice-cubes 'The sun made the ice cubes melt by shining (on them).'	*O sol brilhou e os cubos de gelo derreteram.* the sun shined and the cubes of ice melted 'The sun shined, and the ice cubes melted.'

爸爸 逗 笑 了 孩子。 *Baba dou xiao le haizi.* dad tease laugh ASP child 'The dad made the child laugh by teasing (the child).'	*O pai brincou com a criança e fê-la rir.* the dad played with the child and made.him laugh. 'The dad played with the child and made him laugh.'
他 唱 哭 了 评委。 *Ta chang ku le pingwei.* he sing cry ASP judge 'He made the judge cry by singing.'	*Ele cantou tão bem que fez o júri chorar.* he sang so well that made the judge cry 'He sang so well that made the judge cry.'
她 喝 醉 酒 了。 *Ta he zui jiu le.* she drink drunk alcohol ASP 'She got drunk by drinking alcohol.'	*Ela bebeu álcool e ficou bêbeda.* she drank alcohol and got drunk 'She drank alcohol and got drunk.'
她 听 懂 广播 了。 *Ta ting dong guangbo le.* she listen understand radio ASP 'She got to understand the radio by listening to it.'	*Ela ouviu o rádio e compreendeu.* she listened the radio and understood 'She listened to the radio and understood (it).'
她 踢 开 了 门。 *Ta ti kai le men.* she kick open ASP door 'She kicked the door open.'	*Ela pontapeou a porta para a abrir.* she kicked the door to it open 'She kicked the door to open it.'
她 哭 湿 了 衣服。 *Ta ku shi le yifu.* she cry wet ASP clothes 'She made the clothes wet by crying.'	*Ela chorou tanto que a roupa ficou molhada.* she cried much that the clothes got wet 'She cried so much that the clothes got wet.'
她 跑 累 了。 *Ta pao lei le.* she run tired ASP 'She got tired by running.'	*Ela correu e ficou cansada.* she ran and got tired 'She ran and got tired.'
爸爸 教 会 儿子 骑车 了。 *Baba jiao hui erzi qiche le.* dad teach know son ride-bike ASP 'Dad made the son know how to ride a bike by teaching (him).'	*O pai ensinou o filho a andar bicicleta, e ele aprendeu.* the dad taught the son to ride bike, and he learnt 'The dad taught the son to ride a bike, and he learnt (it).'
她 吃 饱 饭 了。 *Ta chi bao fan le.* she eat full rice ASP 'she got full by eating rice (meal).'	*Ela comeu muito arroz e, por isso, ficou cheia.* she ate much rice and, for that, got full 'She ate a lot of rice and therefore got full.'

Table 10 - Target sentences corresponding to L1 clauses with coordination/subordination/gerunds in Test 1

All the responses were recorded and transcribed. We coded each response based on the construction type that was used in it (e.g., CR V-V, syntactic causative, zero causative). We calculated the CR V-V frequency in each participant's responses and the frequency of each

construction type in each group. The data was analyzed through Excel, and statistical tests were run in R program.

5.3.3.2 Test 2 – Grammaticality Judgment Task (GJT)

Through the Grammaticality Judgment Task (GJT), we attempt to find out whether L1 Portuguese L2 Chinese learners have explicit knowledge of CR V-Vs, in particular, whether they accept CR V-Vs with different V1s/V2s or thematic patterns, are able to recognize alternating and non-alternating CR V-Vs, and are sensitive to CR V-V constraints such as (i) the semantic constraint on V2, (ii) the "small-size" constraint, (iii) the V-V adjacency, (iv) the V-V integrity, and (v) the constraint in Type VIII. The results are based on how successful they are in accepting the grammatical CR V-Vs and ruling out the ungrammatical counterparts.

This task was conducted through an online questionnaire. It consists of 52 items in total, including 35 target items (20 grammatical and 15 ungrammatical ones) and 17 distracting items (10 grammatical and 7 ungrammatical ones). All the target items contain CR V-Vs, which cover diversified conditions in terms of the properties of V1/V2, the thematic patterns, the possibility of causative alternation, the contiguous or non-contiguous word order, and the occurrence or non-occurrence of adverbial modifiers of V1/V2. We dedicatedly designed the items so that each grammatical-ungrammatical pair for comparison is minimally different: the only variable is the target constraint, and all the other conditions are held the same. For example, the sentences in (2) are designed for V-V adjacency, and thus the grammatical and ungrammatical sentences only differ in the word order. Examples of distracting items are presented in (3). The full list of items in this task can be found in Appendix 2.

(2) a. 她 画 脏 了 手。
Ta hua zang le shou.
she paint dirty ASP hand
'She painted (her) hand dirty.'

b. *她 画 手 脏 了。
**Ta hua shou zang le.*
she paint hand dirty ASP
Intended: 'She painted (her) hand dirty.'

(3) a. 面包 被 它 吃 了。

Mianbao bei ta chi le.

bread PASS it eat ASP

'The bread was eaten by it.'

b. *他们 学 中文 了 一 年。

**Tame xue zhongwen le yi nian.*

they learn Chinese ASP one year

'They have learned Chinese for one year.'

In this task, each item was accompanied by a picture as a cue to help the participants understand the intended meanings of the sentences. For L2 learners, both Chinese characters and their Pinyin were presented, and the Portuguese translation of some words was also provided to prevent invalid responses caused by no knowledge or misunderstanding of those words. For native speakers, the sentences were presented in Chinese characters only.

The participants were asked to rate the sentences focusing on the grammaticality and acceptability in the target language, one by one, by choosing a value in a Likert scale from 1 (completely unacceptable) to 5 (completely acceptable). There was no time limit for the task completion.

Samples of the questionnaire display are presented in Figure 4 and 5, which contain a grammatical sentence.

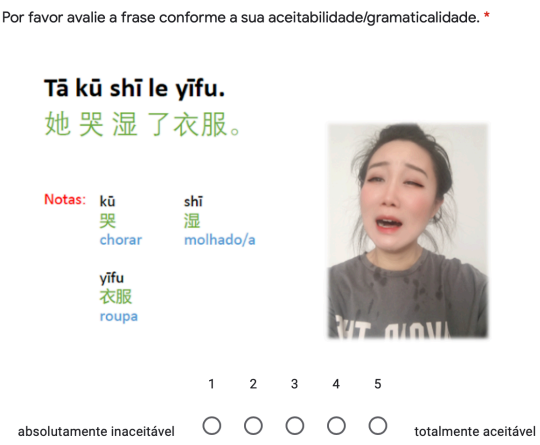


Figure 4 – Test 2 screen display for L2 learners

Figure 5 – Test 2 screen display for native speakers[56]

[56] An asterisk (*) was displayed in both versions of questionnaires due to the software default settings for required questions (it is a symbol to show that the answer to this question is obligatory).

The items were randomized through random.org. We double-checked the list and manually moved some items to make sure that similar items are not adjacent to each other.

Both Excel and R program were used to analyze the data.

5.3.3.3 Test 3 – Comprehension Task (CT)

Through the Comprehension Task (CT), we attempt to find out how L1 Portuguese L2 Chinese learners interpret CR V-Vs and whether their interpretation is similar to that of the Chinese native speakers.

This test is part of the same online questionnaire used for Test 2. After completing Test 2, the participants were automatically directed to Test 3.

There are 10 items altogether, including 7 target items and 3 distractors. Each target item contains a Chinese sentence with a CR V-V involved. Among the 7 target sentences, 4 have ambiguous interpretations and 3 do not show ambiguousness. Each sentence was accompanied by several interpretations written in the participants' native languages (i.e., Portuguese for L2 learner participants, and Chinese for native speakers). The participants were asked to choose the correct one(s) for each sentence based on their understanding, and they were allowed to choose more than one. The participants also had the option of rejecting all and indicating any other interpretation that they considered better. For L2 learners, the sentences were presented in both Pinyin and Chinese characters, and the Portuguese translation of some words was provided to prevent data invalidity caused by no knowledge or misunderstanding of those words. For the native speakers, the sentences were presented in Chinese characters only.

The 7 target items are presented in the following:

Item 1: 女儿 想 哭 妈妈 了。
Nuer *xiang* *ku* *mama* *le*.
daughter miss cry mom ASP

a. 'The daughter misses her mom, so the daughter cried.'
b. *'The daughter misses her mom, so the mom cried.'
c. *'The mom misses her daughter, so the daughter cried.'
d. 'The mom misses her daughter, so the mom cried.'

Item 2: 医生 等 急 病人 了。

Yisheng deng ji bingren le.

doctor wait anxious patient ASP

a. ‘The doctor is waiting for the patient, and the doctor got anxious.’

b. *‘The doctor is waiting for the patient, and the patient got anxious.’

c. *‘The patient is waiting for the doctor, and the doctor got anxious.’

d. ‘The patient is waiting for the doctor, and the patient got anxious.’

Item 3: 妹妹 追 累 哥哥 了。

Meimei zhui lei gege le.

sister chase tired brother ASP

a. ‘The sister is chasing the brother, and the sister got tired.’

b. ‘The sister is chasing the brother, and the brother got tired.’

c. *‘The brother is chasing the sister, and the sister got tired.’

d. ‘The brother is chasing the sister, and the brother got tired.’

Item 4: 他 骑 累 马 了。

Ta qi lei ma le.

he ride tired horse ASP

a. ‘He is riding a horse, and he got tired.’

b. ‘He is riding a horse, and the horse got tired.’

Item 5: 哥哥 打 赢 了 他的 同学。

Gege da ying le ta-de tongxue.

brother fight win ASP his classmate

a. ‘The brother fought with his classmate, and the brother won.’

b. *‘The brother fought with his classmate, and the classmate won.’

Item 6: 他 打 败 了 巨人。

Ta da bai le juren.

he fight lose ASP giant

a. *‘He fought with the giant, and he lost.’

b. ‘He fought with the giant, and the giant lost.’

Item 7: 老师 说 哭 学生 了。

Laoshi shuo ku xuesheng le.

teache talk cry student ASP

a. *‘The teacher talked to the student, and it made the teacher cry.’

b. ‘The teacher talked to the student, and it made the student cry.’

c. *‘The student talked to the teacher, and it made the teacher cry.’

d. *‘The student talked to the teacher, and it made the student cry.’

The full list of items in this test can be found in Appendix 3. Samples of the questionnaire display are presented in Figure 6 and 7, which contain a sentence that accepts two options.

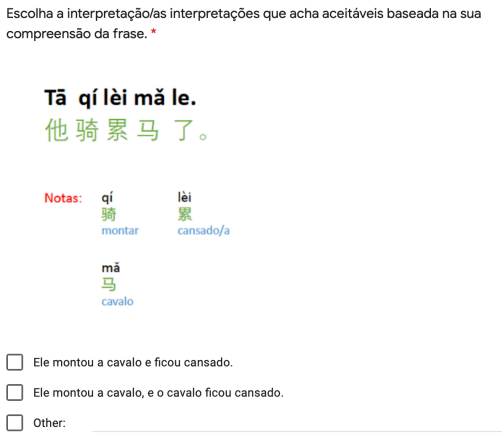


Figure 6 - Screen display of Test 3 for L2 learners

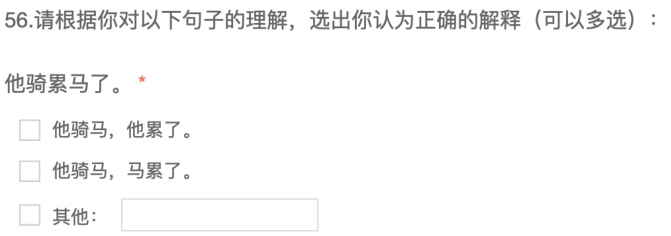


Figure 7 - Screen display of Test 3 for native speakers

The items were randomized through random.org, and we double-checked the list to make sure that similar items are not adjacent to each other.

We used both Excel and R program to analyze the data.

5.4 Summary

Previous studies on L2 Chinese CR V-V acquisition have mainly focused on learners with English as their L1. Our investigation on CR V-V acquisition by L1 Portuguese learners not only contributes to fill the research gap by providing data from participants with a different L1, but more importantly, it can help us understand the role of UG and L1 in L2 acquisition, given that Portuguese is typologically different from both Chinese and English in resultative formation. If L1 transfer is present and UG is accessible, we expect to observe L1-like

properties in the learners' interlanguage grammars, and as proficiency increases, the learners' CR V-Vs should show properties closer to those of the target language. However, assuming with the Feature Reassembly Hypothesis and the Bottleneck Hypothesis, we predict that the advanced learners still exhibit non-target-like CR V-Vs.

To test out our hypotheses and investigate the acquisition process, we conducted a dedicatedly designed experiment, consisting of a semi-elicited production task, a grammaticality judgment task, and a comprehension task. The results are presented in full length in the following chapter.

6 Results

6.1 Results of the Semi-elicited Production Task (SPT)

The L2 learner participants on average spent 14.76 minutes to complete this task, ranging between 6.43 and 33.2 minutes (excluding the Portuguese production part). The native speakers on average spent 7.66 minutes to complete the task, ranging between 4.17 and 14.23 minutes.

The percentage of each structure type in each group's responses was calculated. The result is presented in Figure 8.

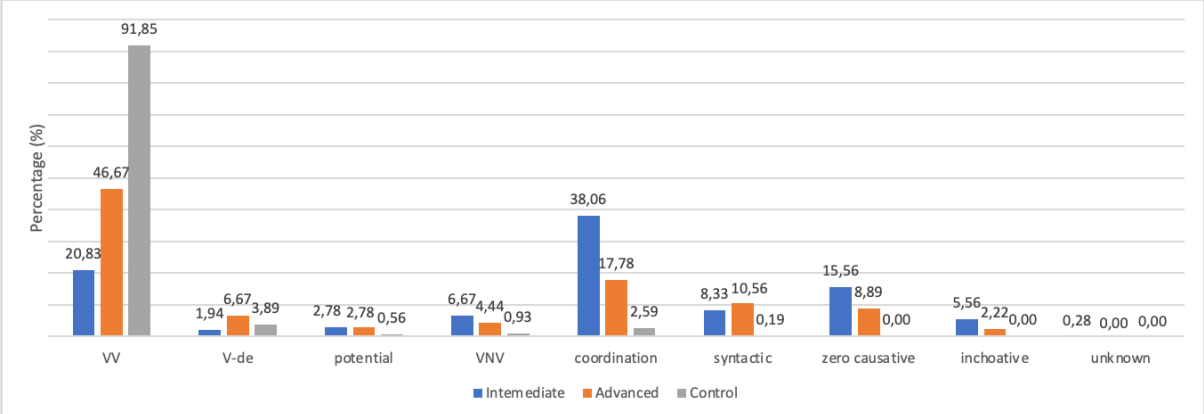


Figure 8 – Produced structure types by groups in Test 1

In the control group, 91.85% of the responses contain CR V-Vs, which indicates that the task successfully elicited the target structure. The next preferred structure by the native speakers is the resultative V-*de* construction (3.89%), followed by coordinating clauses (2.59%). The remaining 1.67% involve the "VNV" sequence (they can be analyzed as pivotal constructions), potential forms, or syntactic causatives.

In the intermediate L2 group, 38.06% of the responses involve coordinating clauses, overtaking the CR V-Vs (20.83%), which is followed by zero causatives (15.56%) and syntactic causatives (8.33%). Other structures that occurred in the intermediate learners' responses include resultative VNV forms[57], inchoative single verbs, potential forms, V-*de*, and unidentifiable structures.

The advanced group outperformed the intermediate group in CR V-V frequency (46.67% vs. 20.83%). In the advanced learners' responses, the CR V-Vs took the biggest percentage

[57] The VNV form refers to the instances where V1 and V2 are intervened by a NP, with the surface similar to pivotal constructions (e.g., *He invited me to eat*) or English resultatives (e.g., *John hammered the metal flat*). Chinese CR V-Vs do not allow any NP to intervene between the two Vs. It is unclear which exactly is the syntactic structure of these L2 learners' utterances. Thus, we simply use "VNV" to describe the surface form.

(46.67%), followed by coordinating clauses (17.78%), syntactic causatives (10.56%), and zero causatives (8.89%). In addition, compared to the intermediate group, the advanced learners produced resultative V-*de* and syntactic causatives more frequently (6.67% vs. 1.94%; 10.56% vs. 8.33%) and showed a recovery from non-native like coordinating clauses (17.78% vs. 38.06%) and zero causatives (8.89% vs. 15.56%). Since in Chinese the resultative V-*de* and syntactic causatives are appropriate structures alternative to CR V-Vs to express resultative/causative meanings, our results suggest that with proficiency increase, the L2 learners not only have a better knowledge of CR V-Vs but also have a better overall knowledge of L2 Chinese grammars.

Among the control group's 496 responses that contain CR V-Vs, 310 (62.5%) involve the marker 把 *ba*, which highlights the subject's disposal of or impact upon the object, and 34 (6.85%) contain the passive marker 被 *bei*. Among the L2 learners' 159 responses that involve CR V-Vs, the marker 把 *ba* co-occurred in 46 (28.93%); only two responses contain the passive marker 被 *bei*, and one involves the passive marker 让 *rang*.

We calculated the CR V-V frequency in each participant's production. As shown in the summary in Table 11 and the boxplots in Figure 9, although all L2 learner participants demonstrated some ability to appropriately supply CR V-Vs for designated cause-result events, they were largely outperformed by the control group.

	N	Min (%)	Median (%)	Mean (%)	Max (%)	SD
Intermediate	18	5.00	17.50	20.83	85.00	18.96204
Advanced	9	20.00	50.00	46.67	70.00	14.7902
Control	27	70.00	95.00	91.85	100	7.225509

Table 11 - CR V-V frequency in Test 1

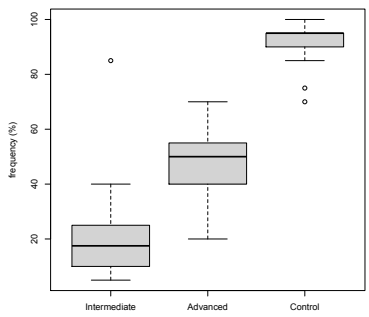


Figure 9 - Boxplots of CR V-V frequency in Test 1

Comparing the two L2 groups, we find that the advanced group outperformed the intermediate group in both median (50.00 vs. 17.50) and mean (46.67 vs. 20.83). As shown by the boxplots in Figure 9, the distribution of the intermediate group has one outliner (namely, the participant PT-20-INT), who produced much more frequent CR V-Vs than other members of the group. The distribution of the advanced group is roughly normal.

We also find that the CR V-V frequency of two L2 learner participants (PT-20-INT and PT-01-ADV), being 70% and 85% respectively, fell within the frequency range of the control group (70-100%). Interestingly, these two L2 learners are among the few participants who have never lived in a Chinese-speaking region. PT-20-INT has studied Chinese for 3 years, and PT-01-ADV for 10 years. Despite a CR V-V frequency as high as 85%, the participant PT-20-INT only had reached HSK III (and was studying for IV), which means an intermediate level of Chinese.[58]

Since the sample sizes of the three groups are different, we ran three Welch's t-tests to find out if there is any statistically significant between-group difference. As shown by the results in Table 12, the difference is significant between all the groups (Inter.×Adv.: p=0.000916<0.05; Adv.×Cont.: 8.063e-06<0.05; Inter.×Cont.: 0.0009162<0.05). For the alternative hypothesis that the true difference is smaller than 0, the p-value is also very small (Inter.×Adv.: p=0.0004581; Adv.×Cont.: 4.031e-06; Inter.×Cont.: 0.0004581). That means, there is a very high probability that the intermediate group is outperformed by the advanced group, and the advanced group is outperformed by the control group, as expected in a language acquisition stage-developmental basis.

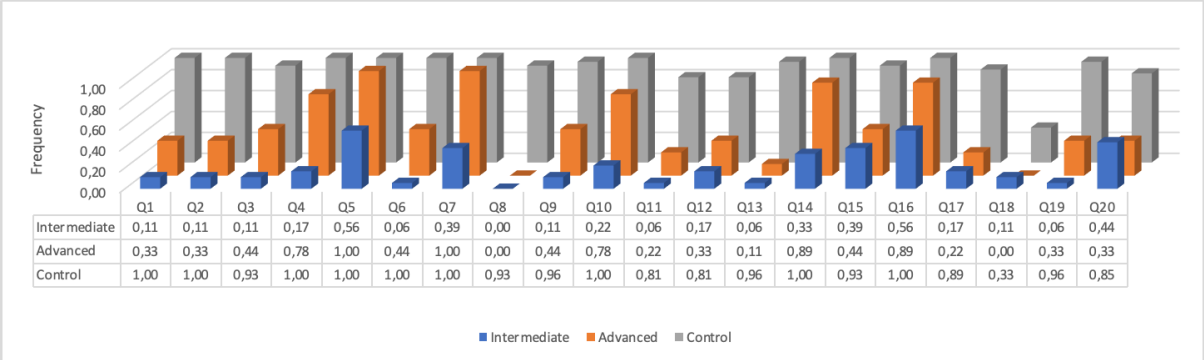
Welch two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
Intermediate × Advanced	-3.8821	20.149	0.0009162	0.0004581
Advanced × Control	-8.8211	9.3054	8.063e-06	4.031e-06
Intermediate × Control	-3.8821	20.149	0.0009162	0.0004581

Table 12 - Welch's t-test of CR V-V frequency in Test 1

Variation is observed if we look at the CR V-V frequency by items (see Appendix 1 for the full list of items). As shown in Figure 10, in the control group's production, the CR V-

[58] The participant PT-20-INT had never lived in China by the time of the experiment but was talking to some Chinese friends frequently, according to a follow-up interview. This participant outperformed other participants with similar length of Chinese studying, which shows that language immersion is a very important factor in L2 acquisition efficiency.

occurrence is much lower with Item 18 (see table 13 below for detailed description). Having a closer look at the responses to this item, we find that the native speakers' responses that do not involve CR V-Vs all contain a modifier of the result-denoting component 累 *lei* 'tired', such as 很 *hen* 'very', 太 *tai* 'too', and 十分的 *shifende* 'extremely'. In this case, alternative structures such as the resultative V-*de* should be applied because the CR V-V structure does not allow any individual modifier of V1/V2 (see §3.2.5 in Chapter 3). Low CR V-V frequency with this item is also observed in the two L2 groups (Intermediate: 0.11; Advanced: 0). That may also be related to the occurrence of V2 modifiers, which were found in 61.11% of the intermediate group's responses and 77.78% of the advanced group's responses. Therefore, the unexpected low frequency of CR V-Vs with this item is due to pragmatic reasons and cannot be taken as an argument against the learnability of CR V-Vs.



	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Intermediate	0,11	0,11	0,11	0,17	0,56	0,06	0,39	0,00	0,11	0,22	0,06	0,17	0,06	0,33	0,39	0,56	0,17	0,11	0,06	0,44
Advanced	0,33	0,33	0,44	0,78	1,00	0,44	1,00	0,00	0,44	0,78	0,22	0,33	0,11	0,89	0,44	0,89	0,22	0,00	0,33	0,33
Control	1,00	1,00	0,93	1,00	1,00	1,00	1,00	0,93	0,96	1,00	0,81	0,81	0,96	1,00	0,93	1,00	0,89	0,33	0,96	0,85

Figure 10 - CR V-V frequency by items in Test 1

Unexpected results[59] have also been found with Items 8 and 20 (see detailed description in Table 13 below), where the advanced group did not outperform the intermediate group.

Item	Video description	Words presented	L2 production sample	Target sentence
8	A boy dragged a girl on the floor, and then the girl cried.	哥 哥 *gege* 'older brother' 妹 妹 *meimei* 'younger sister' 哭 *ku* 'cry'	哥哥 让 妹妹 哭了。 *Gege rang meimei ku le.* brother make sister cry ASP 'The brother made the sister cry.'	哥哥 弄 哭 了 妹妹。 *Gege nong ku le meimei.* brother make cry ASP sister 'The brother made the sister cry.'

[59] We consider the result "unexpected" solely because the advanced group did not produce higher frequency of CR V-Vs for these items. However, the advanced learners were able to produce alternative types of causative constructions grammatically, such as syntactic causatives or the V-*de* resultatives (as shown in Table 13). In general, the advanced group showed a more comprehensive knowledge of Chinese causative expressions.

18	A runner was racing; then she stopped and leaned on the fence.	她 *ta* 'she' 跑 *pao* 'run' 累 *lei* 'tired'	她 跑 得 很 累。 *Ta pao de hen lei.* she run DE very tired 'She ran so much that she became tired.'	她 跑 累 了。 *Ta pao lei le.* she run tired ASP 'She got tired by running.'
20	A girl was eating, and then she leaned back on the chair showing satisfaction.	她 *ta* 'she' 饭 *fan* 'rice' 吃 *chi* 'eat' 饱 *bao* 'full'	她 吃 饭 吃 得 很 饱。 *Ta chi fan chi de hen bao.* she eat rice eat DE very full 'She ate so much rice (meal) that she got very full.'	她 吃 饱 饭 了。 *Ta chi bao fan le.* she eat full rice ASP 'She got full by eating rice (meal).'

Table 13 - Items with unexpected results in Test 1

In particular, no CR V-V was produced by any of the L2 groups for Item 8. Instead, the syntactic causative structure was employed in most of the responses (77.78% in the intermediate group and 88.89% in the advanced group). Regarding Item 20, while there was a slight decrease of CR V-V frequency as L2 learners' proficiency increased (44.44% in intermediate group; 33.33% in advanced group), the advanced group applied much more resultative V-*de*, a structure alternative to CR V-Vs to express resultative meanings (it occurred in only 5.56% of the intermediate group's responses but in 33.33% of the advanced group's).

Except for Items 8, 18, and 20 mentioned above, the advanced group outperformed the intermediate group in all the other items. Moreover, native or near-native performance was observed in the advanced group for Items 5, 7, 14, and 16 (see the item details in Table 14) since the CR frequency in their production is very close to the that in the control group (1 vs. 1 for Q5/Q7, and 0.89 vs. 1 for Q14/Q16; see Figure 10 above).

Item	**Video description**	**Words presented**	**L2 production sample (target sentence)**
5	A person killed an insect.	她 *ta* 'she' 虫子 *chongzi* 'insect' 杀 *sha* 'kill' 死 *si* 'morrer, morto/a'	她 杀 死 了 虫子。 *Ta sha si le chongzi.* she kill die ASP insect 'She killed the insect to death.'
7	A woman cut a branch into pieces.	她 *ta* 'she' 树枝 *shuzhi* 'branch' 切 *qie* 'cut' 断 *duan* 'break, broken'	她 切 断 了 树枝。 *Ta qie duan le shuzhi.* she cut snap ASP branch 'She cut the branch.'
14	A girl was drinking alcohol, and then got drunk.	她 *ta* 'she' 酒 *jiu* 'alcohol' 喝 *he* 'drink' 醉 *zui* 'drunk'	她 喝 醉 了 酒。 *Ta he zui le jiu.* she drink drunk ASP alcohol 'She got drunk by drinking alcohol.'

16	A person kicked a door open.	她 *ta* 'she' 门 *men* 'door' 踢 *ti* 'kick' 开 *kai* 'open, be open'	她 踢 开 了 门。 *Ta ti kai le men.* she kick open ASP door 'She kicked the door open.'

Table 14 - Items with native-like performance in Test 1

Dividing the items into three categories according to their correspondence in L1 Portuguese, namely single verb predicates, syntactic causatives, and clauses in coordination/subordination or with gerunds (labeled as "other"), we compared the average CR V-V frequency in each category by each group. As shown in Figure 11, as proficiency increased, there was an increase of CR V-V frequency in each category. In addition, we have found that the CR V-Vs that correspond to Portuguese syntactic causatives received the lowest CR V-V frequency in both L2 learner groups.

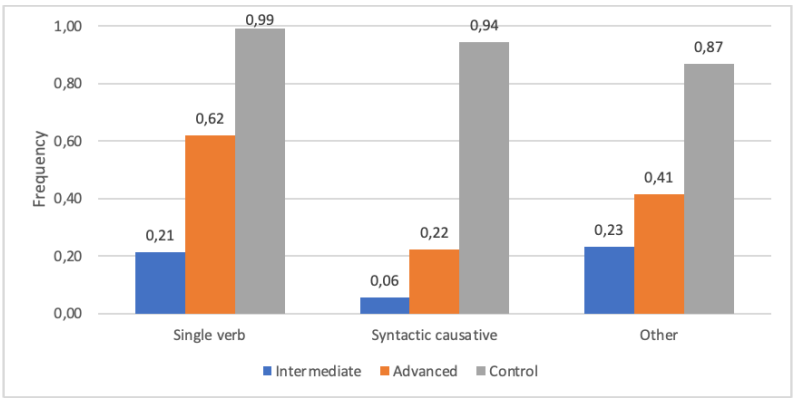


Figure 11 - CR V-V frequency by L1 correspondence in Test 1

In this task, 14 out of the 20 target items were provided with both V1 and V2 as keywords. The other 6 items were provided with the result-denoting component only, which was expected to occur at V2 position in a CR V-V. In the latter case, the participants should add an appropriate Manner verb to form CR V-Vs. We calculated the mean frequency of CR V-Vs in each of these two categories. As shown in Figure 12, in both categories there is an increase of CR V-V frequency with acquisition progress.

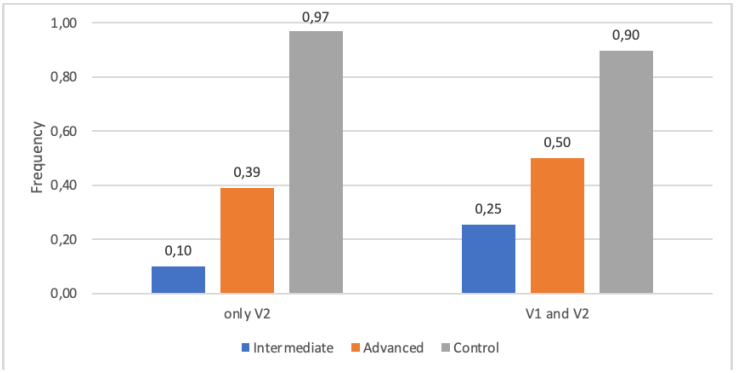


Figure 12 - CR V-V frequency by number of keywords provided in Test 1

Moreover, in both L2 learner groups, the CR V-V frequency is slightly lower with the items where only V2 was provided. Nevertheless, as proficiency increased, the difference diminished (Mean difference is 0.15 in the intermediate group and 0.11 in the advanced group). In the control group's production, the mean frequency is very high in both categories (0.97 and 0.90).

To summarize, despite some particular items, the results of SPT show a general trend that the advanced group outperform the intermediate group in CR V-V production.

6.2 Results of the Grammaticality Judgment Task (GJT)

6.2.1 Overall results

The ratings of acceptable and unacceptable CR V-Vs by the intermediate group, the advanced group, and the control group are summarized in Table 15. The mean scores are compared in Figure 13.

		N	Min	Median	Mean	Max	SD
Intermediate	Acceptable	360	1.00	4.00	3.47	5.00	1.300953
	Unacceptable	270	1.00	3.00	2.80	5.00	1.323508
Advanced	Acceptable	180	1.00	4.00	3.42	5.00	1.502161
	Unacceptable	135	1.00	2.00	2.23	5.00	1.343535
Control	Acceptable	540	1.00	5.00	4.36	5.00	1.121572
	Unacceptable	405	1.00	1.00	1.45	5.00	0.8532243

Table 15 - Scores of acceptable and unacceptable items in Test 2

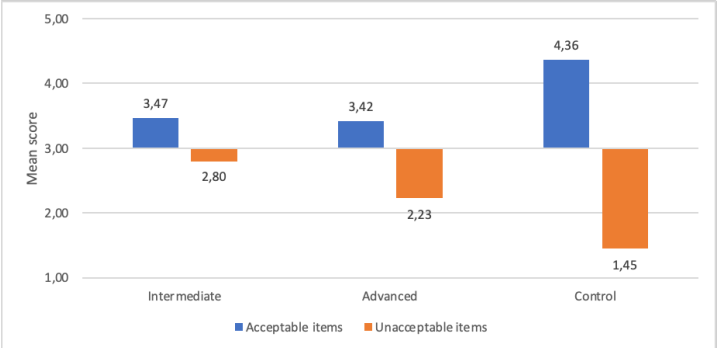


Figure 13 - Mean scores of acceptable and unacceptable items in Test 2

As expected, the control group strongly accepted the acceptable items (Mean=4.36) and rejected the unacceptable ones (Mean=1.45). While showing the same acceptation and rejection trend, the two L2 learner groups showed smaller contrast between the two categories. The acceptable items received similar mean ratings from both L2 groups (Intermediate: 3.47; Advanced: 3.42). The rejection of the unacceptable items is stronger in the advanced group (Mean=2.23) than in the intermediate group (Mean=2.80).

Similar results can be observed from the boxplots in Figure 14. The contrast between the acceptable and unacceptable items seems to be the biggest in the native control group and the smallest in the intermediate group. We also observed some outliers in the control group's responses. We went through the data and did not find any cluster of outliers – they were scattered among different items and different native speakers. Those few unexpected ratings should not challenge the validity of our test design because the sentences were presented individually without any specific background story, and it is quite understandable that a small number of native speakers may find the sentences pragmatically odd. Despite the few outliers, we can still find a very clear trend that the native speakers rate the acceptable items much higher than the unacceptable ones.

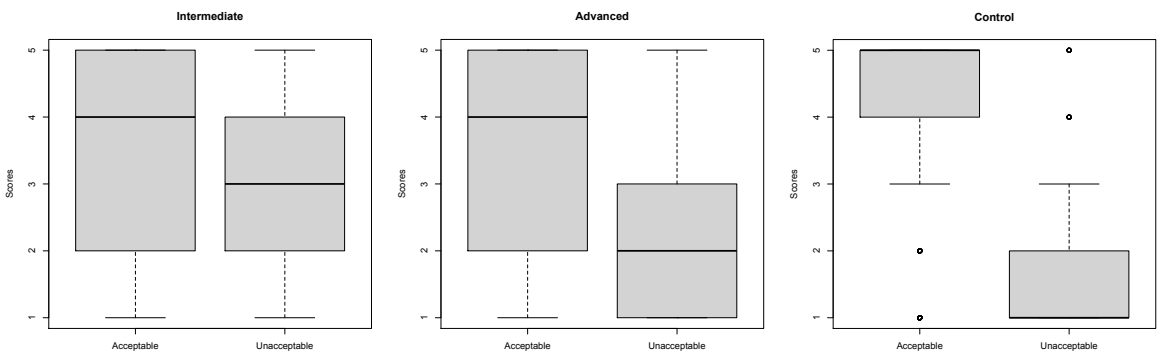


Figure 14 - Boxplots of acceptable and unacceptable items in Test 2

To find if the difference between acceptable and unacceptable items is statistically significant in each group, we ran three Welch's t-tests. As shown in Table 16, the *p*-values are all very low, which indicates that there is a statistically significant difference between the acceptable and unacceptable items for both alternative hypotheses (i.e., the difference is not equal to 0; the difference is bigger than 0) in all three groups. The t value goes from lower to higher, and the *p*-value goes from higher to lower in the same order: the intermediate group, the advanced group, and the control group. That means the strength of contrast between the two categories shows a gradient among the three groups: it is the strongest in the control group and the weakest in the intermediate group, as expected from a developmental perspective.

Welch two sample t-test		**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference>0)**
Acceptable × unacceptable	Intermediate	6.3025	574.19	5.839e-10	2.919e-10
	Advanced	7.4094	303.4	1.268e-12	6.339e-13
	Control	45.305	942.8	< 2.2e-16	< 2.2e-16

Table 16 – Welch two sample t-tests of acceptable and unacceptable items in Test 2

Looking at the scores of the acceptable items only, we ran Welch two sample t-tests to see if there is any significant between-group difference. As shown in Table 17, there is no significant difference between the intermediate and the advanced groups (t=0.33852, *p*=0.7352). However, the difference between the advanced group and the control group is statistically significant (t=-7.6702, *p*=3.874e-13<0.05), and the difference is even more significant between the intermediate and the control group (t=-10.623, *p*< 2.2e-16).

Welch two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
Intermediate × Advanced	0.33852	316.26	0.7352	0.6324
Advanced × Control	-7.6702	248.85	3.874e-13	1.937e-13
Intermediate × Control	-10.623	690.06	< 2.2e-16	< 2.2e-16

Table 17 - Welch two sample t-tests of acceptable items between groups in Test 2

For the unacceptable items, as shown by the results of the three two sample t-tests in Table 18, there is a statistically significant difference for both hypotheses in each comparison pair

since the *p*-values are all under 0.05. The t value goes higher and the *p*-value goes lower in the same order: Intermediate × Advanced, Advanced × Control, and Intermediate × Control.

Welch two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference>0)**
Intermediate × Advanced	4.0475	264.56	6.803e-05	3.402e-05
Advanced × Native	6.3553	171.42	1.814e-09	9.072e-10
Intermediate × Native	14.865	417.38	< 2.2e-16	< 2.2e-16

Table 18 – Welch two sample t-tests of unacceptable items between groups in Test 2

Therefore, although both L2 groups showed a similar tendency of acceptance towards the acceptable CR V-Vs, a stronger tendency of rejecting the unacceptable CR V-Vs was observed in the advanced group. That means, in general, both L2 groups reacted similarly towards the acceptable CR V-Vs, but the advanced group outperformed the intermediate group in ruling out the unacceptable CR V-Vs.

6.2.2 Effect of V1

The items that are included in this analysis are presented in Table 19. In each pair, the only variant is V1 – whether it denotes a genetic causative meaning of 'to do, to make' (being "causative") or has a specific meaning (being "non-causative"). All the sentences are grammatical.

Causative V1	**Non-causative V1**
Q1 她 弄 脏 了 手。 *Ta nong zang le shou.* she make dirty ASP hand 'She made (her) hand dirty.'	Q4 她 画 脏 了 手。 *Ta hua zang le shou.* she paint dirty ASP hand. 'She painted (her) hand dirty.'
Q2 她 弄 哭 了 弟弟。 *Ta nong ku le didi.* she make cry ASP brother 'She made the brother cry.'	Q3 她 打 哭 了 弟弟。 *Ta da ku le didi.* she hit cry ASP brother 'She hit the brother, and this made the brother cry.'

Table 19 - Items for the effect of V1 in Test 2

The scores of the two categories in the three groups are summarized in Table 20. The mean scores are compared in Figure 15. All groups showed acceptance to both categories, but the control group gave higher mean ratings.

	V1	N	Min	Median	Mean	Max	SD
Intermediate	Causative	36	1.00	4.00	3.44	5.00	1.181874
	Non-causative	36	1.00	3.50	3.17	5.00	1.207122
Advanced	Causative	18	1.00	3.00	3.28	5.00	1.447332
	Non-causative	18	2.00	3.50	3.61	5.00	1.092159
Control	Causative	54	3.00	5.00	4.85	5.00	0.4517224
	Non-causative	54	1.00	4.00	3.93	5.00	1.30097

Table 20 - Scores of items with causative or non-causative V1 in Test 2

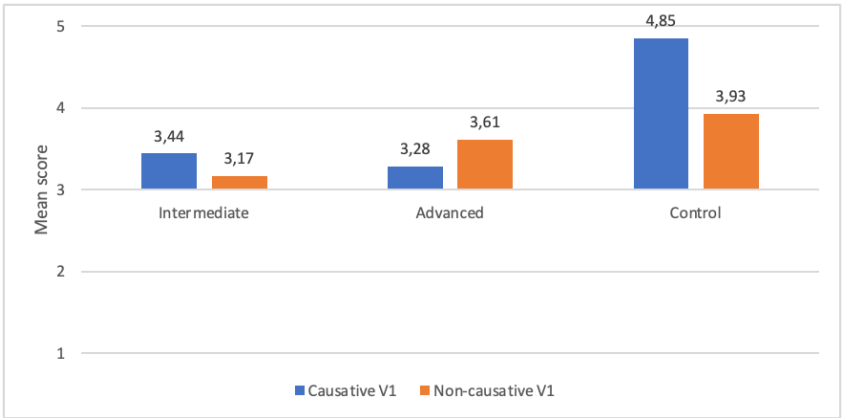


Figure 15 - Mean scores of items with causative or non-causative V1 in Test 2

As shown by the boxplots in Figure 16, no significant difference is observed between the two categories in either the intermediate or the advanced group. While the control group almost consistently rated the items with causative V1 as "5" (with only a few exceptions), a bigger variation is observed among the items with non-causative V1.

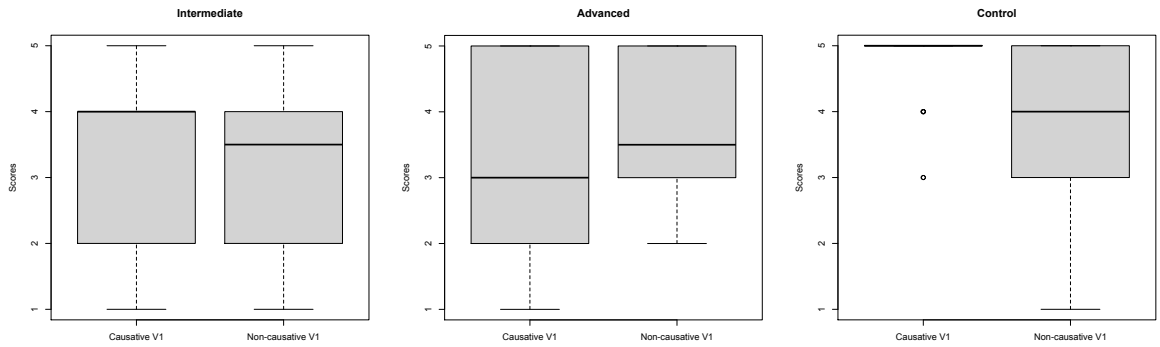


Figure 16 - Boxplots of items with causative or non-causative V1 in Test 2

We ran three paired t-tests to find out if the difference between the two categories is significant in each group. As shown in Table 21, the *p*-values of the intermediate and the advanced L2 learner groups are both high (0.309 and 0.4117), which means, causative or non-

causative V1 does not have a significant effect on the L2 learners' ratings. However, it has a significant effect on the control group's ratings (t=5.7699, *p*=4.197e-07<0.05).

Paired t-test		t	df	*p*-value
Causative V1 × Non-causative V1	Intermediate	1.0324	35	0.309
	Advanced	-0.84163	17	0.4117
	Control	5.7699	53	4.197e-07

Table 21 - Paired t-tests for the effect of V1 in Test 2

As mentioned above, variation is observed among the control group's responses regarding the items with non-causative V1 (see Figure 16 above). Looking at the native speakers' responses to the two items with non-causative V1, namely Q3 and Q4, we find that the variation is mostly from Q3, as shown by the boxplots in Figure 17 below.

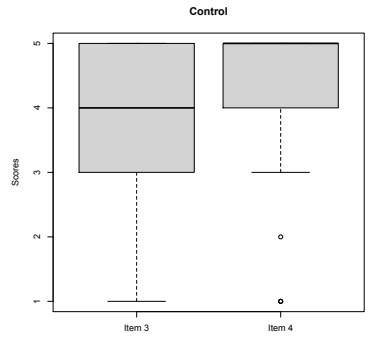


Figure 17 - Boxplots of Items 3 and 4 in the control group

Through a follow-up interview with the native speaker participants who rated any of these items as "1" or "2", we have acknowledged thsat their low ratings are due to pragmatic reasons: the canonical SVO word order expresses a neutral meaning and the sentences sound quite out of blue and weird without any specific context; they would sound more natural with the co-occurrence of 把 *ba* (as in (1)), which emphasizes the impact of the Causer on the Causee.

(1) a. 她 把 弟弟 打 哭 了。
Ta ba didi da ku le.
she BA brother hit cry ASP
'She hit the brother, and this made the brother cry.'

b. 她 把 手 画 脏 了。
Ta ba shou hua zang le.
she BA hand paint dirty ASP

'She painted (her) hand dirty.'

However, this pragmatic interference does not call into question the results of the experimental test since the tendency of acceptance towards these items from the native speakers is very clear, as shown by the boxplots in Figure 17 and the mean/median values (Item 3: Mean=3.74, Median=4.00; Item 4: Mean=4.11, Median=5.00).

We ran Welch's t-tests to find out if there is any significant between-group difference in any of the two categories. As shown by the results in Table 22, no statistically significant difference is found between the intermediate and the advanced groups since the *p*-values are above 0.05, but the difference in the items with non-causative V1 (t=-1.3603, *p*=0.1819) is more significant than those with causative V1 (t=0.42309, *p*=0.6754). Therefore, there is a weak tendency that the advanced group outperforms the intermediate group in accepting the CR V-Vs with non-causative V1. The difference between each L2 learner group and the control group is statistically significant except for the non-causative V1 items' judgment between the advanced and the control group (t=-1.0076, *p*=0.3207). That means, the advanced L2 learners' ratings of the items with non-causative V1 are nearly native-like. Contrastingly, the difference between advanced L2 learners and the control group is significant for items with causative V1 (t=-4.541, *p*=0.0002493<0.05), which shows that the Chinese CR V-Vs with causative V1s are more difficult to acquire than those with non-causative V1s by L1 Portuguese speakers.

Welch t-test		**t**	**df**	***p*-value**
Intermediate ×	Causative V1	0.42309	28.677	0.6754
Advanced	Non-causative V1	-1.3603	37.343	0.1819
Advanced ×	Causative V1	-4.541	18.116	0.0002493
Control	Non-causative V1	-1.0076	34.415	0.3207
Intermediate ×	Causative V1	-6.8206	41.887	2.661e-08
Control	Non-causative V1	-2.8332	78.935	0.005848

Table 22 - Welch t-tests of items with causative or non-causative V1 for between-group difference in Test 2

6.2.3 Effect of V2

Three pairs of CR V-Vs are involved in this analysis. In each pair, the nature of V2 is the only variable (i.e., being acceptable or unacceptable), and other conditions are held constant. The items that enter into this analysis are presented in Table 23.

Acceptable V2	Unacceptable V2
Q7 这个 歌手 唱 哭 她 了。 *Zhe-ge geshou chang ku ta le.* this singer sing cry she ASP 'This singer's singing made her cry.'	Q22 *这 个 歌手 唱 跳 她 了。 **Zhe ge geshou chang tiao ta le.* this singer sing jump she ASP 'This singer's singing made her jump.'
Q12 她 看 懂 这 本 书 了。 *Ta kan dong zhe ben shu le.* she read understand this CLF book ASP 'She read this book, and this made her understand (it).'	Q21 *她 看 扔 这 本 书 了。 **Ta kan reng zhe ben shu le.* she read throw this CLF book ASP 'She read this book, and this made her throw (it) away.'
Q17 她 饿 晕 了。 *Ta e yun le.* she hungry dizzy ASP 'She was so hungry that she got dizzy.'	Q25 *她 饿 喊 了。 **Ta e han le.* she hungry scream ASP 'She was so hungry that she screamed.'

Table 23 - Items for the effect of V2 in Test 2

The scores of each category by each group are summarized in Table 24. The mean scores are compared in Figure 18, from which we observe that the mean score of the unacceptable items is lower than that of the acceptable items in every group. From the intermediate group, the advanced group, to the control group, the mean score of the acceptable items becomes greater (Mean=3.65, 3.67, 4.42) and that of the unacceptable items decreases (Mean=3.00, 2.52, 1.20). In general, the acceptance rate between intermediate and advanced groups is similar (3.65 vs. 3.67), but the rejection rate of the advanced group seems to be further away from that of intermediate (3.00 vs. 2.52). In general, the advanced L2 learners seem to be more confident in the linguistic knowledge they have of this construction than the intermediate ones.

		N	Min	Median	Mean	Max	SD
Intermediate	Acceptable	54	1.00	4.00	3.65	5.00	1.290859
	Unacceptable	54	1.00	3.00	3.00	5.00	1.345853
Advanced	Acceptable	27	1.00	4.00	3.67	5.00	1.414214
	Unacceptable	27	1.00	2.00	2.52	5.00	1.251779
Control	Acceptable	81	1.00	5.00	4.42	5.00	1.035184
	Unacceptable	81	1.00	1.00	1.20	5.00	0.6004114

Table 24 - Scores of items with acceptable or unacceptable V2 in Test 2

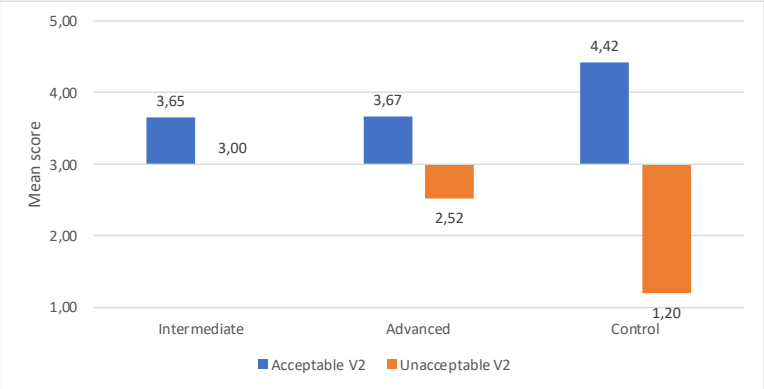


Figure 18 - Mean scores of items with acceptable or unacceptable V2 in Test 2

Similar results can be observed from the boxplots in Figure 19. The contrast between the two categories is observed in all groups but is the strongest in the control group. We also have observed some outliers in the native speakers' responses. After going through the data, we found that all the outliners in the "Acceptable V2" category were from Q7 (see the target sentence in Table 3 above). Through a follow-up interview with the native speaker participants who rated Q7 as "1" or "2", we acknowledged that they would prefer the sentences to involve 把 *ba*, the marker that emphasizes the impact of the Causer on the Causee, due to pragmatic reasons (i.e., when describing a caused-result event, the speakers tend to highlight the causative meaning). Despite the pragmatic interference, those outliers cannot overwrite the general tendency of acceptance towards Q7 by the native speakers, as shown by the boxplot in Figure 19 and the mean/median values (Mean=3.52, Median=4.00). Regarding the "Unacceptable V2" category, only one unexpected rating was found – Q25 was rated as "5" by the participant CN-05. We hold that this is just a rare case, and it should not challenge the overall result.

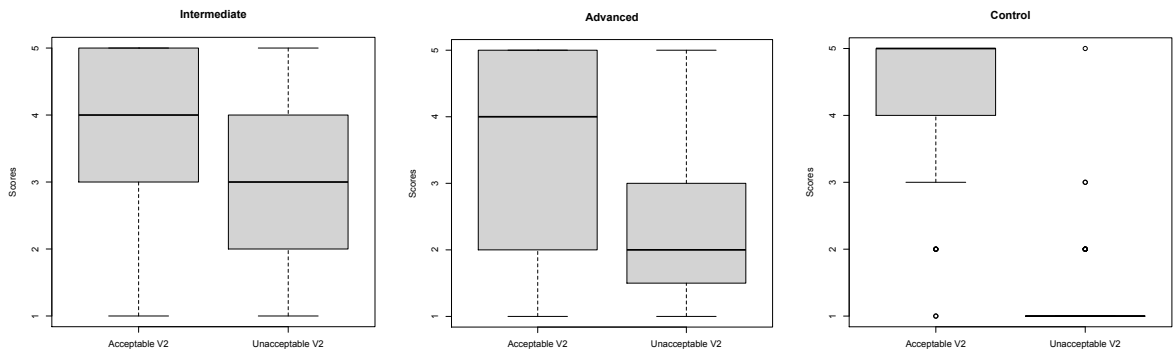


Figure 19 - Boxplots of items with acceptable or unacceptable V2 in Test 2

We ran three paired t-tests to find out if the difference between the two categories is statistically significant in each group. As shown by the results presented in Table 25, V2 has a statistically significant effect on all the groups since the *p*-values are low (<0.05). Its effect is the strongest on the control group (t=24.959, *p*< 2.2e-16) and is more significant in the advanced group (t=4.1626, *p*=0.0003056) than in the intermediate group (t=3.3629, *p*=0.001438). We also ran paired t-tests for the alternative hypothesis that the difference is greater than 0. The *p*-value is very low in all the three groups but goes from bigger to smaller from the intermediate group, the advanced group, to the control group. The results indicate that there is a high probability for all the groups to give higher ratings to the items with acceptable V2 than those with unacceptable V2, but this tendency is the strongest in the control group and is the weakest in the intermediate group.

Paired t-test		**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference>0)**
Acceptable × Unacceptable	Intermediate	3.3629	53	0.001438	0.0007192
	Advanced	4.1626	26	0.0003056	0.0001528
	Control	24.959	80	< 2.2e-16	< 2.2e-16

Table 25 - Paired t-tests for the effect of V2 in Test 2

We calculated the score difference of each acceptable-unacceptable pair by each participant and ran three Welch's t-tests to find out if the between-group differences are significant. As shown in Table 26, there is a statistically significant difference in Advanced × Native (t=-6.8105, *p*=4.417e-08<0.05) and Intermediate × Native (t=-11.096, *p*<2.2e-16). However, the difference between the intermediate group and the advanced group is not statistically significant (t=-1.4859, *p*=0.1434). For the alternative hypothesis that the difference is less than 0, the *p*-value is 0.07169. That means, there is a weak tendency that the advanced group outperforms the intermediate group in distinguishing acceptable and unacceptable V2.

Welch two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
Intermediate × Advanced	-1.4859	51.559	0.1434	0.07169
Advanced × Control	-6.8105	38.046	4.417e-08	2.208e-08
Intermediate × Control	-11.096	98.14	< 2.2e-16	< 2.2e-16

Table 26 - Welch t-tests of score difference between items with acceptable and unacceptable V2 in Test 2

6.2.4 Effect of thematic patterns

The scores of the 20 acceptable items (see Appendix 2) with different thematic patterns, namely transitive CR V-V with N1 as Causee (Q12-15), those with N2 as Causee (Q1-11), and intransitive V-Vs (Q16-20) are summarized in Table 27. The mean scores are compared in Figure 20. All groups showed acceptance towards all the categories, but the items with N2 as Causee received the lowest mean score in each group.

		N	Min	Median	Mean	Max	SD
Intermediate	N1 Causee	72	1.00	4.00	3.72	5.00	1.177515
	N2 Causee	198	1.00	4.00	3.27	5.00	1.299772
	Intransitive	90	1.00	4.00	3.70	5.00	1.336186
Advanced	N1 Causee	36	1.00	4.00	3.50	5.00	1.558387
	N2 Causee	99	1.00	3.00	3.14	5.00	1.442858
	Intransitive	45	1.00	5.00	3.98	5.00	1.453661
Control	N1 Causee	108	2.00	5.00	4.59	5.00	0.7239177
	N2 Causee	297	1.00	5.00	4.29	5.00	1.173346
	Intransitive	135	1.00	5.00	4.31	5.00	1.24269

Table 27 - Scores of items with different thematic patterns in Test 2

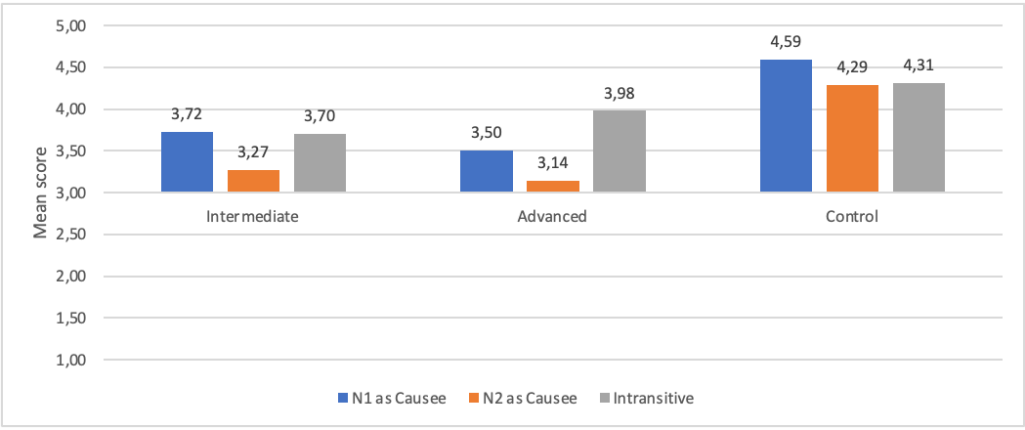


Figure 20 - Mean scores of items with different thematic patterns in Test 2

As shown by the boxplots in Figure 21, the distributions of the three categories in the control group are very similar. A bigger variation is observed in each of the L2 learner groups. In addition, the advanced group is approaching native-like performance for intransitive items but still show big variation for transitive items (N1 as Causee or N2 as Causee).

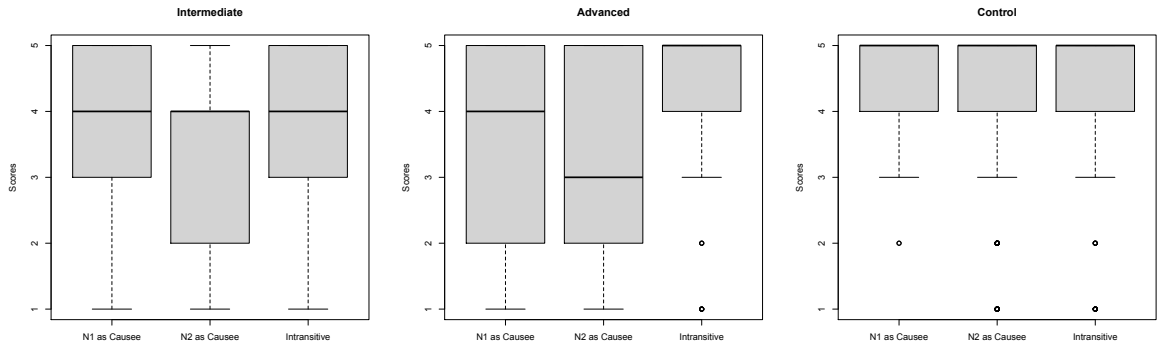


Figure 21 - Boxplots of items with different thematic patterns in Test 2

For each group, we ran three Welch's t-tests to find out if there is any significant between-category difference, and the results are presented in Table 28. In the intermediate group, the N2-as-Causee pattern differs from the other two patterns significantly (p=0.007228, 0.01114; both<0.05). In the advanced group, statistically significant difference is only observed between the N2-as-Causee pattern and the intransitive pattern (p=0.00189<0.05). Even though the difference between the N1-as-Causee and N2-as-Causee patterns or between the N1-as-Causee and intansitive patterns is not statistically significant, the p-values are still relatively low (p=0.2329, 0.1621), showing a certain degree of difference. In general, for both L2 learner groups, the N2-as-Causee pattern makes a significant difference – the L2 learners tend to show lower acceptance to this pattern than the other two. In the control group, a statistically significant difference is observed in N1 as Causee × N2 as Causee (t=3.0764, p=0.002283<0.05) and N1 as Causee × Intransitive (t=2.2053, p=0.02846<0.05), whereas the p-value of N2 as Causee × Intransitive is very high (p=0.8861). That means, it is the N1-as-Causee pattern that makes a significant difference – the native speakers tend to give higher ratings (i.e., show stronger acceptance) to items of this pattern. Nevertheless, the tendency of acceping all the three patterns is very strong in the control group, as evidenced by the high mean/median values (Mean=4.59, 4.29, 4.31; Median=5.00, 5.00, 5.00; see Table 27 above).

Welch two sample t-test		**t**	**df**	***p*-value**
Intermediate	N1 Causee × N2 Causee	2.7267	138.08	0.007228
	N2 Causee × Intransitive	-2.5667	167.98	0.01114
	N1 Causee × Intransitive	0.11239	158.47	0.9107
Advanced	N1 Causee × N2 Causee	1.2054	58.201	0.2329
	N2 Causee × Intransitive	-3.2076	84.613	0.00189
	N1 Causee × Intransitive	-1.4125	72.674	0.1621

	N1 Causee × N2 Causee	3.0764	307.61	0.002283
Control	N2 Causee × Intransitive	-0.14341	246.3	0.8861
	N1 Causee × Intransitive	2.2053	221.81	0.02846

Table 28 - Welch t-tests for the effect of thematic patterns in Test 2

Since the N2-as-Causee pattern seems to impose more difficulty for the L2 learners, we ran Welch's t-tests to find out if there is any significant between-group difference in this pattern's ratings. As shown by the results in Table 29, the difference between each L2 learner group and the native control group is statistically significant (Advanced × Control: p=3.307e-11<0.05; Intermediate × Control: p<2.2e-16). However, no significant difference is found between the intermediate and the advanced groups, and the t-value is above 0 (Intermediate × Advanced: t=0.73437, p=0.4637), which indicates that the increase of proficiency did not result in stronger acceptance towards this thematic pattern.

Welch two sample t-test	**t**	**df**	***p*-value**
Intermediate × Advanced	0.73437	179	0.4637
Advanced × Control	-7.188	143.66	3.307e-11
Intermediate × Control	-8.9346	392.16	< 2.2e-16

Table 29 - Welch t-tests of N2-as-Causee items for group difference in Test 2

6.2.5 Awareness of the compound nature of CR V-Vs

By comparing the scores of CR V-Vs with monosyllabic or bi-syllabic V1/V2, those with contiguous or non-contiguous word order, and those with or without individual adverbial modifiers of V1/V2, we attempt to find out whether the L2 learners are aware of the compound nature of Chinese CR V-Vs.

6.2.5.1 "Small size" constraint

Two pairs of items are involved in this analysis, as presented in Table 30.

Acceptable items	**Unacceptable items**
Q7 这 个 歌手 唱 哭 她 了。 *Zhe ge geshou chang ku ta le.* this CLF singer sing cry she ASP 'This singer's singing made her cry.'	Q26 *这 个 歌手 唱 哭泣 她 了。 **Zhe ge geshou chang **kuqi** ta le.* this CLF singer sing cry she ASP 'This singer's singing made her cry.'

Q11 这 个 工作 累 哭 她 了。 *Zhe ge gongzuo lei ku ta le.* this CLF work tired cry she ASP 'The work made her so tired that she cried.'	Q28 *这 个 工作 劳累 哭 她 了。 *Zhe ge gongzuo **laolei** ku ta le.* this CLF work tired cry she ASP 'The work made her so tired that she cried.'

Table 30 - Items for small-size constraint in Test 2

In one pair (Q7, Q26), the only variable is the "size" of V2 (i.e., monosyllabic vs. disyllabic); in the other pair (Q11, Q28), the only variable is the "size" of V1.

Comparing the scores of the items violating the "small size" constraint (i.e., the unacceptable items) with that of their acceptable counterparts, as shown in Table 31 and Figure 22, we find that the control group showed acceptance towards the acceptable items (Mean=3.83) and rejection towards the unacceptable items (Mean=1.65), as expected. However, it is not the case with the L2 learners. The intermediate group showed slight rejection to the acceptable items (Mean=2.83) and slight acceptance to the unacceptable ones (Mean=3.08), both on a chance level (around 3), while the advanced group showed rejection to both the acceptable and unacceptable categories (Mean=2.28, 2.17).

		N	Min	Median	Mean	Max	SD
Intermediate	Acceptable	36	1.00	3.00	2.83	5.00	1.230563
	Unacceptable	36	1.00	3.00	3.08	5.00	1.155731
Advanced	Acceptable	18	1.00	2.00	2.28	5.00	1.22741
	Unacceptable	18	1.00	2.00	2.17	4.00	1.150447
Control	Acceptable	54	1.00	4.00	3.83	5.00	1.313931
	Unacceptable	54	1.00	1.00	1.65	5.00	0.9743388

Table 31 - Scores of items with or without violation of the small-size constraint in Test 2

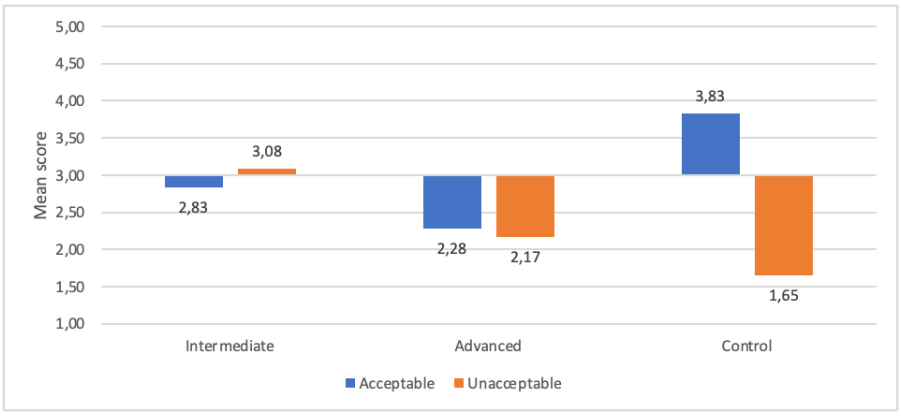


Figure 22 - Mean scores of items with or without violation of the small-size constraint in Test 2

Similar observations can be found from the boxplots in Figure 23 below. The control group, but not the two L2 groups, showed clear contrast between the two categories.

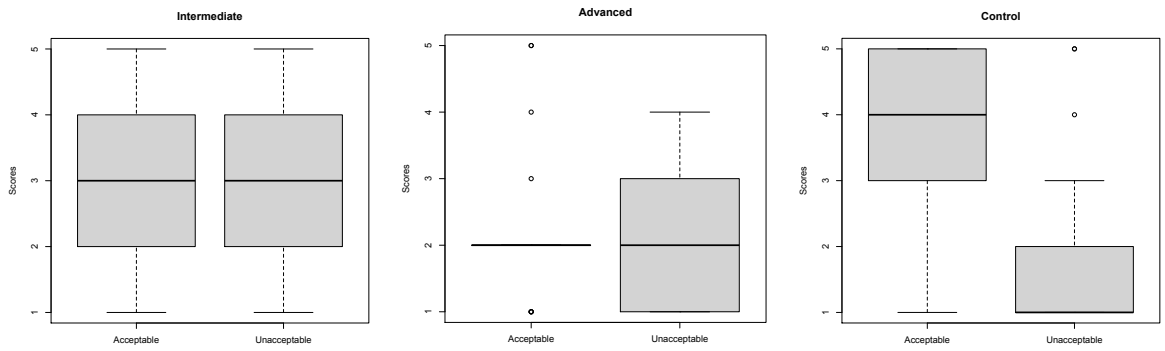


Figure 23 - Boxplots of items with or without violation of the small-size constraint in Test 2

We have also observed some unexpected ratings in the control group, and they are mostly from Q7, whose low ratings are due to pragmatic reasons, as explained in §6.2.3 above. In addition, Q11, an acceptable item, was rated as "1" by 3 out of 27 native speaker participants, and its unacceptable counterpart, Q28, was rated as "5" by two and "4" by one participant. We believe that such rare cases should not waive the tendency of each component of CR V-Vs being mono-syllabic, as shown by the strong contrast between the two categories in both mean scores and boxplots in the control group. However, the result also indicates that the "small size" constraint is not a rule that should be strictly applied. Certain flexibility exists, and native speakers may have varied opinions.

We ran three paired t-tests to find out if the difference between the acceptable and unacceptable items is significant in each group, and the results are presented in Table 32.

Paired t-test		**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference>0)**
Acceptable × Unacceptable	Intermediate	-1.1578	35	0.2548	0.8726
	Advanced	0.4165	17	0.6823	0.3411
	Control	11.455	53	5.892e-16	2.946e-16

Table 32 - Paired t-tests for the "small size" constraint in Test 2

As expected, there is a statistically significant difference between the two categories in the control group's ratings (t=11.455, p=5.892e-16<0.05), and the p-value is also very small for the alternative hypothesis that the difference is greater than 0 (p=2.946e-16). In contrast, no

statistically significant difference is observed in any of the two L2 learner groups since the *p*-values are high (*p*=0.2548, 0.6823). For the alternative hypothesis that the difference is greater than 0, the *p*-value is also high in both L2 groups (*p*=0.8726 vs. 0.3411).

We calculated the score difference of each acceptable-unacceptable pair by each participant and ran three Welch's t-tests to find out if the between-group differences are significant. As shown by the results in Table 33, there is a significant difference in Advanced × Control (t=-6.3241, *p*=2.623e-07<0.05) and Intermediate × Control (t=-8.4518, *p*=1.133e-12<0.05), but the difference between the intermediate and the advanced groups is not statistically significant (t=-1.0521, *p*=0.2993). For the alternative hypothesis that the difference is less than 0, the *p*-value in Intermediate × Advanced is not very low either (*p*=0.1496).

Welch two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
Intermediate × Advanced	-1.0521	38.538	0.2993	0.1496
Advanced × Control	-6.3241	35.825	2.623e-07	1.311e-07
Intermediate × Control	-8.4518	79.124	1.133e-12	5.666e-13

Table 33 - Welch t-tests of score difference for the small-size constraint in Test 2

6.2.5.2 V-V adjacency

Two pairs of items are involved in this analysis. In each pair, the only variable is the word order, i.e., V1 and V2 being adjacent or not. The involved items are presented in Table 34.

Acceptable items	**Unacceptable items**
Q4 她 画 脏 了 手。 *Ta hua zang le shou.* she paint dirty ASP hand. 'She paint (her) hand dirty.'	Q33 *她 画 手 脏 了。 **Ta hua shou zang le.* she paint hand dirty ASP 'She painted (her) hand dirty.'
Q2 她 弄 哭 了 弟弟。 *Ta nong ku le didi.* she make cry ASP brother 'She made the brother cry.'	Q34 *她 弄 弟弟 哭了。 **Ta nong didi ku le.* she make brother cry ASP 'She made the brother cry.'

Table 34 - Items with or without V-V adjacency in Test 2

The scores of the acceptable and unacceptable items are summarized in Table 35. The mean scores are compared in Figure 24, which shows a clear contrast between the two categories in the control group but not in any of the L2 learner groups.

		N	Min	Median	Mean	Max	SD
Intermediate	Acceptable	36	2.00	4.00	3.61	5.00	1.021981
	Unacceptable	36	1.00	4.00	3.61	5.00	1.20185
Advanced	Acceptable	18	1.00	3.00	3.06	5.00	1.21133
	Unacceptable	18	1.00	3.00	3.11	5.00	1.567647
Control	Acceptable	54	1.00	5.00	4.48	5.00	1.04142
	Unacceptable	54	1.00	1.00	1.26	3.00	0.4831182

Table 35 - Scores of items with or without V-V adjacency in Test 2

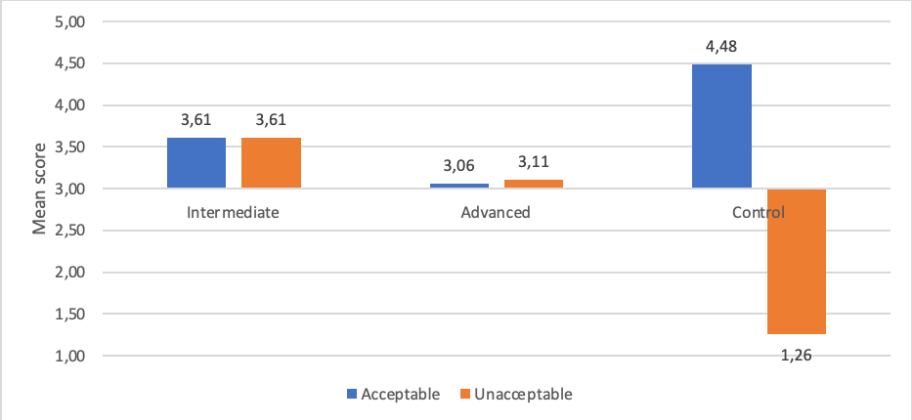


Figure 24 - Mean scores of items with or without V-V adjacency in Test 2

Similar results can be observed from the boxplots in Figure 25. The control group's ratings of the two categories show stronger contrast than that of the two L2 learner groups.

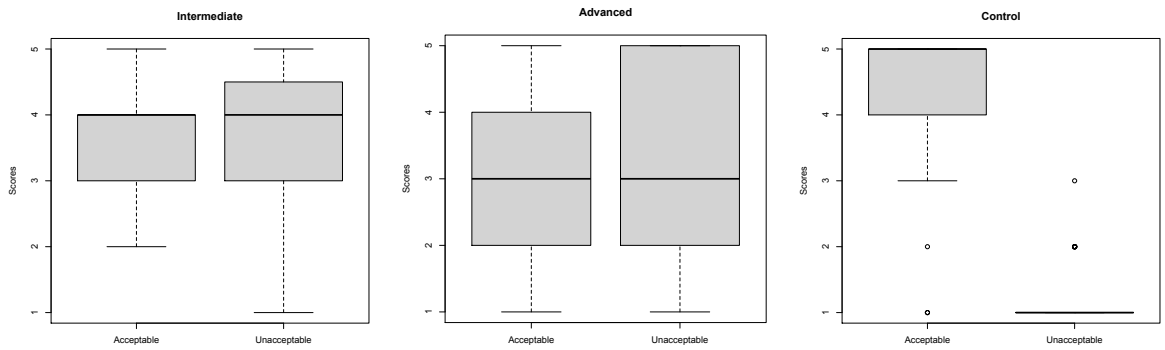


Figure 25 - Boxplots of items with or without V-V adjacency in Test 2

We have also observed some unexpected ratings from the control group – Q4, which contains a grammatical sentence, was rated as only "1" or "2" by 4 out of 27 native speakers.

As explained previously in §6.2.2, the unexpected ratings were due to pragmatic reasons. Despite such rare cases, the contrast between the acceptable and unacceptable items in the control group is still very clear, as shown by the bar plots in Figure 24 and the boxplots in Figure 25.

To find out if the difference between acceptable and unacceptable items is significant in all groups, we ran three paired t-tests, the results of which are presented in Table 36. There is a statistically significant difference between the two categories in the control group (t=22.011, p<2.2e-16); for the alternative hypothesis that the difference is greater than 0, the p-value is also very low (p<2.2e-16). In contrast, no significant difference is observed in any of the L2 learner groups since the p-values are extremely high (Intermediate: $p\approx1$; Advanced: p=0.9182). For the alternative hypothesis that the difference is greater than 0, the p-values in the two learner groups are quite close to each other and are both high (Intermediate: p=0.5409; Advanced: p=0.5). The result shows that the advanced learners did not outperform the intermediate group in distinguishing the acceptable items and their unacceptable counterparts that violate the V-V adjacency constraint.

Paired t-test		**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference>0)**
Acceptable × Unacceptable	Intermediate	0	35	≈1	0.5
	Advanced	-0.10422	17	0.9182	0.5409
	Control	22.011	53	< 2.2e-16	< 2.2e-16

Table 36 - Paired t-tests for V-V adjacency in Test 2

We calculated the score difference of each acceptable-unacceptable pair by each participant and ran three Welch's t-tests to find out if the between-group differences are significant. As shown by the results in Table 37, there is a statistically significant difference between the control group and each L2 learner group (Intermediate × Control: p=2.894e-14<0.05; Advanced × Control: p=9.134e-06<0.05). However, no significant difference is found between the two L2 groups (Intermediate × Advanced: t=0.092348, p=0.9271), and the p-value is high for the alternative hypothesis that the difference is less than 0 (p=0.5364). The result further confirms that the L2 learners lack the knowledge of the V-V adjacency constraint, and that there is no proficiency effect.

Welch two sample t-test	t	df	*p*-value (alt: difference≠0)	*p*-value (alt: difference<0)
Intermediate × Advanced	0.092348	26.612	0.9271	0.5364
Advanced × Control	-5.9297	19.625	9.134e-06	4.567e-06
Intermediate × Control	-10.23	54.226	2.894e-14	1.447e-14

Table 37 - Welch t-tests of score difference for V-V adjacency in Test 2

6.2.5.3 V-V integrity

The "V-V integrity" constraint in CR V-Vs is manifested by that neither V1 nor V2 can take individual adverbial modifiers (see §3.2.5 in Chapter 3). Two pairs of items are involved in this analysis, as presented in Table 38. In each pair, the only variable is the occurrence/non-occurrence of an individual modifier of V1/V2.

Acceptable items	Unacceptable items
Q2 她 弄 哭 了 弟弟。 *Ta nong ku le didi.* she make cry ASP brother 'She made the brother cry.'	Q27 *她 弄 哭 了 一 天 弟弟。 *Ta nong ku le **yi** **tian** didi.* she make cry ASP **one** **day** brother 'She made the brother cry for one day.'
Q11 这 个 工作 累 哭 她 了。 *Zhe ge gongzuo lei ku ta le.* this CLF work tired cry she ASP 'The work made her so tired that she cried.'	Q29 *这 个 工作 **太** 累 哭 她 了。 **Zhe ge gongzuo **tai** lei ku ta le.* this CLF work **too** tired cry she ASP 'The work made her too tired, so she cried.'

Table 38 - Items for V-V integrity in Test 2

The scores of each category in each group are summarized in Table 39. The mean scores are compared in Figure 26, which shows that all groups showed rejection to the unacceptable items (Mean=1.89, 1.72, 1.57). However, while the intermediate group and the control group showed acceptance to the acceptable items (Mean=3.39, 4.50), the advanced group showed slight rejection (Mean=2.5). As expected, the mean score difference between the acceptable and unacceptable items is the biggest in the control group. However, the mean score difference is smaller in the advanced group than in the intermediate group, which shows that the advanced learners did not outperform the intermediate learners.

		N	Min	Median	Mean	Max	SD
Intermediate	Acceptable	36	1.00	4.00	3.39	5.00	1.20185
	Unacceptable	36	1.00	2.00	1.89	5.00	0.9495195

Advanced	Acceptable	18	1.00	2.00	2.50	5.00	1.294786
	Unacceptable	18	1.00	1.00	1.72	5.00	1.22741
Control	Acceptable	54	1.00	5.00	4.50	5.00	1.004706
	Unacceptable	54	1.00	1.00	1.57	5.00	0.9635205

Table 39 - Scores of items with or without an individual modifier of V1/V2 in Test 2

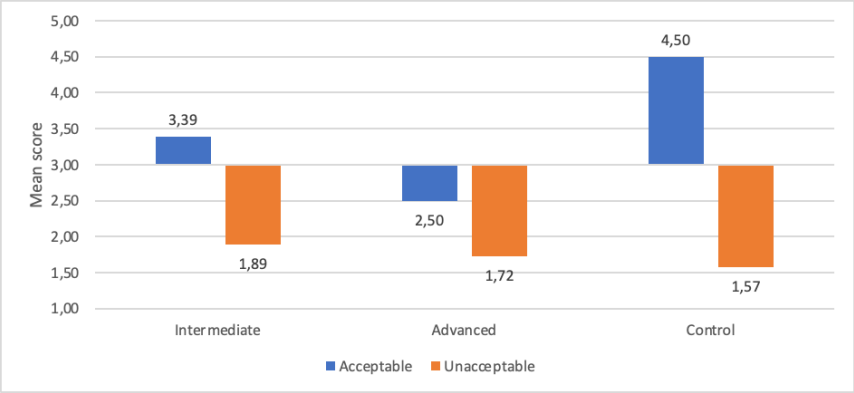


Figure 26 - Mean scores of items with or without an individual modifier of V1/V2 in Test 2

We can find similar observations from the boxplots in Figure 27. The contrast between the two categories is the strongest in the control group and seems to be weaker in the advanced group than in the intermediate group.

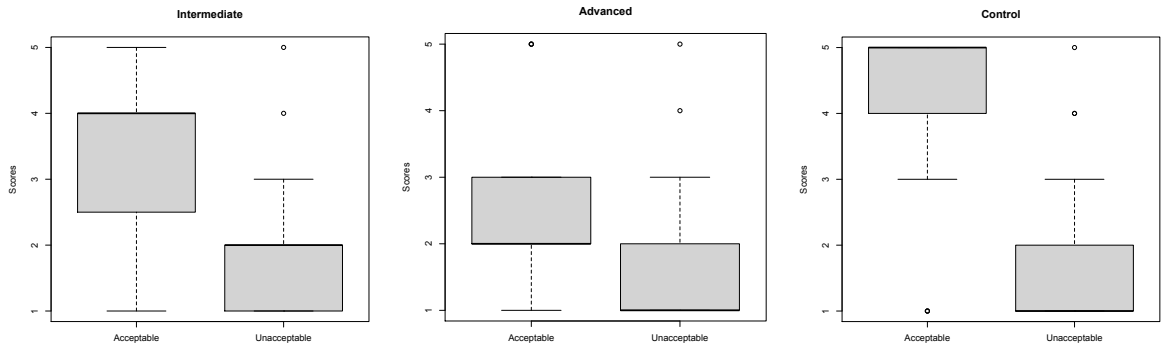


Figure 27 - Boxplots of items with or without an individual modifier of V1/V2 in Test 2

We have also observed some unexpected ratings in the control group. Among the acceptable items, Q11 was rated as "1" by 3 out of 27 native speakers. The reason is pragmatic – those participants told us the sentence would become more natural if 把 *ba* co-occurs (similar to the cases in previous sections where acceptable items received low ratings from a few native speakers). However, such rare low ratings do not overwrite the general tendency of acceptance

towards these items by the native speakers. Regarding the unacceptable items, out of our expectation, Q27 was rated as "4" by two native speakers, and Q29 was rated as "5" by one. We interpret these ratings as a sign of CR V-Vs' lexicalization. For example, as illustrated in (2a), the adverb 大声地 *dashengde* 'loudly', as a modifier of V1 in the CR V-V 说累 *shuo-lei* 'speak-tired', makes the sentence agrammatical because CR V-Vs do not allow any individual modifier of V1. On the contrary, as shown in (2b), this adverb can co-occur with 说明 *shuoming* 'explain', a verb that was an erstwhile CR V-V, where 说 *shuo* 'speak' donotes the Manner and 明 *ming* 'clear' the Result, but has been completely lexicalized. We claim that the rare high ratings of Q27 and Q29 suggest that the CR V-Vs contained in these sentences are undergoing lexicalization. However, if we view lexicalization as a continuum where a particular construction moves towards the lexicalized end, these CR V-Vs are still close to the syntactic end and thus are considered CR V-Vs instead of single verbs, as shown by the rejection of Q27 and Q29 by the majority of the native speaker participants.

(2) a. 他 （*大声地） 说 累 大家 了。
*Ta (*dashengde) shuo lei dajia le.*
he (*loudly) speak tired everyone ASP
'He made everyone tired by speaking (*loudly).'

b. 他 （大声地） 说明 了 问题。
Ta (dashengde) shuoming le wenti.
he (loudly) explain ASP problem
'He explained the problem (loudly).'

We ran three paired t-tests to find out if the difference between the two categories is statistically significant in each group. The results in Table 40 show that the occurrence of individually modifying adverbials has a statistically significant effect on all the three groups' ratings since the *p*-values are under 0.05 (Intermediate: p=6.287e-07; Advanced: p=0.0007769; Control: p<2.2e-16). For the alternative hypothesis that the difference is greater than 0, the *p*-values are also small (Intermediate: p=3.143e-07; Advanced: p=0.0003885; Control: p<2.2e-16), showing that there is a high probability that the three groups rate the ungrammatical items lower than the grammatical ones.

Paired t-test		t	df	*p*-value (alt: difference≠0)	*p*-value (alt: difference>0)
Acceptable × Unacceptable	Intermediate	6.0678	35	6.287e-07	3.143e-07
	Advanced	4.0817	17	0.0007769	0.0003885
	Control	17.317	53	< 2.2e-16	< 2.2e-16

Table 40 - Paired t-tests for V-V integrity in Test 2

We calculated the score difference of each acceptable-unacceptable pair by each participant and ran three Welch's t-tests to find out if there is any significant between-group difference. As shown by the results in Table 41, there is a statistically significant difference between all groups since the *p*-values are under 0.05 (*p*=0.0247, 7.731e-11, 1.092e-05). However, for Intermediate × Advanced, the t-value is above 0 (t=2.3139), and the *p*-value for the alternative hypothesis that the difference is less than 0 is very high (*p*=0.9877). That means, the score difference between the two categories did not go bigger as proficiency increased.

Welch two sample t-test	t	df	*p*-value (alt: difference≠0)	*p*-value (alt: difference<0)
Intermediate × Advanced	2.3139	51.509	0.0247	0.9877
Advanced × Control	-8.4349	45.265	7.731e-11	3.865e-11
Intermediate × Control	-4.7621	65.849	1.092e-05	5.459e-06

Table 41 - Welch t-tests of score difference for V-V integrity in Test 2

We further took a look at the between-group differences in the ratings of the acceptable and unacceptable items separately through Welch's t-tests, the results of which are presented in Table 42.

Welch two sample t-test		t	df	*p*-value
Intermediate × Advanced	Acceptable	2.435	31.924	0.02066
	Unacceptable	0.50542	27.5	0.6173
Advanced × Control	Acceptable	-5.9807	24.196	3.457e-06
	Unacceptable	0.46642	24.371	0.6451
Intermediate × Control	Acceptable	-4.5815	65.781	2.115e-05
	Unacceptable	1.5318	75.92	0.1297

Table 42 - Welch t-tests of items with/without V-V integrity in Test 2

For the acceptable items, a statistically significant difference is found in all the compared pairs (p=0.02066, 3.457e-06, 2.115e-05). Note that the t-value for Intermediate × Advanced is above 0 (t=2.435), which means, the advanced learners did not show stronger acceptance towards the acceptable items than the intermediate learners. Regarding the unacceptable items, the t-values are all above 0 (t=0.50542, 0.46642, 1.5318), but the p-values are high in all the comparisons (p=0.6173, 0.6451, 0.1297).

6.2.6 Causative alternation

6.2.6.1 Causative constraint

Inchoative CR V-Vs may have transitive counterparts with an overt Causer, but the Causer is subject to constraints – it should be a participant or a direct causer of the causing subevent. Two groups of items are involved in this analysis, as presented in Table 43. Each group consists of an inchoative CR V-V, an acceptable causative counterpart, and an unacceptable causative counterpart.

Inchoative	**Acceptable causative**	**Unacceptable causative**
Q16 她 看 哭 了。 *Ta kan ku le.* she read cry ASP 'She read, and this made her cry.'	Q9 这 本 书 看 哭 她 了。 *Zhe ben shu kan ku ta le.* this book read cry she ASP 'Reading this book made her cry.'	Q35 *坏 心情 看 哭 她 了。 **Huai xinqing kan ku ta le.* bad mood read cry she ASP 'Bad mood made her cry from reading.'
Q18 她 累 哭 了。 *Ta lei ku le.* she tired cry ASP 'She cried due to tiredness.'	Q11 这 个 工作 累 哭 她 了。 *Zhe ge gongzuo lei ku ta le.* this CLF work tired cry she ASP 'The work made her so tired that she cried.'	Q30 *感冒 累 哭 她 了。 **Ganmao lei ku ta le.* cold tired cry she ASP 'The cold made her so tired that she cried.'

Table 43 - Items for the causative constraint in Test 2

The score summary in Table 44 and the mean score comparison in Figure 28 show that all groups showed acceptance to the inchoative items (Mean=3.72, 4.17, 4.80) and rejection to the unacceptable causatives (Mean=2.06, 1.50, 1.59).

		N	**Min**	**Median**	**Mean**	**Max**	**SD**
Intermediate	Inchoative	36	1.00	4.00	3.72	5.00	1.256096
	Acc. causative	36	1.00	3.00	2.67	5.00	1.218899
	Unacc. causative	36	1.00	2.00	2.06	5.00	1.040452

Advanced	Inchoative	18	1.00	5.00	4.17	5.00	1.248529
	Acc. causative	18	1.00	2.00	2.17	5.00	1.339447
	Unacc. causative	18	1.00	1.00	1.50	4.00	0.8574929
Control	Inchoative	54	3.00	5.00	4.80	5.00	0.4505606
	Acc. causative	54	1.00	4.00	3.65	5.00	1.468633
	Unacc. causative	54	1.00	1.00	1.59	5.00	1.019036

Table 44 - Scores of inchoative items and the (un)acceptable causative counterparts in Test 2

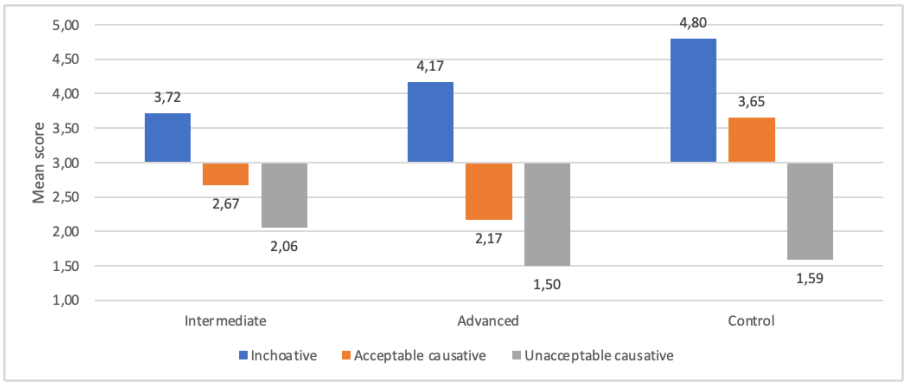


Figure 28 - Mean scores of inchoative items and the (un)acceptable causative counterparts in Test 2

However, variation is observed in the acceptable causative category – while the control group showed acceptance (Mean=3.65), both L2 learner groups showed rejection (Mean=2.67 and 2.17).

According to the boxplots in Figure 29, the contrast between the acceptable and unacceptable causative items seems to be stronger in the control group than the two L2 learner groups.

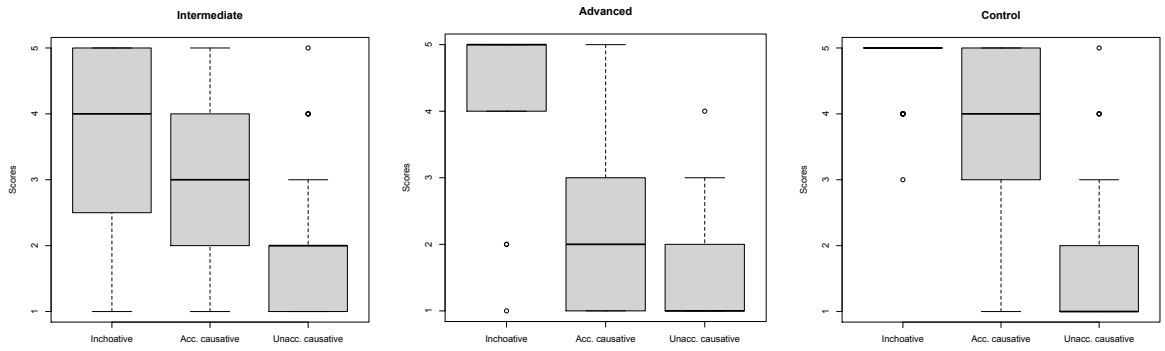


Figure 29 - Boxplots of inchoative items and the (un)acceptable causative counterparts in Test 2

In addition, we have observed some unexpected ratings in the control group. The acceptable causative items were rated as "1" or "2" by a few native speakers (Q9 by nine; Q11

by three), and this is due to pragmatic reasons (the co-occurrence of 把 *ba* would improve the sentences pragmatically). Despite the few unexpectedly low ratings, the general trend of acceptance towards this category in the control group is still evident, as shown by the boxplot in Figure 29 and the mean/median value (Mean =3.65; Median=4.00). Unexpected ratings by the native speakers are also found in the unacceptable causative category – Q30 was rated as "4" or "5" by three native speakers, and Q35 was rated as "4" by one. These rare high ratings show that the causative constraint does not have a clear cut. Since it is a constraint based on semantics, the native speakers may vary in judging whether a particular Causer is "direct" enough. However, it is still evident that the "directness" of the Causer plays an impact on the acceptability of a causative construction, as shown by the contrast between the acceptable and unacceptable causative categories in the control group in Figure 29 (also the paired t-tests in Table 45 below). The more "direct" a Causer is, the more probable it is that the native speakers accept the causative counterpart, and vice versa. Among those four unexpected ratings in the unacceptable causative category, we believe that only one of them can be considered a true anomaly. Only one of them received a rating that is higher than that of its acceptable counterpart.

We ran three paired t-tests to find out if the contrast between the acceptable and unacceptable causatives is statistically significant in each group. As shown by the results presented in Table 45, the acceptable/unacceptable causation has a statistically significant effect in all groups since the *p*-values are all under 0.05 (*p*=0.006667, 0.006275, 1.423e-12). For the alternative hypothesis that the difference is greater than 0, the *p*-value is also low in all groups (*p*=0.003334, 0.003137, 7.113e-13). The results suggest that all groups tend to rate unacceptable causative items lower than the acceptable causatives.

Paired t-test		**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference>0)**
Acc. causative × Unacc. causative	Intermediate	2.8845	35	0.006667	0.003334
	Advanced	3.1168	17	0.006275	0.003137
	Control	9.2013	53	1.423e-12	7.113e-13

Table 45 - Paired t-tests for the causative constraint in Test 2

We calculated the score difference of each acceptable and unacceptable causative pair by each participant and ran three Welch's t-tests to find out if there is any significant between-group difference. The results in Table 46 show that there is a statistically significant difference

in Advanced × Control (t=-4.4906, *p*=3.795e-05<0.05) and Intermediate × Control (t=-4.6915, *p*=1.014e-05<0.05). However, no statistically significant difference is found in Intermediate × Advanced (t=-0.18453, *p*=0.8544), and the *p*-value is high for the alternative hypothesis that the difference is less than 0 (*p*=0.4272).

Welch two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
Intermediate × Advanced	-0.18453	45.464	0.8544	0.4272
Advanced × Control	-4.4906	53.787	3.795e-05	1.898e-05
Intermediate × Control	-4.6915	85.939	1.014e-05	5.07e-06

Table 46 - Welch t-tests of score difference for causative constraint in Test 2

6.2.6.2 Unacceptable alternation

Accusative CR V-Vs do not allow causative alternation and thus do not have intransitive counterparts. To find out whether the L2 learners have knowledge of this constraint, two pairs of items are involved in the analysis, as presented in Table 47. Each pair consists of an item containing an accusative CR V-V, which is acceptable, and its intransitive counterpart, which is unacceptable.

Accusative V-V	**Unacceptable intransitive counterpart**
Q2 她 弄 哭 了 弟弟。 *Ta nong ku le didi.* she make cry ASP brother 'She made the brother cry.'	Q31 *弟弟 弄 哭 了。 **Didi nong ku le.* brother make cry ASP 'The brother was made to cry.'
Q5 他 杀 死 了 那 条 鱼。 *Ta sha si le na tiao yu.* he kill die ASP that fish 'He killed that fish to death.'	Q32 *那 条 鱼 杀 死 了。 **Na tiao yu sha si le.* that fish kill die ASP 'That fish got killed to death.'

Table 47 - Accusative items and the unacceptable intransitive counterparts in Test 2

According to the score summary in Table 48 and the mean score comparison in Figure 30, the mean score of the acceptable accusatives is higher than that of their unacceptable intransitive counterparts in all groups. However, while both the control group and the advanced group show rejection towards the unacceptable items (Mean=1.30, 2.06), the intermediate group did not (Mean=3.22). In general, the mean score difference between the acceptable and

unacceptable items is the biggest in the control group, followed by the advanced group, and is the smallest in the intermediate group.

		N	Min	Median	Mean	Max	SD
Intermediate	Accusative	36	1.00	4.00	3.94	5.00	1.119807
	Intransitive	36	1.00	3.50	3.22	5.00	1.354592
Advanced	Accusative	18	1.00	3.00	3.39	5.00	1.577
	Intransitive	18	1.00	1.50	2.06	5.00	1.304843
Control	Accusative	54	2.00	5.00	4.80	5.00	0.6258467
	Intransitive	54	1.00	1.00	1.30	3.00	0.6333389

Table 48 - Scores of accusative items and the unacceptable intransitive counterparts in Test 2

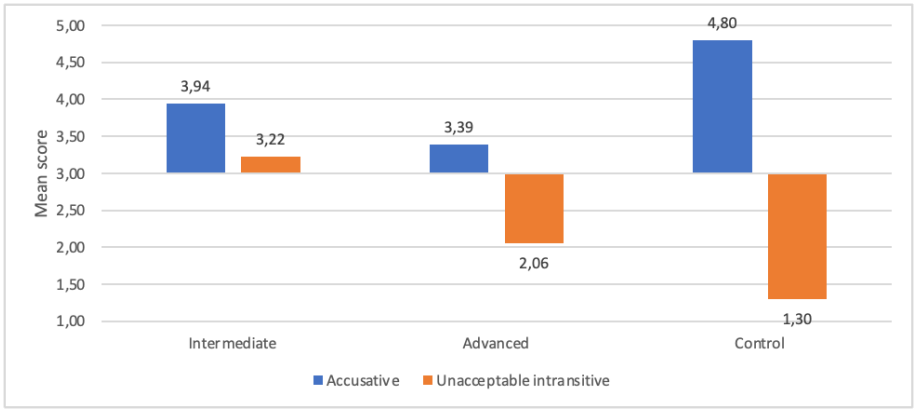


Figure 30 - Mean scores of accusative items and the unacceptable intransitive counterparts in Test 2

Similar observation can be found in the boxplots in Figure 31, which shows that while all groups showed some contrast between the two categories, the contrast is the strongest in the control group.

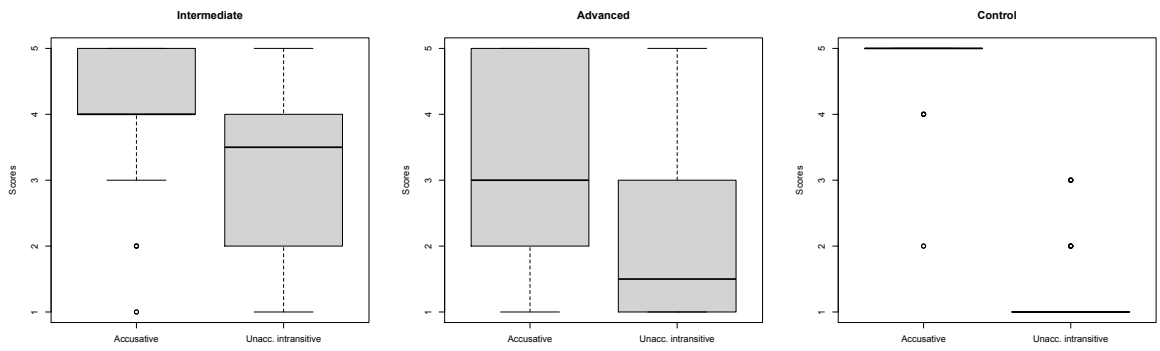


Figure 31 - Boxplots of accusative items and the unacceptable intransitive counterparts in Test 2

We also observed two unexpected ratings in the control group – Q5, which is an acceptable item, was rated as "2" by two native speakers, and the reason is pragmatic. Despite those rare cases, the trend of acceptance towards the acceptable accusative items in the control group is very clear, as shown in the boxplots in Figure 31 and the mean/median value (Mean=4.80; Median=5.00).

We ran three paired t-tests to find out if the between-category difference is statistically significant in each group. The results in Table 49 show that there is a significant difference in all groups since the *p*-values are all under 0.05 (Intermediate: p=0.009485; Advanced: p=0.01159; Control: p<2.2e-16). For the alternative hypothesis that the difference is greater than 0, the *p*-value is also small in all groups (Intermediate: p=0.004743; Advanced: p=0.005795; Control: p<2.2e-16). In all, the L2 learners have a quite good instinct about the impossible transitive alternation of the Accusative CR V-Vs.

Paired t-test		**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference>0)**
Accusative × Unacc. intransative	Intermediate	2.745	35	0.009485	0.004743
	Advanced	2.8284	17	0.01159	0.005795
	Control	29.066	53	< 2.2e-16	< 2.2e-16

Table 49 - Paired t-tests of accusative items and the unacceptable intransitive counterparts in Test 2

We calculated the score difference of each item pair by each participant and ran three Welch's t-tests to find out if there is any significant between-group difference. As shown in Table 50, statistically significant difference is found in Advanced × Control (t=-4.4532, p=0.0002646<0.05) and Intermediate × Control (t=-9.6, p=6.553e-13<0.05). The difference between the two L2 groups is not statistically significant (t=-1.132, p=0.2673), and the *p*-value for the alternative hypothesis that the difference is less than 0 is not low either (p=0.1336).

Welch two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
Intermediate × Advanced	-1.132	27.925	0.2673	0.1336
Advanced × Control	-4.4532	19.265	0.0002646	0.0001323
Intermediate × Control	-9.6	49.757	6.553e-13	3.277e-13

Table 50 - Welch t-tests of score difference for the unacceptable alternation of accusative V-Vs in Test 2

6.2.7 Constraint on N2 in Type VIII

As presented above in §4.5 of Chapter 4, N2 in the Type VIII of CR V-Vs (see Table 1 in §3.2.6, Chapter 3) can only carry a categorical meaning (e.g., 'alcohol') instead of having a specific reference (e.g., 'this bottle of wine'). Two pairs of CR V-Vs are involved in our test targeting at this constraint, as presented in Table 51. In each pair, the only variable is the nature of N2 (i.e., denoting a generic or a specific meaning).

Acceptable items	**Unacceptable items**
Q14 她 吃 饱 饭 了。 *Ta chi bao fan le.* she eat full rice ASP 'She got full by eating rice(meal).'	Q23 *她 吃 饱 面包 了。 **Ta chi bao mianbao le.* she eat full bread ASP 'She got full by eating bread.'
Q15 她 喝 醉 酒 了。 *Ta he zui jiu le.* she drink drunk alcohol ASP 'She got drunk by drinking alcohol.'	Q24 *她 喝 醉 这 瓶 酒 了。 **Ta he zui zhe ping jiu le.* she drink drunk this bottle alcohol ASP 'She got drunk by drinking this bottle of alcohol.'

Table 51 - Items for the constraint in Type VIII in Test 2

The scores of the acceptable items with a generic N2 and the unacceptable ones with a specific N2 are summarized in Table 52. The mean scores are compared in Figure 32.

		N	**Min**	**Median**	**Mean**	**Max**	**SD**
Intermediate	Acceptable	36	1.00	4.00	3.58	5.00	1.155731
	Unacceptable	36	1.00	2.00	2.64	5.00	1.290687
Advanced	Acceptable	18	1.00	2.00	2.78	5.00	1.699673
	Unacceptable	18	1.00	2.00	2.39	5.00	1.500545
Control	Acceptable	54	2.00	5.00	4.43	5.00	0.8378285
	Unacceptable	54	1.00	1.00	1.69	5.00	1.078505

Table 52 - Scores of Type VIII items with generic/specific N2 in Test 2

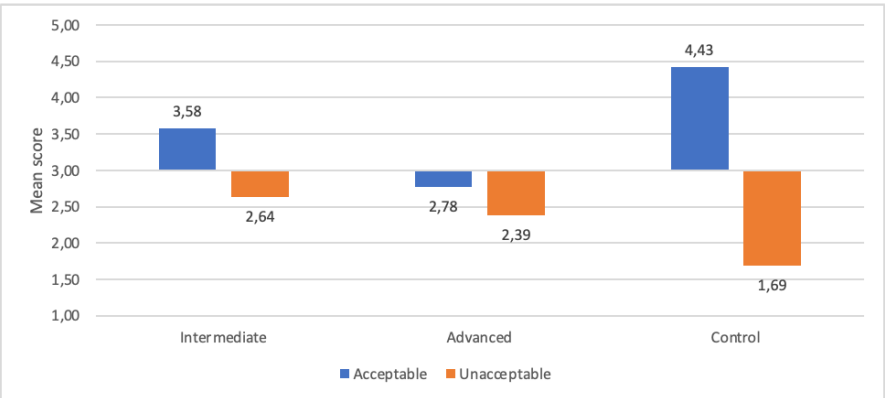


Figure 32 - Mean scores of Type VIII items with generic/specific N2 in Test 2

The result shows that the acceptable items received a higher mean score than the unacceptable items in all groups. However, the mean score difference between the two categories is bigger in the control group than in any of the L2 groups. We have observed that while the intermediate group and the control group showed acceptance to the acceptable items (Mean=3.58 and 4.43, respectively), the advanced group showed slight rejection, giving a mean score of 2.78.

Similar observations can be found in the boxplots in Figure 33. The contrast between the acceptable and unacceptable categories is stronger in the control group than in any of the L2 groups. While the tendency of acceptance towards the acceptable items is clear in the intermediate and the control group, a big variation is observed in the advanced group.

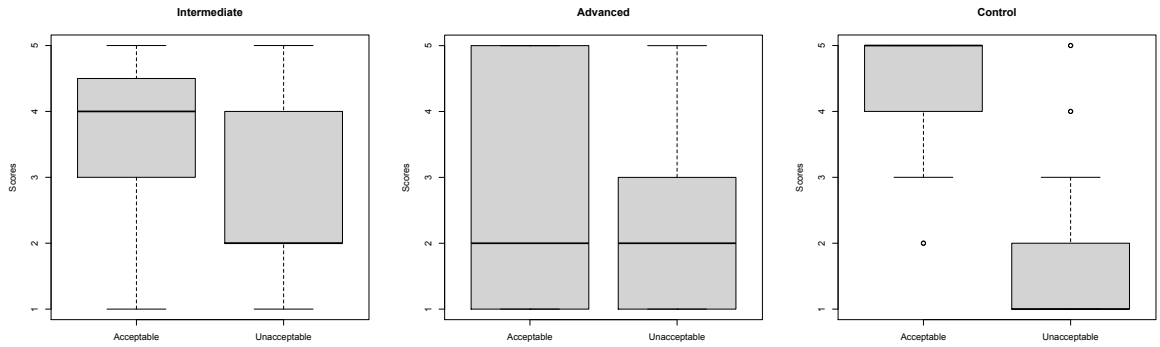


Figure 33 - Boxplots of Type VIII items with generic/specific N2 in Test 2

In addition, some unexpected ratings are observed in the control group. The acceptable items, Q14 and Q15, each received a rating of "2" (by different participants) due to pragmatic reasons (the canonical SVO word order makes the sentence seem a bit "out of blue" without any specific context). Despite those rare cases, the tendency of accepting the acceptable items is very clear in the control group, as shown by the boxplot in Figure 33 and the mean/median value (Mean=4.43, Median=5.00). Unexpectedly, Q23, which is an unacceptable item, was rated as "4" or "5" by four native speakers. However, the other unacceptable item, Q24, did not receive any high rating from the native speakers. That means, some (but very few) native speakers accept 'eat bread' in Q23 to denote a categorial meaning and to enter in syntax as a complex root, similar to 'eat rice' in Q14; however, it is absolutely unacceptable that 'drink this bottle of alcohol' in Q24 enters in syntax as a complex root. That is quite understandable since 'this bottle of alcohol' has a specific reference and is less likely to occur as part of a root than 'bread'. Nevertheless, the trend of rejecting the unacceptable items is very clear in the control group, as shown by the boxplots in Figure 33 and the mean/median value (Mean=1.69, Median=1.00).

We ran three paired t-tests to find out if the contrast between the acceptable and the unacceptable categories is significant in each group. As shown in Table 53, the nature of N2 has a statistically significant effect in the intermediate group (t=3.4236, p=0.001592<0.05) and the control group (t=16.563, p< 2.2e-16) but not in the advanced group (t=0.82328, p=0.4217). For the alternative hypothesis that the difference is greater than 0, the p-value is low in the intermediate group (p=0.0007958<0.05) but high in the advanced group (p=0.2109). The result shows that the advanced group did not outperform the intermediate group.

Paired t-test		**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference>0)**
Acceptable × Unacceptable	Intermediate	3.4236	35	0.001592	0.0007958
	Advanced	0.82328	17	0.4217	0.2109
	Control	16.563	53	< 2.2e-16	< 2.2e-16

Table 53 - Paired t-tests for the effect of generic/specific N2 in Type VIII in Test 2

We calculated the score difference of each acceptable-unacceptable pair by each participant and ran three Welch's t-tests to find out if there is any significant between-group difference. As shown by the results in Table 54 below, statistically significant difference is found in Advanced × Control (t=-4.6989, p=0.0001179<0.05) and Intermediate × Control (t=-5.5839, p=6.107e-07<0.05). However, no significant difference is found in Intermediate × Advanced, and the t-value is above 0 (t=1.0156, p=0.3182), which shows that the advanced group did not outperform the intermediate group. That is also reflected by the high p-value for the alternative hypothesis that the true difference is less than 0 (p=0.8409).

Welch two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
Intermediate × Advanced	1.0156	28.939	0.3182	0.8409
Advanced × Control	-4.6989	21.326	0.0001179	5.897e-05
Intermediate × Control	-5.5839	59.621	6.107e-07	3.053e-07

Table 54 - Welch t-tests of score difference for the constraint in Type VIII in Test 2

To find out if there is any significant difference between the two L2 groups in the judgment of the acceptable items and the unacceptable items separately, we ran two Welch's t-tests, the results of which are presented in Table 55. No statistically significant difference is found between the two groups since the p-values are all above 0.05 (p=0.08193, 0.5504).

Welch Two Sample t-test		t	df	*p*-value
Intermediate × Advanced	Acceptable	1.8122	25.117	0.08193
	Unacceptable	0.60392	29.915	0.5504

Table 55 - Welch t-tests for proficiency effect in Type VIII in Test 2

6.2.8 Effect of the co-occurrence of 把 *ba*

In previous sections, is has been observed that some native speaker participants may find the sentences with canonical SVO word order a big pragmatically strange, and that the occurrence of 把 *ba* can make the sentences sound more natural. In this section, we will find the effect of 把 *ba* statistically. Two pairs of items are included in this analysis, as presented in Table 56. In each pair, one sentence has the canonical SVO word order, and the other contains 把 *ba*, which forces the Object to raise to a higher position, making the sentence surface as S *ba* O V. Both sentences are grammatical, and the only difference is in pragmatic terms – the co-occurrence of 把 *ba* emphasizes the impact of the Subject (the Causer) on the Object (the Causee).

Without 把 *ba*	**With 把 *ba***
Q7 这 个 歌手 唱 哭 她 了。 *Zhe ge geshou chang ku ta le.* this CLF singer sing cry she ASP 'This singer's singing made her cry.'	Q8 这 个 歌手 把 她 唱 哭 了。 *Zhe ge geshou ba ta chang ku le.* this CLF singer BA she sing cry ASP 'This singer's singing made her cry.'
Q9 这 本 书 看 哭 她 了。 *Zhe ben shu kan ku ta le.* this CLF book read cry she ASP 'Reading this book made her cry.'	Q10 这 本 书 把 她 看 哭 了。 *Zhe ben shu ba ta kan ku le.* this CLF book BA she read cry ASP 'Reading this book made her cry.'

Table 56 - Items for the effect of 把 *ba* in Test 2

The scores of each category in each group are summaries in Table 57. The mean scores are compared in Figure 34. It is observed that the items with 把 *ba* received higher mean scores than those with canonical SVO word order in all groups. In addition, while the control group accepted both categories (Mean=3.33 and 4.76, respectively), the two L2 groups showed acceptance to the items with 把 *ba* (Mean=3.25 and 3.22, respectively) but rejection to the SVO counterparts (Mean=2.50 and 2.00, respectively).

		N	Min	Median	Mean	Max	SD
Intermediate	SVO	36	1.00	2.50	2.50	4.00	1.133893
	With *ba*	36	1.00	4.00	3.25	5.00	1.42177
Advanced	SVO	18	1.00	2.00	2.00	4.00	1.028992
	With *ba*	18	1.00	3.00	3.22	5.00	1.516791
Control	SVO	54	1.00	4.00	3.33	5.00	1.387274
	With *ba*	54	1.00	5.00	4.76	5.00	0.8226782

Table 57 - Scores of items with or without *ba* in Test 2

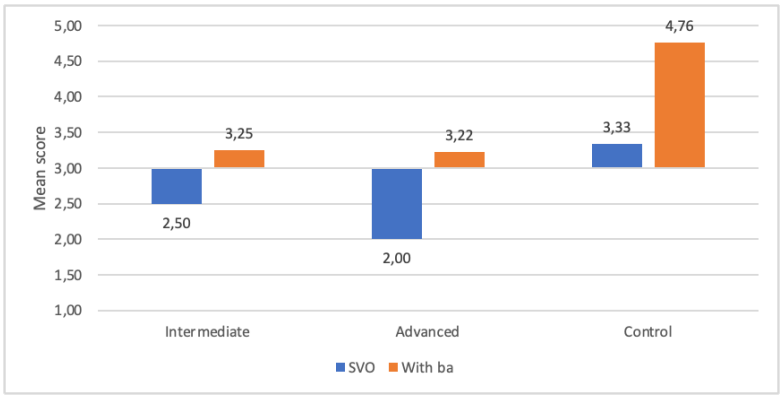


Figure 34 - Mean scores of items with or without *ba* in Test 2

The boxplots of the scores can be found in Figure 35, from which we can have a similar observation: it seems that each group tends to give higher ratings to the items with 把 *ba* than the SVO counterparts.

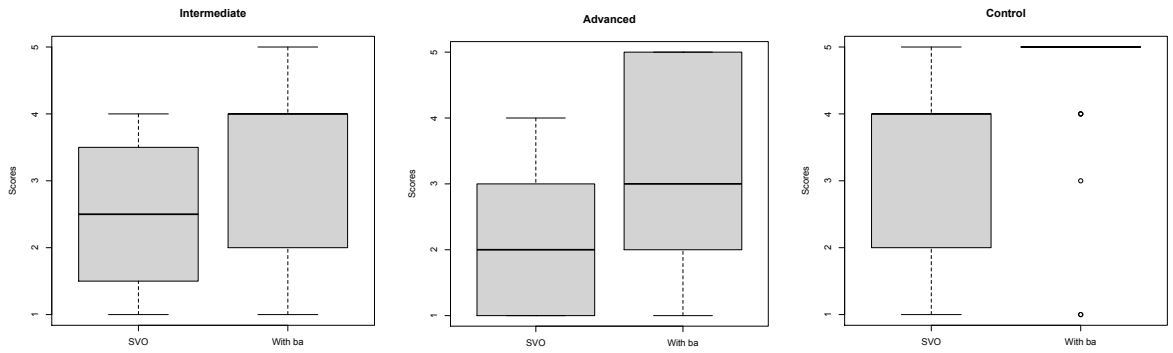


Figure 35 - Boxplots of scores of items with or without *ba* in Test 2

We also have observed some unexpected ratings in the control group. A total of 16 (out of 54) unexpected ratings (as "1" or "2") are found in the SVO category, and only two (out of 54) are found in the category with 把 *ba*. The result shows that when no specific context is provided,

CR V-Vs with the canonical SVO word order may sound pragmatically strange to some native speakers; however, the sentences can be improved with the occurrence of 把 *ba*.

We ran three paired t-tests to find out if the difference between the two categories is significant in each group. As shown by the results in Table 58, there is a statistically significant difference between the two categories in all groups since the *p*-values are all under 0.05 (*p*=0.01272, 0.02134, 1.607e-10). For the alternative hypothesis that the difference is less than 0, the *p*-values are very small (*p*=0.006359, 0.01067, 8.036e-11), which indicates a strong tendency that the participants in all groups rate the items with 把 *ba* higher than the SVO counterparts.

Paired t-test		**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
SVO × With *ba*	Intermediate	-2.6264	35	0.01272	0.006359
	Advanced	-2.5354	17	0.02134	0.01067
	Control	-7.9016	53	1.607e-10	8.036e-11

Table 58 - Paired t-tests of items with or without *ba* in Test 2

6.3 Results of the Comprehension Task (CT)

The selected choices in each group for each of the 7 target sentences are summarized in Figure 36-42.

For Item 1, as shown in Figure 36 below, the two L2 learner groups' responses are highly concentrated in the choice "a" (Intermediate: 88.9%; Advanced: 100%). In the control group, the choice "a" has a lower frequency (56.7%), with "d" as an alternative choice (36.7%). The "d" choice was not found in any of the L2 groups.

Item 1: 女儿 想 哭 妈妈 了。
Nuer xiang ku mama le.
daughter miss cry mom ASP
a. 'The daughter misses her mom, so the daughter cried.'
b. *'The daughter misses her mom, so the mom cried.'
c. *'The mom misses her daughter, so the daughter cried.'
d. 'The mom misses her daughter, so the mom cried.'

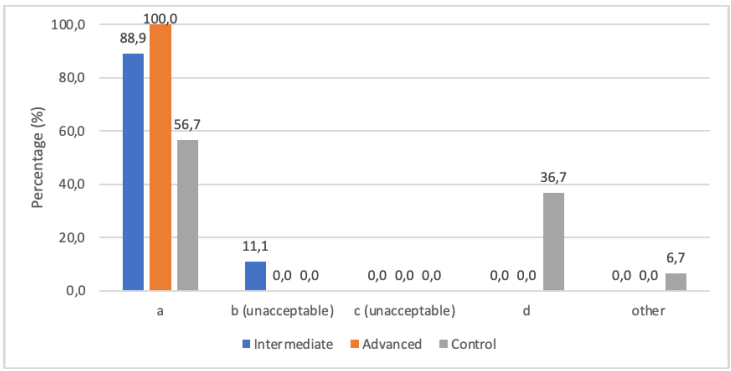


Figure 36 - Frequency of Item 1 choices in Test 3

The two L2 learner groups' responses to Item 2 seem to be quite similar: as shown in Figure 37 below, in both groups, the choice "a" has the highest frequency (Intermediate: 40%; Advanced: 44.4%), followed by "b" (Intermediate: 30%; Advanced: 22.2%), which is an unacceptable choice, and "other" (Intermediate: 25%; Advanced: 22%). The choice "c", which is unacceptable, has a frequency of 11.1% in the advanced group. In contrast, the control group's responses have a different distribution. The native speakers almost equally preferred "a" (48.4%) and "d" (45.2%). However, the "d" choice only has a 5% frequency in the intermediate group and 0% in the advanced group.

Item 2: 医生 等 急 病人 了。

Yisheng deng ji bingren le.

Doctor wait anxious patient ASP

a. 'The doctor is waiting for the patient, and the doctor got anxious.'

b. *'The doctor is waiting for the patient, and the patient got anxious.'

c. *'The patient is waiting for the doctor, and the doctor got anxious.'

d. 'The patient is waiting for the doctor, and the patient got anxious.'

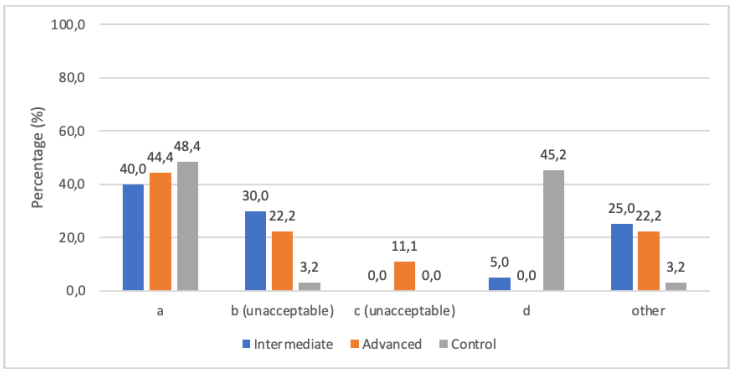


Figure 37 – Frequency of Item 2 choices in Test 3

For Item 3, as shown in Figure 38 below, all groups showed preference to the choice "a" (Intermediate: 68.4%; Advanced: 88.9%; Control: 58.8%), which is followed by "b" (Intermediate: 21.1%; Advanced: 11.1%; Control: 20.6%). While "d" is also a preferred choice in the control group (20.6%), it only has a frequency of 5.3% in the intermediate group and 0% in the advanced group.

Item 3: 妹妹 追 累 哥哥 了。

Meimei zhui lei gege le.

Sister chase tired brother ASP

a. 'The sister is chasing the brother, and the sister got tired.'

b. 'The sister is chasing the brother, and the brother got tired.'

c. *'The brother is chasing the sister, and the sister got tired.'

d. 'The brother is chasing the sister, and the brother got tired.'

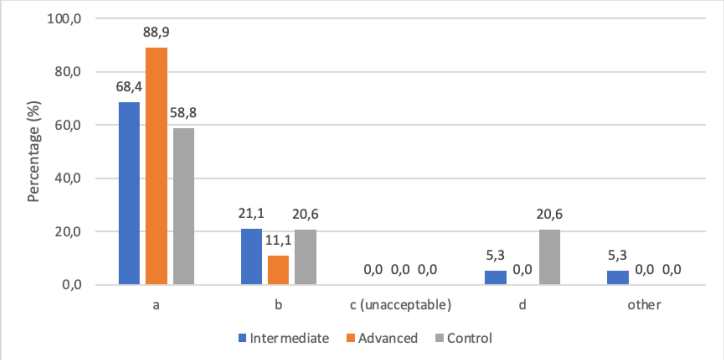


Figure 38 – Frequency of Item 3 choices in Test 3

The choices "a" and "b" for Item 4 are both acceptable. As shown in Figure 39 below, the participants' responses are more or less split between the two choices, with the intermediate group showing a stronger preference to "a" (61.1% vs. 38.9%).

Item 4: 他 骑 累 马 了。

Ta qi lei ma le.

He ride tired horse ASP

a. 'He is riding a horse, and he got tired.'

b. 'He is riding a horse, and the horse got tired.'[60]

[60] Contrasting to the previous items, only two options were provided with this item. That is because the interpretations with other thematic patterns are pragmatically ruled out (i.e., 'The horse is riding him…').

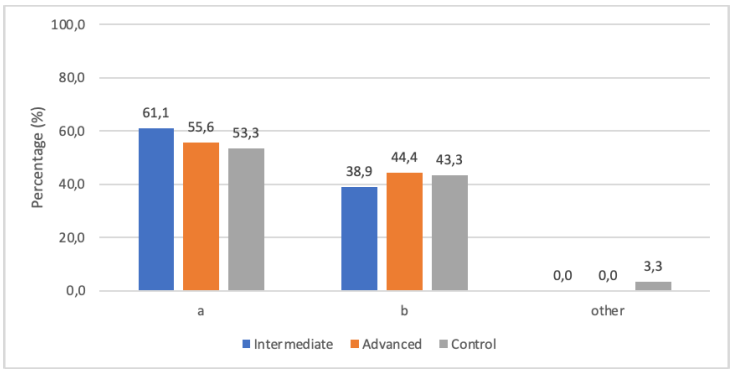


Figure 39 – Frequency of Item 4 choices in Test 3

For Item 5, the choice "a" is acceptable, but "b" is unacceptable. As shown in Figure 40 below, all groups' responses are perfectly concentrated in "a", with a frequency of 100% in each group.

Item 5: 哥哥 打 赢 了 他的 同学。

Gege da ying le ta-de tongxue.

Brother fight win ASP his classmate

a. 'The brother fought with his classmate, and the brother won.'

b. *'The brother fought with his classmate, and the classmate won.'[61]

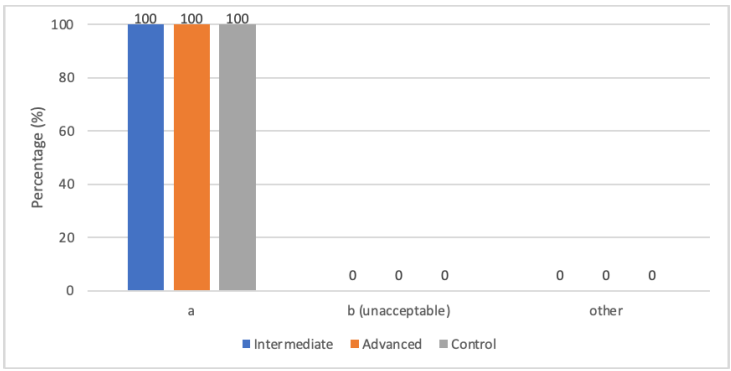


Figure 40 – Frequency of Item 5 choices in Test 3

Regarding Item 6, the choice "a" is unacceptable, while "b" is acceptable. As shown in Figure 41 below, as expected, the control group's responses are concentrated in "b" (96.3%). However, the two L2 learner groups' responses are almost split between the two choices. The

[61] Only two options (instead of four) were provided because we did not distinguish between 'the brother fought with his classmate' and 'the classmate fought with the brother'. In both cases, the semantic meaning is that the brother and the classmate fought against each other.

intermediate group even preferred the unacceptable "a" (61.1%) over the acceptable "b" (38.9%). The advanced group showed slightly more preference to "b" (55.6%), which is closer to the native speakers' performance compared to the intermediate group, but is till at a chance level (around 50%).

Item 6: 他 打 败 了 巨人。

Ta da bai le juren.

he fight lose ASP giant

a. *'He fought with the giant, and he lost.'

b. 'He fought with the giant, and the giant lost.'[62]

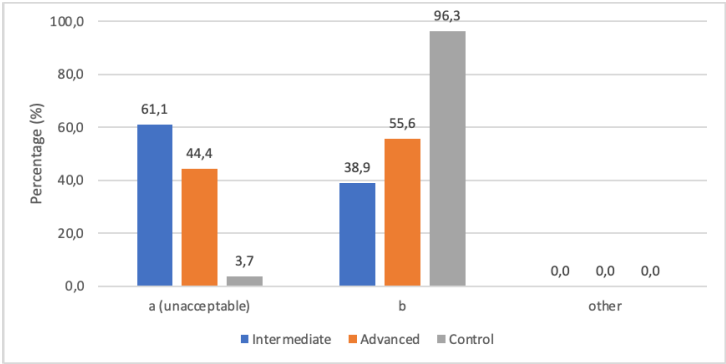


Figure 41 - Frequency of Item 6 choices in Test 3

Among the four choices for Item 7, only "b" is acceptable. The results in Figure 42 show that, as expected, the control group's responses are concentrated in the choice "b" (92.9%). However, while the two L2 learner groups also demonstrated preference to "b" (Intermediate: 78.9%; Advanced: 60%), the choice "a", which is unacceptable, has a frequency of 21.1% in the intermediate group and 40% in the advanced group.[63]

[62] Only two options (instead of four) were provided for the same reason as in Item 5 (see the previous footnote).

[63] The contrast between 打赢 *da ying* 'fight win' in Figure 40 and 打败 *da bai* 'fight lose' Figure 41 show that 打赢 *da ying* 'fight win' probably is more lexicalized than 打败 *da bai* 'fight lose' (since the native controls' responses towards 'fight win' are 100% "a", but their responses to 'fight lose' show a split), which corresponds to our statement in §3.2.6 in Chapter 3. The L2 learners have successfully acquired 打赢 *da ying* 'fight win' as a compound (100% matching the native controls' responses). Meanwhile, the L2 learners are acquiring 打败 *da bai* 'fight lose' as a syntactic structure, thus allowing both interpretations. There is also a progressive trend since the learners' responses are approaching the native speakers' as proficiency increased.

Item 7: 老师 说 哭 学生 了。

Laoshi shuo ku xuesheng le.

teacher talk cry student ASP

a. *‘The teacher talked to the student, and it made the teacher cry.’

b. ‘The teacher talked to the student, and it made the student cry.’

c. *‘The student talked to the teacher, and it made the teacher cry.’

d. *‘The student talked to the teacher, and it made the student cry.’

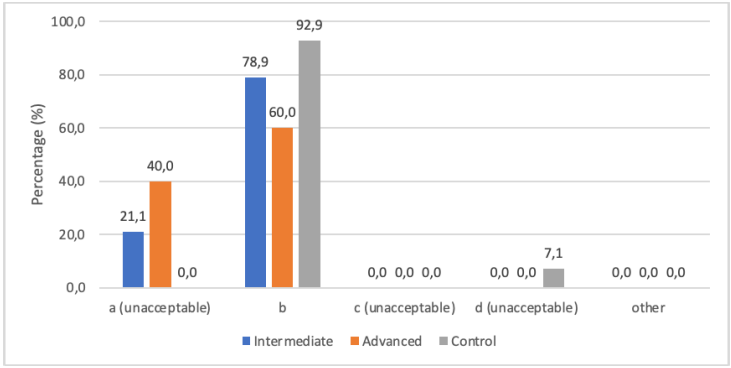


Figure 42 - Frequency of Item 7 choices in Test 3

The results above shows that the L2 learner participants’ responses mostly fell within the range of the acceptable options. For the items which involve both acceptable and unacceptable options, namely Items 1-3 and 5-7, we calculated the accuracy rate of each L2 learner participant, and the results are summarized in Table 59 below. The accuracy ranged from 57.14% to 100.00% in both groups. The mean accuracy rate of the intermediate group is 74.34%, and that of the advanced group is slightly higher, being 76.72%.

	N	Min (%)	Median (%)	Mean (%)	Max (%)	SD
Intermediate	18	57.14	69.05	74.34	100.00	11.59255
Advanced	9	57.14	83.33	76.72	100.00	13.24345

Table 59 - Accuracy rate of L2 learners in Test 3

The boxplots of the accuracy rates in both L2 groups are presented in Figure 43. We do not see a big contrast between the two groups, but the advanced group seems to show slightly higher accuracy.

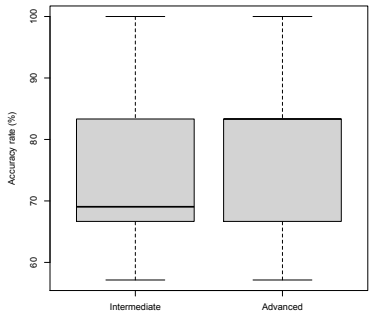


Figure 43 - Boxplots of L2 learners' accuracy rate in Test 3

To find out if the difference between the two groups is significant, we ran a Welch's t-test. As shown by the result in Table 60, there is no statistically significant between-group difference since the *p*-value is high (t=-0.45853, *p*=0.6535). For the alternative hypothesis that the difference is less than 0, the *p*-value is also high (*p*=0.3267). Therefore, there is only a weak tendency that the advanced group outperform the intermediate group in interpreting the items.

Welch Two sample t-test	**t**	**df**	***p*-value (alt: difference≠0)**	***p*-value (alt: difference<0)**
Intermediate × Advanced	-0.45853	14.315	0.6535	0.3267

Table 60 - Welch's t-test of L2 learners' accuracy rate in Test 3

Comparing the accuracy rate of each item (see Figure 44), we find a big variation among the items. In general, both L2 learner groups showed similar trends – they have the highest accuracy with Items 1, 3, and 5, and the lowest with Items 2 and 6.

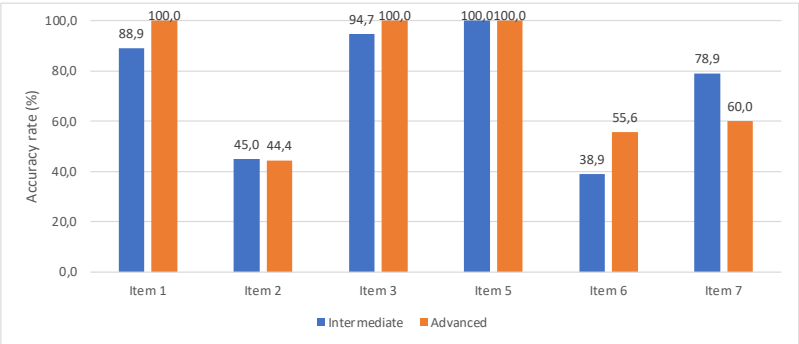


Figure 44 - Accuracy rate by items in the L2 groups in Test 3

The percentage of each thematic pattern (i.e., N1 as Causee or N2 as Causee) in each group's responses is compared in Figure 45.

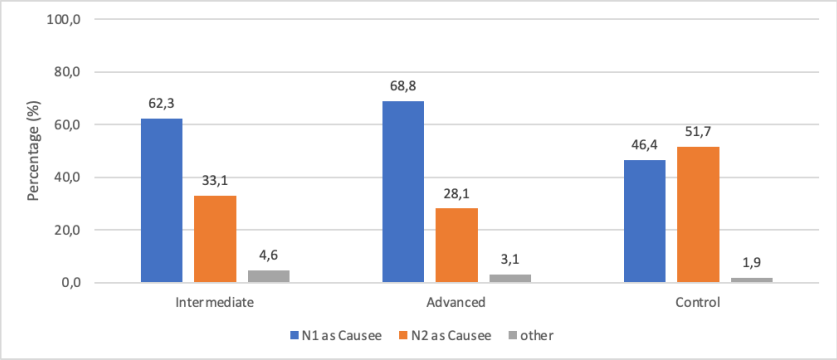


Figure 45 - Percentages of different thematic patterns in Test 3

According to Figure 45, the control group is almost on a chance level (46.4% vs. 51.7%), showing no preference towards a particular pattern. In contrast, the two L2 learner groups showed a preference to the N1-as-Causee pattern (Intermediate: 62.3%; Advanced: 68.8%). The N2-as-Causee pattern only took 33.1% of the responses in the intermediate group and 28.1% in the advanced group.

We further looked at the items with four provided options (i.e., Items 1, 2, 3, and 7), which correspond to the four thematic patterns presented in (3).

(3) For a CR V-V instance with the surface N1 V1 V2 N2

a. V1 {N1, N2}, V2 {N1}

b. V1 {N1, (N2)}, V2 {N2}

c. V1 {N2, N1}, V2 {N1} (inaccessible)

d. V1 {N2/*pro*, N1}, V2 {N2}

The thematic pattern in (3c) is inaccessible in CR V-Vs (see §3.2.6 in Chapter 3). The others are theoretically possible, but their acceptability is context-dependent (see §4.5 in Chapter 4). For this reason, some CR V-Vs may allow all these three interpretations (e.g., Item 3), some allow only two of them (e.g., Items 1, 2), while others allow only one (e.g., Item 7).

The three groups' responses to Items 1, 2, 3, and 7 are summarized in Figure 46.

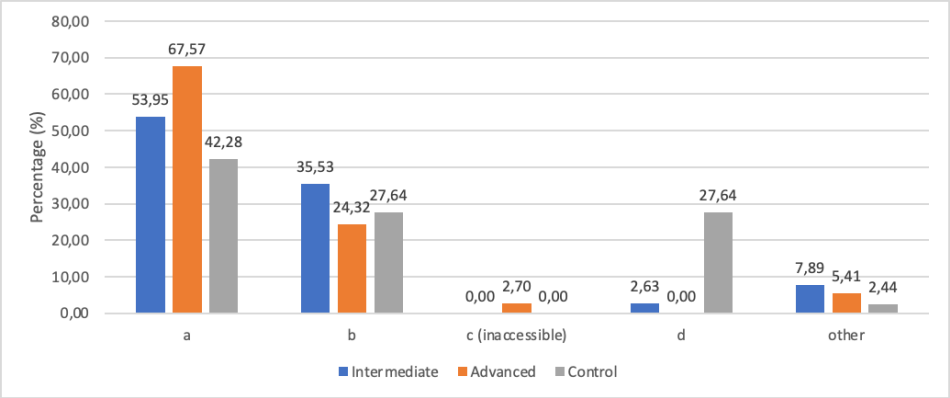


Figure 46 - Percentage of four thematic patterns in Test 3

It shows that pattern (3a) received the highest percentage in all groups (Intermediate: 53.95%; Advanced: 67.57%; Control: 42.28%), followed by pattern (3b) (Intermediate: 35.53%; Advanced: 24.32%; Control: 27.64%). As expected, pattern (3c) was not found in the control groups' responses and only took 0% or 2.7% in the L2 learner groups' responses. However, while pattern (3d) received a fairly high percentage from the control group (27.64%), it is barely found in the L2 learners' responses (2.63% in the intermediate group, and 0% in the advanced group). This pattern seems to impose the greatest difficulty for CR V-V processing by these L2 learners.

6.4 Summary

In this chapter, we have presented the results of the empirical study in full length, including the results of a semi-elicited production task, a grammaticality judgment task, and a comprehension task.

The results of the Semi-elicited Production Task (SPT) show that a proficiency effect is detected in the L2 learner groups, and native-like performance is observed among some L2 learners.

Comparing the scores of the acceptable and unacceptable items in the Grammaticality Judgment Task (GJT), it has been found that in general, L2 learners can distinguish between the two categories. However, proficiency effect is detected in the scores of the unacceptable items but not in the acceptable items. The causative or non-causative V1 does not have a significant effect on the learners' ratings, but the proficiency effect is found in the items with non-causative V1 – this category received higher acceptance from the advanced learners than the intermediate learners. Both L2 learner groups showed sensitivity to the semantic constraint

on V2, and a proficiency effect is observed. Regarding the CR V-Vs with different thematic patterns, the N2-as-Causee pattern seems to impose difficulties since it received the lowest score from both L2 learner groups and does not show a proficiency effect. It has been observed that both L2 learner groups lack knowledge of the "small-size" constraint and the V-V adjacency constraint, but the advanced group slightly outperformed the intermediate group regarding the first one. Both L2 learner groups were sensitive to the V-V integrity constraint, and a weak proficiency effect is detected. With respect to the causative alternation constraints, the L2 learners performed well, and the proficiency effect is evident. However, the constraint in the Type VIII of CR V-Vs seems to be problematic for L2 acquisition: results show that the intermediate group, but not the advanced group, can distinguish the acceptable and unacceptable items.

In the Comprehension Task (CT), a weak proficiency effect is detected in the accuracy rate, and some L2 learners achieved 100% accuracy. Compared to the N1-as-Causee pattern, the N2-as-Causee pattern is more difficult to acquire. In particular, the thematic pattern in (3d) imposes the greatest difficulty.

A summary of the overall results is presented in Table 61 below.

Task	Subject		Proficiency effect	Constraint awareness[64]
Semi-elicited Production Task	CR V-V frequency		Yes	-
Grammaticality Judgment Task	Overall results:	Acceptable items	No	-
		Unacceptable items	Yes	-
		Acceptable vs. unacceptable	Yes	Both
	Causative/non-causative V1:	Items with causative V1	No	-
		Items with non-causative V1	Yes	-
	Constraint on V2		Yes	Both
	The N2-as-Causee pattern		No	-
	Compound properties:	"Small size" constraint	Yes	Neither
		V-V adjacency	No	Neither
		V-V integrity	Weak	Both
	Causative alternation:	Causative constraint	Weak	Both
		Non-alternation of Accusative V-Vs	Yes	Both
	Constraint in Type VIII		No	Intermediate
Comprehension Task	Accuracy		Weak	-

Table 61 - Summary of the empirical study results

[64] In this column, we indicate which group shows sensitivity to a certain constraint.

In the next chapter, we will discuss these results in the light of the hypotheses presented in §5.2 of Chapter 5 and provide answers to the research questions put forward in §5.3.1 of Chapter 5.

7 Discussion

7.1 L1 transfer

7.1.1 Transfer of lexical properties

In the Semi-elicited Production Task (SPT), when describing the video clip where a person wiped the stain off the table (Item 2, see Appendix 1), five L2 learner participants used the verb 打扫 *dasao* 'do cleaning'. This Chinese verb denotes the meaning of 'doing cleaning works' and usually takes an NP that refers to a room or a house instead of a particular object such as a table or a cup. More importantly, it conveys a pure activity meaning without implying the result that 'something became clean', as shown by the acceptable refutation in (1a). To involve the result meaning, a CR V-V would be employed, with the result explicitly expressed in the V2 position, as shown in (1b), where the refutation is not acceptable anymore. Among the five L2 learners' responses that contain 打扫 *dasao* 'do cleaning', only one (an advanced learner, PT-12-ADV) correctly employed the CR V-V construction, with 打扫 *dasao* 'do cleaning' occurring at V1 position denoting the manner. In the other four responses (all by intermediate learners), this verb alone formed a predicate. We hypothesize that the latter one constitutes a case of L1 lexical transfer. These L2 learners may have linked this Chinese verb to *limpar* 'to clean' in L1 Portuguese, assuming that they are semantically equivalent. In other words, they transferred the lexical properties of L1 *limpar* 'to clean' to L2 打扫 *dasao* 'to do cleaning', not knowing that this Chinese verb does not involve result meanings and that the L2 Chinese equivalence to *limpar* 'to clean' should have a CR V-V structure.

(1) a. 孩子 打扫 了 房间，(但 房间 还是 不 干净)。
Haizi dasao le fangjian, (danshi fangjian haishi bu ganjing).
child do.cleaning ASP room, (but room still not be.clean).
'The child did some cleaning in the room, (but the room is still not clean).'

b. 孩子 <u>打扫 干净</u> 了 房间，(*但 房间 还是 不 干净)。
*Haizi <u>dasao ganjing</u> le fangjian, (*dan fangjian haishi bu ganjing).*
child do.clearning be.clearn ASP room, (*but room still not be.clean)
'The child cleaned the room, *(but the room is still not clean).

7.1.2 Transfer of functional properties

Results of the SPT show that CR V-Vs dominated in the control group's responses (91.86%). However, this structure took only 46.67% in the advanced L2 group and is only the second preferred structure type in the intermediate group (20.83%), following coordinating clauses (38.06%) (see Figure 8 in §6.1 of Chapter 6). For instance, all native speaker participants' responses to Item 14 contain CR V-Vs, one example of which is presented in (2a). In contrast, coordinating clauses were used in 61.1% of the intermediate group's responses and 11.1% of the advanced group's responses to this item, as exemplified in (2b).

(2) Item 14: A girl drank alcohol and then got drunk.

a. 她 喝 醉 酒 了。
Ta *he zui* *jiu* *le*.
she drink drunk alcohol ASP
'She got drunk by drinking alcohol.'

b. 她 喝 酒, 醉 了。 (PT-14-INT, PT-27-INT)
Ta *he* *jiu,* *zui* *le.*
she drink alcohol, drunk ASP
'She drank alcohol, (and then) got drunk.

The overuse of coordinating clauses by L2 learners may be considered a case of L1 transfer of syntactic properties. That is because in their L1 Portuguese, coordinated/subordinated clauses or clauses with gerunds/PPs are used when both the manner and the result are expressed explicitly – the resultative structure involving both manner and result is not accessible (see §2.2 of Chapter 2 and §4.6 of Chapter 4). That means, in their L1, the causing subevent and the result subevent are expressed in separate domains, contrasting to CR V-Vs where these two are compounded together.

On the other hand, using coordination to express a complex event is not a property that only belongs to a particular typological group of languages. It is not difficult to understand that with incomplete knowledge of Chinese CR V-Vs, L2 learners may employ coordination, a UG-constrained strategy, to express caused-result events, regardless of their L1s (i.e., a strategy that is also employed in L1 acquisition; see L1 acquisition of coordinate clauses in Costa et al. (2008) for Portuguese and Diessel (2004) for English). Therefore, the high frequency of coordination in the L2 learners' production in our study (more in the intermediate group than

in the advanced group) may not necessarily be interpreted as evidence of L1 transfer. The observed increase of CR V-V frequency and the decrease of coordination frequency in the L2 learners' production as proficiency increased may be treated as either a recovery from L1 transfer or simply a better knowledge of L2 grammars driven by progressive acquisition and parameter (re)setting, both enabled by UG access.

We have also noticed that the CR V-V frequency is 0 for Item 8 in both L2 learner groups, contrasting to the frequency of 93% in the control group (see Figure 10 in §6.1 of Chapter 6). Two examples of the control group's responses can be found in (3a, b). In the L2 groups, the majority of the responses involve syntactic causatives (Intermediate: 14/18, 77.78%; Advanced: 8/9, 88.89%), as exemplified in (3c). In our experiment, no Manner verb was provided for this item, and only the result-denoting verb 哭 *ku* 'cry' was offered as a cue (besides the NPs that correspond to Causer and Causee). Therefore, the participants had the option of overtly expressing the causing activity or only focusing on the caused event. In either case, CR V-Vs occurred with a high frequency in the control group. When the native speakers would like to describe the causing activity, a Manner verb occurred at V1 position (3a); when the causing activity was omitted, V1 position was occupied by a verb denoting generic meanings like 'do' or 'make' (3b). Contrastingly, the L2 learners mostly employed syntactic causatives, with the causing activity being covert (3c).

(3) Item 8: A boy dragged a girl on the floor, and then the girl cried.

a. 哥哥 把 妹妹 欺负 哭 了。

Gege ba meimei qifu ku le.

brother BA sister bully cry ASP

'The brother made the sister cry by bullying (her).'

b. 哥哥 把 妹妹 弄 哭 了。

Gege ba meimei nong ku le.

brother BA sister do cry ASP

'The brother made the sister cry.'

c. 哥哥 让 妹妹 哭 了。 (PT-01-ADV, PT-03-INT, PT-13-INT, PT-18-INT, PT-19-INT, PT-22-INT)

Gege rang meimei ku le.

brother make sister cry ASP

'The brother made the sister cry.'

We claim that this constitutes a case of L1 transfer. Since the result event is an action, namely 'to cry', syntactic causative structures are used in the learners' L1 Portuguese (although coordinating clauses are also theoretically possible) (see discussions on syntactic causatives in §2.1.3 of Chapter 2). The L2 learners transferred this L1 property to L2 and thus produced a high frequency of syntactic causatives. Although syntactic causatives such as (3c) are grammatical in Chinese, no instance was found in the native speakers' responses to this item.

In addition, according to the results related to acceptable/unacceptable causation in the Grammaticality Judgment Task (GJT), while the L2 learner groups accepted the Inchoative CR V-Vs, they showed rejection not only to the unacceptable causative counterparts but also to the acceptable ones (see §6.2.6.1 of Chapter 6). This may be considered a case of L1 transfer since their L1 Portuguese does not exhibit zero causatives (i.e., causatives without overt causative markers) (see §4.6.1 of Chapter 4). In Portuguese, when causative alternation occurs, it is the anticausative process but not the causative one that is employed (see §2.1 of Chapter 2). Therefore, if the L2 learners transfer this L1 property to L2, they may not accept the causative process without overt causative markers, thus showing less acceptance towards the Causative type of CR V-Vs than the Inchoative counterparts, corresponding to the results in our experiment. However, note that zero causatives have been found in the L2 learners' production in SPT (see Figure 8 in §6.1 of Chapter 6), which seems to be a counterargument to this claim. We will dedicate §7.1.3 below to a detailed discussion on this matter.

To summarize, the results of our study seem to suggest L1 transfer of functional properties, but other factors may intervene.

7.1.3 Ambiguous evidence

Zero causatives have been found in the L2 learners' production in SPT, taking 15.56% of the intermediate group's responses and 8.89% of the advanced group's (see Figure 8 in §6.1, Chapter 6). In (4)-(7) below, samples of the L2 learners' responses that contain zero causatives are presented in (a), and the target sentences (i.e., with CR V-Vs) are presented in (b). The zero causatives in (4a)-(7a), where the verb that is supposed to take the V2 position in CR V-Vs forms a predicate on its own to express causative meanings, are unacceptable or marginal in Chinese. In SPT, no zero causative instance has been found in the control group's production. What makes it interesting is that zero causatives are not allowed in the learners' L1 Portuguese. As discussed in §2.1 of Chapter 2, although Portuguese exhibits verbs that allow causative

alternation, the involved process is anticausation, deriving intransitive counterparts from the transitive verbs. In general, Portuguese does not allow zero causatives (see §4.6.1 of Chapter 4).

(4) 'She broke the cup.' (Item 3)

a. *她 碎 了 杯子。 (PT-02-INT, PT-03-INT, PT-15-INT)

*Ta sui le beizi.

she be.broken ASP cup

b. 她 弄/打 碎 了 杯子。 (target sentence)

Ta nong/da sui le beizi.

she make/hit be.broken ASP glass

(5) 'She stained the table.' (Item 1)

a. *她 脏 桌子 了。 (PT-06-INT)

*Ta zang zhuozi le.

she dirty table ASP

b. 她 弄/搞 脏 桌子 了。 (target sentence)

Ta nong/gao zang zhuozi le.

she make dirty table ASP

(6) 'She cleaned the table.' (Item 2)

a. *她 干净 了 桌子。 (PT-02-INT)

*Ta ganjing le zhuozi.

she be.clearn ASP table

b. 她 弄/擦 干净 了 桌子。 (target sentence)

Ta nong/ca ganjing le zhuozi.

she make/wipe clean ASP table

(7) 'She made the box fall (accidently).' (Item 9)

a. *她 掉 盒子 了。 (PT-01-ADV, PT-19-INT)

*Ta diao hezi le.

she fall box ASP

b. 她 弄/碰 掉 了 盒子。 (target sentence)

Ta nong/peng diao le hezi.

she make/touch fall ASP box

On one hand, some of these zero causatives produced by L2 learners may be treated as evidence of L1 lexical transfer. Taking (4a) as an example, since the verb *partir* 'to break' in L1 Portuguese allows both causative and inchoative uses (although the anticausative marker -*se* is needed in the inchoative use), the learners may have transferred the lexical properties of this verb to 碎 *sui* 'be.broken' in L2 Chinese, assuming that it also allows both uses, not knowing that the causative counterpart should employ a CR V-V structure. The sentences in (5a) and (6a) may also be considered cases of L1 transfer. Despite the morphological differences between verbs and adjectives in L1 Portuguese, the causative counterparts, *sujar* 'to stain' and *limpar* 'to clean', share the same stems with the inchoative counterparts, *sujo/a* 'dirty' and *limpo/a* 'be.clean'. Transferring this property to L2, the L2 learners may expect to somehow "inflect" 脏 *zang* 'dirty' and 干净 *ganjing* 'be.clean' in Chinese to produce causative meanings. Since Chinese does not exhibit morphological distinction between verbs and adjectives, the L2 learners ended up using these words causatively with null inflectional morphology, thus producing zero causatives. Other zero causative instances found in the L2 learners' production, such as those formed with 开 *kai* 'to open, be.open', 化 *hua* 'to melt, be.melted', and 湿 *shi* 'be.wet', may also be explained by lexical transfer from the verbs *abrir* 'to open', *derreter* 'to melt', and *molhar* 'to wet' in L1 Portuguese, all of which express causative meanings. Zero causatives with these verbs in Chinese may be acceptable in some particular contexts, but in describing a caused-result event, it is usually more plausible to use CR V-Vs.

On the other hand, the zero causatives in (4a)-(7a) may also be treated as evidence of UG access. According to various studies on children's L1 acquisition of causatives (Allen, 1998; Berman, 1985, 1993; Borer, 1997; Bowerman, 1982a, b, 1988; Bowerman & Croft, 2008; Pye, 1994; a. o.), it has been observed cross-linguistically that children may incorrectly use intransitive verbs transitively to produce causative meanings. For instance, zero causative errors from Chinese-speaking children have been observed by Erbaugh (1982, 1992) and Deng (2010). According to Montrul (2001), when children are not sure about the lexico-syntactic properties of a particular verb but attempt to express causative meanings, they may use a fallback strategy by using the verb transitively. The zero causation thus can be considered a UG-constrained strategy that is employed when the learners do not have full knowledge of what structure should be used in the target language to produce causative meanings. The zero causatives produced by the L2 learners in our study may be just products of this UG-

constrained fallback strategy. The zero causative instance in (7a) seems to support this claim. The Portuguese verb *cair* 'fall' does not have a causative use, and thus (7a) cannot be explained by L1 transfer, but UG access. More supporting evidence can be found in (8a) below, where the verb 哭 *ku* 'to cry' is used causatively and put in a passive structure. Since *chorar* 'to cry' in Portuguese does not have a causative use (8b) and can only be causativized by syntactic means (8c), the zero causative in (8a) is unlikely to result from L1 transfer but UG access.

(8) a. *妹妹 被 哥哥 哭 了 起来。 (PT-04-INT)
**Meimei bei gege ku le qilai.*
sister PASS brother cry ASP up
'The sister was made to start crying by the brother.'

b. **A irmã foi chorada pelo irmão.*
the sister was cried by.the brother
'The sister was made to cry by the brother.'

c. *O irmão fez a irmã chorar.*
the brother made the sister cry
'The brother made the sister cry.'

Furthermore, L2 overgeneralization may also be an alternative explanation. As presented in §2.1.2 of Chapter 2, although not as productive as in Old Chinese, zero causatives are still attested in Modern Chinese. In fact, the zero causative in (5a) above would be more acceptable if the aspect marker immediately follows 脏 *zang* 'dirty' (9a) and will become even more natural in an imperative sentence (9b). In the sentence in (7a), if the Subject takes the role of an Experiencer instead of a Causer, the verb 掉 *diao* 'to fall' may allow a transitive use with a zero-causative-like surface, as illustrated in (9c). Being exposed to such instances produced by the Chinese native speakers, the L2 learners may overgeneralize, creating zero causatives overly productively.

(9) a. ?她 脏 了 桌子。
?Ta zang le zhuozi.
she dirty ASP table
'She stained the table.'

b. 别　脏　了　桌子！

Bie zang le zhuozi!

NEG dirty ASP table

'Don't stain the table!'

c. 你　掉　钱包　了。

Ni diao qianbao le.

you fall wallet ASP

'You had (your) wallet dropped.'

7.1.4 Full transfer

The results of our study have provided evidence of L1 transfer both lexical and functional properties. However, some apparent evidence of L1 functional transfer may be ambiguous. Since L1 grammars are constrained by UG, when L1-like performance is detected in learners' L2 grammars, sometimes it is hard to tell whether such performance should be a result of L1 transfer or simply a retreat to UG options (assuming that UG is accessible).

Despite some ambiguous evidence, it is clear that L2 learners transfer both lexical and functional properties to their L2 grammars. In general, the results of our study argue in favor of Schwartz & Sprouse's (1994, 1996) full transfer view of L1 in L2 acquisition.

7.2 UG access

7.2.1 General knowledge of CR V-Vs

Through our experimental tasks, it is evidenced that the L2 learners demonstrated a better general knowledge of Chinese CR V-Vs as proficiency increased.

First of all, we have observed that the CR V-V frequency in L2 learners' production increased with proficiency – the advanced group outperformed the intermediate group, and the difference is statistically significant (see §6.1 of Chapter 6). In particular, the advanced group produced CR V-V more frequently than the intermediate group regardless of the corresponding L1 structures (see Figure 11) or the number of keywords provided (see Figure 12).

In addition, the developmental acquisition path is also evident in CR V-Vs' comprehension. Both L2 groups demonstrated a high accuracy rate in interpreting CR V-Vs, but the advanced learners outperformed the intermediate learners (see §6.3 of Chapter 6).

Results of the GJT show that in general, both L2 groups could distinguish between the acceptable and unacceptable CR V-Vs, and the distinction between the two categories is stronger in the advanced group than in the intermediate group (see §6.2.1 of Chapter 6). In particular, a proficiency effect is detected in the ratings of the unacceptable items: the advanced group greatly outperformed the intermediate group in ruling out the ungrammatical ones, showing a better general knowledge of CR V-V constraints.

Moreover, recall that Chinese CR V-Vs allow the V1 component to be either causative (i.e., denoting a generic meaning of 'do' or 'make') or non-causative (i.e., denoting a specific meaning) (see §3.2.3 of Chapter 3). On the surface, the CR V-Vs with causative V1 appear to be similar to the *fazer*-Inf construction in Portuguese (although with different underlying structures, see §3.4 of Chapter 3) and therefore might be easier to acquire than those with non-causative V1. However, the results of the GJT show that the causative or non-causative V1 does not have a significant effect on the L2 learners' ratings, and both L2 groups showed acceptance to both categories (see §6.2.2 of Chapter 6). More importantly, the advanced group outperformed the intermediate group in accepting the CR V-Vs with non-causative V1, the acquisition of which did not receive any "help" from L1 transfer. A near-native performance has been found in the advanced group since their ratings of the CR V-Vs with non-causative V1 are not significantly different from that of the control group (see Table 22 in §6.2.2 of Chapter 6).

The results presented above all demonstrate that the L2 learners' knowledge of CR V-Vs has developed with proficiency increase.

7.2.2 Acquisition of constraints

Successful acquisition of some specific CR V-V constraints has been detected in our study, including the semantic constraint on V2, the V-V integrity, the constraints related to causative alternation, and the "small size" constraint.

First of all, both L2 groups have good knowledge of the semantic constraint on V2 since the difference in ratings between the grammatical and the ungrammatical items is significant in both groups (see Table 25 in §6.2.3 of Chapter 6). More importantly, the L2 learners' knowledge of this constraint grew as proficiency increased, which is evidenced by the bigger contrast between the two categories in the advanced group. Since the semantic constraint on V2 is due to the root-selecting v_{CAUSE} (see §4.2 of Chapter 4), a structure that is not allowed in

Portuguese (see §4.6.1 of Chapter 4), the L1 Portuguese L2 learners' knowledge of this constraint provides evidence of successful resetting of parameter feature values.

Besides, both L2 groups demonstrated knowledge of the V-V integrity constraint by successfully distinguishing the acceptable items and those with an individual modifier of V1/V2 (see Table 40 in §6.2.5.3 of Chapter 6). No significant difference was observed between the control group and any of the L2 groups in terms of the ratings of the ungrammatical items, and the advanced group slightly outperformed the intermediate group (see Table 42 in §6.2.5.3 of Chapter 6).

Moreover, it has been found that both L2 groups could distinguish plausible and unplausible causative CR V-Vs (see Table 45 in §6.2.6.1 of Chapter 6) and demonstrated knowledge of the impossible causative alternation of the Accusative CR V-Vs (see Table 49 in §6.2.6.2 of Chapter 6). Therefore, they were generally sensitive to the constraints related to causative alternation.

As presented earlier in §4.6 of Chapter 4, the Chinese CR V-V has a syntactic structure that does not exist in Portuguese. For L1 Portuguese L2 Chinese learners to acquire CR V-Vs, they should reset the root-selecting and the Manner Conflation options for v_{CAUSE}. The successful acquisition of the constraints mentioned above suggest that UG is accessible and that with L2 exposure, the L2 learners can reset the parameter feature values in conformity with the properties of the target grammar.

Although the L2 learners showed insufficient knowledge of the "small size" constraint in CR V-Vs (the difference in ratings between the grammatical and ungrammatical categories is not statistically significant; see §6.2.5.1 of Chapter 6), the advanced group outperformed the intermediate group, showing a tendency that the L2 learners' knowledge of the "small size" constraint grows with proficiency increase. We predict that successful acquisition of this constraint may be attainable with more L2 exposure.

7.2.3 Native-like performance

Through our research, native-like performances have been observed in the L2 learner groups. In particular, some L2 learner participants' performance reached a native-like level in producing and comprehending Chinese CR V-Vs.

In SPT, the CR V-V frequency in two L2 learner participants's production (PT-01-ADV and PT-20-INT) fell within the frequency range of the control group (70-100%), being 70% and 85%, respectively, showing native-like performance. In addition, among the L2 learners'

responses that contained CR V-Vs, three responses employed passive markers such as 被 *bei* and 让 *rang*, as presented in (10). It suggests that those L2 learners not only could produce CR V-Vs but also allowed further syntactic operations such as passivization.

(10) a. 虫子 被 她 杀 死 了。(PT-09-ADV)
Chongz bei ta sha si le.
insect PASS she kill die ASP
'The insect was killed to death by her.'

b. 树枝 被 她 切 断 了。(PT-11-INT)
Shuzhi bei ta qie duan le.
branch PASS she cut snap ASP
'The branch was cut into pieces by her.'

c. 孩子 让 爸爸 逗 笑 了。(PT-01-ADV)
Haizi rang baba dou xiao le.
child PASS dad tease laugh ASP
'The child was made to laugh by dad's teasing.'

Moreover, for Items 5, 7, 14, and 16, the CR V-V frequency in the advanced group is very close to that in the control group (1.00 vs. 1.00; 1.00 vs. 1.00; 0.89 vs. 1.00; 0.89 vs. 1.00; see Figure 10 in §6.1 of Chapter 6), showing native-like or near-native-like performance.

In CR V-Vs' comprehension, one intermediate (PT-04-INT) and one advanced learner (PT-16-ADV) achieved an accuracy rate of 100%, showing native-like performance.

These native-like or near-native-like performances suggest that the acquisition of Chinese CR V-Vs by L1 Portuguese learners is attainable.

7.2.4 Full access

The the positive developmental trends, the successful acquisition of some CR V-Vs constraints, and the native-like performances presented in the previous sections provide evidence for UG access, showing that these aspects of the L2 grammars are acquirable. However, it is also worth noting that the acquisition of some constraints show more difficulty, such as the V-V adjacency

and the "small-size" constraint. We attribute such difficulty to a few reasons, which will be presented in detail in §7.3.[65]

Our findings are consistent with the ones in previous work on L2 acquisition of resultatives where L1 and L2 are typologically different, for example, de Souza & de Oliveira (2014), who investigated the acquisition of L2 English resultatives by L1 Brazilian Portuguese learners. Despite that the authors called the participants "bilinguals", we still find the results in their study relevant since the participants' "English language learning process had occurred in contexts of formal education in a society that does not have English as the dominant language for social interactions" (2014: 396). The results show that those learners were capable of categorizing the English resultative construction as a grammatical construction in their L2 and could distinguish between semantically acceptable and unacceptable resultatives in L2 English. According to the authors, as those learners were acquiring a construction that can be linked to a parameter absent from their L1, parameter resetting-like behavior was detected.

In addition, our findings are also in line with the results of previous studies on the acquisition of L2 Chinese CR V-Vs by L1 English learners, such as Zhao (2006). Although Chinese and English are both satellite-framed and manner-conflated languages, the resultatives in the two languages still manifest differences – v_{CAUSE} embeds a Small Clause in English resultatives but a root in Chinese CR V-Vs (see §4.2 in Chapter 4). Therefore, resetting of parameter feature values is also required for L1 English learners to acquire Chinese CR V-Vs. The results in Zhao (2006) show that L1 English learners could acquire the syntactic structure of CR V-Vs, suggesting that functional categories are acquirable.

To summarize, the results in our study suggest a full access view of UG in L2 acquisition and the attainability of resetting parameter feature values. Since L1 transfer is evident, as discussed in §7.1 above, our findings argue in favor of the Full Transfer Full Access Hypothesis proposed by Schwartz & Sprouse (1994, 1996), which claims that the entire L1 grammar is the initial stage of L2 acquisition, and with L2 exposure, learners can restructure from L1 settings to L2 settings by resourcing to UG options when L1 grammars cannot accommodate L2 input.

[65] It is interesting to see that the L2 learners showed successful acquisition of V-V integrity but not V-V adjacency. We do not consider this as an argument against a successful developmental trend or UG access. We hypothesize that the L2 learners may simultaneously allow Chinese CR V-V structure and the English-type of resultative structure (i.e., with an embedded Small Clause, surfacing as a non-contiguous word order), thus allowing both V-V adjacency and a non-adjacency. Note that the small clause structure is allowed in their L1 Portuguese (in simple resultatives without Manner Conflation), and the L2 learner participants in our study all acquired English prior to Chinese. They may need more L2 Chinese exposure to "deactivate" the small clause resultative structure in their L2 Chinese grammar.

7.3 Acquisition difficulty

In the previous section, we presented L2 data that achieved the target grammar. The successful acquisition or promising attainability of some L2 grammar aspects, such as the semantic constraint on V2, the "small size" constraint, the V-V integrity, and the constraints related to causative alternation, suggest full UG access in L2 acquisition. However, the L2 acquisition process seems to be more complex than just resetting the parameter feature values and is not a one-way steady process. In the following subsections, the L2 grammar aspects that showed unsuccessful acquisition will be presented.

7.3.1 Processing difficulty

In the GJT, for both L2 learner groups, the N2-as-Causee thematic pattern makes a significant difference – in general, the L2 learners tend to show lower acceptance to this pattern than the N1-as-Causee or the intransitive pattern (see §6.2.4 in Chapter 6). We did not find significant difference between the two L2 learner groups in terms of the N2-as-Causee category' ratings (p=0.4637). The advanced group even showed slightly less acceptance towards this pattern than the intermediate group since the t-value for Intermediate × Advanced is above 0 (t=0.73437). That means, the increase of proficiency did not result in better knowledge of this thematic pattern. Due to the limited number of participants in our study, the result does not necessarily suggest that the acquisition process of this property is a case of regression. However, what it really shows is that this thematic pattern imposes great difficulty for acquisition.

Results in the CT show that for the items where both N1-as-Causee and N2-as-Causee patterns were presented as choices, N2 was interpreted as Causee in 51.7% of the control group's responses; in contrast, the L2 learners mostly treated N1 as Causee (Intermediate: 62.3%; Advanced: 68.8%; see Figure 45 in §6.3 of Chapter 6). In particular, the pattern (d) in (11) (repeating (3) in §6.3 of Chapter 6), where N2 takes the role of Causee and N1 is interpreted as a Theme (not Agent) of V1, took 27.64% of the control group's responses but only 2.63% in the intermediate group and 0% in the advanced group (see Figure 46 in §6.3 of Chapter 6). This thematic structure seems to impose the greatest difficulty for CR V-V processing by the L2 learners. Our findings are consistent with those in Zhao (2006) and Yuan

& Zhao (2010) in that even if the syntactic structures of CR V-Vs may be acquired, the acquisition of their event structures is still difficult for L2 learners.

(11) For a CR V-V instance with the surface N1 V1 V2 N2
  a. V1 {N1, N2}, V2 {N1}
  b. V1 {N1, (N2)}, V2 {N2}
  c. V1 {N2, N1}, V2 {N1} (inaccessible)
  d. V1 {N2/*pro*, N1}, V2 {N2}

In contrast, the pattern (11a) took a high percentage in the L2 learner groups' responses (Intermediate: 53.95%; Advanced: 67.57%; see Figure 46 in §6.3 of Chapter 6), which suggests that these learners may tend to process the CR V-V sequence N1 V1 V2 N2 as N1 being a shared Subject of V1 and V2. In this case, CR V-Vs are processed as if they had a covert coordinating structure. In many cases, such a processing strategy can yield correct interpretations, and this may be the reason why the L2 learners' responses in the CT showed high accuracy. Meanwhile, the thematic structures that require more complex processing and more working memory, such as pattern (11d), are more difficult for acquisition. Note that the (11a) pattern also achieved a decent percentage in the control group (42.28%), which is higher than that of pattern (11d) (27.64%). We believe that the processing complexity also has an impact on native speakers' preference – they also prefer the interpretation that requires less processing effort. However, the contrast between (11a) and (11d) is much more prominent in the L2 learner groups (Intermediate: 53.95% vs. 2.63%; Advanced: 67.57% vs. 0) than in the control group (42.28% vs. 27.64), which shows that the pattern (11d) had not been successfully acquired by the L2 learners yet by time of our experiment.

In all, we posit that the processing difficulty of certain L2 grammar is a predicting factor of acquisition difficulty.

7.3.2 Feature Reassembly

In §7.2.1 above we showed that the L2 learners had successfully acquired quite a few CR V-V constraints. At least from the intermediate level, the L2 learners were sensitive to the semantic constraint on V2, the V-V integrity, and the constraints related to causative alternation. It seems that those are the properties that were acquired the earliest. For the small-size constraint, the

intermediate group did not show sensitivity but was outperformed by the advanced group, which reveals a proficiency effect.

However, the success mentioned above is only a part of the story. If the acquisition of CR V-Vs is successful, it would be expected that the advanced learners show more acceptance towards the grammatical CR V-Vs than the intermediate learners. Contrary to this, the advanced learners did not outperform the intermediate group in accepting the grammatical items (the difference is not significant, p=0.7352), and both groups were significantly different from the control group. The reason why the advanced group showed a stronger distinction between the grammatical and ungrammatical items is because their rejection towards the ungrammatical items was much stronger (the difference between the two L2 groups is significant, p=6.803e-05<0.05). The fact that the advanced learners did not show stronger acceptance towards the grammatical CR V-Vs indicates that the acquisition of Chinese CR V-Vs still imposes difficulty on the L2 learners.

Looking at individual constraints, we find the results quite mixed: while some constraints showed successful acquisition (e.g., semantic constraint on V2, V-V integrity, constraints related to causative alternation), others did not. It has been observed that neither L2 learner group was sensitive to the V-V adjacency constraint, and no better performance was detected as proficiency increased (Intermediate × Advanced: t=0.092348, p=0.9271; see §6.2.5.2 of Chapter 6). Regarding the constraint in the Type VIII of CR V-Vs (see Table 1 in §3.2.6 of Chapter 3 and §4.5 of Chapter 4), the intermediate group outperformed the advanced group, but the difference between the two L2 groups is not significant (Intermediate × Advanced: t=1.0156, p=0.3182; see §6.2.7 of Chapter 6). The acquisition of these two constraints seems to be difficult and need more L2 exposure and learning efforts. The result also implies a possible U-shaped development in acquisition (see Strauss, 1982): a particular property of the target language may appear, disappear, and then reappear in the acquisition process. It might be that the advanced learners in our study were in the second phase, and that given more L2 exposure, successful acquisition would be observed.

In all, the results in SPT seem to show that the CR V-V properties under investigation form a hierarchy of acquisition order and difficulty. As shown in Figure 47, the semantic constraint on V2, the V-V integrity, and the constraints related to the causative alternation were acquired the earliest; the small-size constraint had not been fully acquired but its acquisition is promising since there was proficiency effect; the V-V adjacency and the constraint in Type VIII are the most difficult to acquire and need more L2 exposure for successful acquisition.

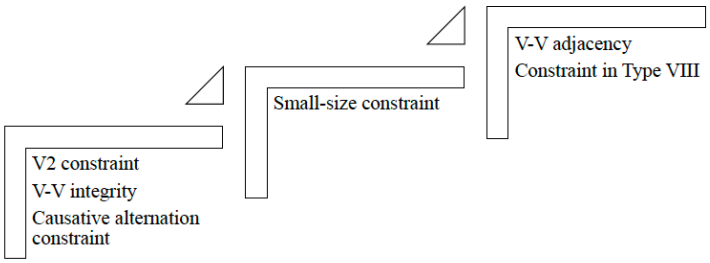


Figure 47 - Acquisition hierarchy

The question is, if UG is accessible and thus parameter feature values can be reset (as discussed in §7.2 above), why some aspects of L2 grammars showed successful acquisition but others still impose difficulty? We claim that the Feature Reassembly Hypothesis proposed by Lardiere (2005, 2008, 2009a, b) may provide an explanation. According to Lardiere, in language acquisition, the parameter "selection" part seems easy, but the feature "assembly" part may impose difficulty. That means, "the greater difficulty for the second language acquirer lies in assembling just the right combination of features into the right lexical items for each language, and in determining the appropriate conditioning environments for their expression" (Lardiere, 2009a: 215).

As illustrated in Figure 48, if the acquisition of Grammar *x* only requires parameter resetting, but Grammar *y* requires not only parameter resetting but also feature reassembly, it is predicted that the acquisition of Grammar *y* imposes more difficulty and needs a longer L2 exposure. Given a Grammar *z* that requires the reassembly of an even more complex bundle of features, its acquisition is expected to be even more difficult.

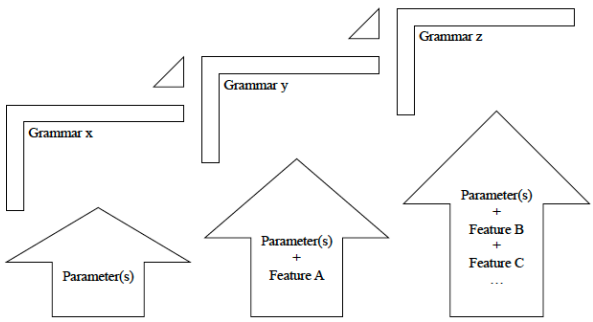


Figure 48 – Feature reassembly hierarchy

The hierarchy in Figure 47 then finds an explanation. The properties of the first level of are the earliest to acquire because they come "automatically" once the parameters are reset. In particular, once [+root-selecting] is set for v_{CAUSE} by the L2 learners, the semantic constraint

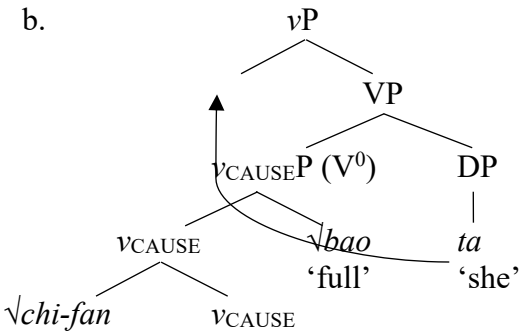
on V2 is expected to come naturally through UG access since it is a cross-linguistic and UG-constrained rule that in root causativization, the embedded root should have unaccusative but not unergative properties (see §4.2 in Chapter 4). Moreover, once both [+root-selecting] and [+Manner Conflation] are set by the L2 learners, the V-V integrity comes naturally since the two roots conflate/incorporate into the same head to jointly form a V^0, showing high integrity. The constraints related to verbs' causative alternation belong to some UG-governed rules which apply cross-linguistically (for discussions on the semantic rules, see Levin & Rappaport Hovav, 1994, ff.); once parameter resetting is completed, the CR V-Vs would be treated as verbal units by the L2 learners, and the universal semantic rules can automatically apply in learners' L2 grammar.

However, the "small-size" constraint not only requires parameter resetting but also knowledge about the disyllable tendency of Chinese words/compounds. For this reason, its acquisition takes more time and effort compared to the first-level properties.

The third level of properties are even more difficult to acquire since they involve more complex feature reassembly. One is the constraint in Type VIII of CR V-Vs (see Table 1 in §3.2.6 of Chapter 3), an example of which is presented in (12a). As discussed earlier in §4.5 of Chapter 4, this type of CR V-Vs contains a complex Manner-denoting root. The surface Object 饭 *fan* 'rice' in (12a) forms a complex root with 吃 *chi* 'to eat' to denote a type of human activity, 'eating', as illustrated in (12b).

(12) a. 她 吃 饱 饭 了。
Ta chi bao fan le.
she eat full rice ASP
'She got full by eating (rice).'

b.



*'eat that/a bowl of rice'
*'eat bread'

In this case, successful parameter resetting towards [+Manner Conflation] and [+root-selecting] does not guarantee successful acquisition. The L2 learners are also required to obtain the knowledge that the surface Object in this type of CR V-Vs cannot have a reference and should combine with V1 to denote a generic type of activity (see §4.5 of Chapter Four for constraints in this type of CR V-Vs, such as 骑累 *qi lei* 'ride tired'). As shown in (12b), the sentence would be ungrammatical if 'that bowl of rice' or 'bread' occurs at that position. Besides, the learners should also know about the phonetic constraints in Chinese compounds to yield correct word order (see footnote 44 in §4.5 of Chapter 4).

The V-V adjacency constraint also imposes great difficulty. In the learners' L1 Portuguese, v_{CAUSE} can embed a Small Clause to form simple resultatives (see §4.6 of Chapter 4). However, that structure is not allowed in Chinese. In Chinese resultatives, v_{CAUSE} can embed a root but not a Small Clause. For this reason, non-contiguous resultatives with an NP intervening the Manner and the Result (e.g., *John hammered the metal flat*) does not exist in Chinese. Therefore, acquiring the V-V adjacency constraint of Chinese CR V-Vs requires the L1 Portuguese learners to not only set [+Root-selecting] and [+Manner Conflation], but also disallow v_{CAUSE} to take an embedded Small Clause in their L2 grammar.

Therefore, we claim that the complexity of feature reassembly is also a predicting factor of acquisition difficulty. However, other factors, such as the quality of input, may also contribute to the difficulty of some properties' acquisition, which will be discussed in the next section.

7.3.3 Input quality

The acquisition difficulty of the "small-size" constraint (see §6.2.5.1 of Chapter 6) may also owe to the ambiguousness of the input. As shown by the unexpected high ratings of one item (namely, Q28) that violates the "small size" constraint by three native speakers, there seems to be a certain level of flexibility in the application of this constraint. In fact, there indeed exist CR V-Vs that involve components containing more than one syllables, such as 干净 *ganjing* 'be.clean' and 明白 *mingbai* 'to understand' (see §3.2.4 in Chapter 3 for detailed examples). Such exceptional cases may yield a longer acquisition process of the "small-size" constraint.

Results in the GJT show that in all groups, there is a tendency that the items with 把 *ba* receive more acceptance than their counterparts with the canonical SVO word order (see §6.2.8 in Chapter 6), such as those in (13).

(13) a. 这 个 歌手 唱 哭 她 了。 (SVO)
zhe ge geshou chang ku ta le.
this CLF singer sing cry she ASP
'This singer's singing made her cry.'
b. 这 个 歌手 把 她 唱 哭 了。 (with *ba*)
Zhe ge geshou ba ta chang ku le.
this CLF singer BA she sing cry ASP
'This singer's singing made her cry.'

While the control group accepted both categories, the L2 learner groups showed acceptance towards the items with 把 *ba* but rejection towards their counterparts in SVO word order. Comparing the two L2 learner groups, the advanced group even showed less acceptance towards the SVO items than the intermediate group. We hypothesize that the input plays an important role here. The CR V-Vs with the SVO word order are grammatically fine in Chinese. However, in real-life conversation, speakers tend to highlight the causative meaning and seldomly use a plain and neutral tone. The co-occurrence of 把 *ba* meets this pragmatic need since it emphasizes the impact of the Subject on the Object (see footnote 24 and §3.2.5 of Chapter 3). That can be reflected by the high co-occurrence rate of 把 *ba* in the control group's responses containing CR V-Vs in the SPT (62.5%; see §6.1 in Chapter 6). For the same reason, in the GJT, the items with 把 *ba* received a higher average score than their SVO counterparts in the control group since they are pragmatically better. Therefore, in the L2 input that the learners are exposed to, CR V-Vs frequently co-occur with 把 *ba*, which may make the L2 learners assume that the occurrence of 把 *ba* is somehow obligatory in expressing a caused-result event, thus rejecting CR V-Vs in SVO word order. It may take a long time for the L2 learners to eventually acknowledge that the CR V-V is a construction that can stand alone.[66]

As already mentioned in the previous section, neither the intermediate nor the advanced L2 learner group showed sensitivity to the V-V adjacency constraint in CR V-Vs, and the advanced learners did not outperform the intermediate group (also see §6.2.5.2 in Chapter 6). The L2 learners' incorrect acceptance towards CR V-Vs with an intervening Causee may also owe to the superficial similarities between CR V-Vs and the pivotal constructions such as those in (14). Both CR V-Vs and pivotal constructions contain two Vs that are in temporal relations

[66] Since this matter involves an interface between syntax and pragmatics, the acquisition difficulty may also be explained by the Interface Hypothesis (Sorace, 2005; Sorace & Filiaci, 2006), which states that it is particularly hard for L2 learners to acquire a linguistic phenomenon if it involves an interface between a syntactic domain and another cognitive domain, such as the lexicon, discourse, or pragmatics.

– the subevent encoded by V1 precedes the subevent denoted by V2. However, the two Vs are in adjacency in CR V-Vs but are intervened by an NP in pivotal constructions.

(14) Pivotal constructions

a. 他 请 我 吃 晚餐。

Ta qing wo chi wancan.

he invite me eat dinner

'He invites me to have dinner.'

b. 老师 教 学生们 说 葡萄牙语。

Laoshi jiao xueshengmen shuo putaoyayu.

teacher teach students speak Portuguese

'The teacher teaches the students to speak Portuguese.'

Sometimes, a pair of Vs may be able to form both CR V-Vs and pivotal constructions if their lexical properties are compatible with both. For example, the two Vs of Item 12 in the SPT actually allow both CR V-V and pivotal constructions, as shown in (15). In our study, 4 out of the 27 native speakers responded to this item using the pivotal structure, while 22 employed CR V-Vs. Such ambiguous input may impose great difficulty for L2 acquisition. The L2 learners may not be aware of the syntactic distinctions between the two constructions, assuming that both contiguous and non-contiguous word orders are acceptable for CR V-Vs. According to the results in SPT, 32 out of the L2 learners' 540 responses surfaced similar to the pivotal construction with an NP intervening between the two Vs (labeled as "VNV" in Figure 8 of §6.1, Chapter 6). A majority of them (28 responses) were incorrect uses because the pairs of Vs in CR V-Vs usually are not compatible with the pivotal construction structure (the one in [15] is just an exceptional and rare case).

(15) a. 爸爸 逗 笑 孩子 了。 (CR V-V)

Baba dou xiao haizi le.

dad tease laugh child ASP

'The dad made the child laugh by teasing (the child).'

b. 爸爸 逗 孩子 笑 了。 (pivotal construction)

Baba dou haizi xiao le.

dad tease child laugh ASP

'The dad teased the child to laugh.'

Based on Chomsky's (2005) three factors in language development, namely, language faculty, experience, and language- or even organism- independent principles, Yang (2010) suggests that in children's language acquisition, frequency has a significant effect on parameter setting, and productivity is motivated by efficient computation. Applying this to L2 acquisition, we can infer that unambiguous input can facilitate the parameter resetting and feature reassembly and elevate acquisition efficiency, while ambiguous input may complicate the process. This provides a good explanation of the acquisition difficulty that is presented in this section.

We hold that explicit instructions are necessary when the natural L2 input is ambiguous. At least the difficulties mentioned in this section may be waived if the L2 learners have received explicit instructions that CR V-Vs tend to be disyllabic, do not require the co-occurrence of 把 *ba*, and do not allow an intervening NP. Explicit instructions can make up for the acquisition inefficiency caused by poor input quality.[67]

7.3.4 Other possible factors

We hypothesize that some other factors may also provide an explanation to the acquisition difficulty observed in our study.

Slabakova's (2009, 2014, 2016, 2019) Bottleneck Hypothesis states that the acquisition of functional morphology, including null morphology, imposes more difficulty than the core syntax and semantics. The parameters under discussion in this study are related to the functional head v_{CAUSE}, which is null in CR V-Vs and has different features in Chinese and Portuguese. Despite the general positive developmental trend, the difficulty of acquisition observed in our study may owe to the fact that functional morphology is the bottleneck of L2 acquisition, even if it is null.

The different levels of acquisition difficulty regarding different L2 properties may also find an explanation from the distinction between macroparameters and microparameters (see Baker, 2008). According to Slabakova (2019) and Tsimpli (2014), compared to the macro-type,

[67] To the best of our knowledge, there is barely any explicit instruction about CR V-Vs in the existing manuals of Chinese language as an L2. In general, there is a lack of a systematic and comprehensive instruction regarding this productive construction. This highlights the importance of our study, which can help to improve the Chinese language manual design to make the acquisition process more efficient.

the micro-type may take a longer time to acquire and be subject to more individual variation in interlanguage development. The different acquisition difficulties may be attributed to input, more specifically, the frequency. Macroparameters address the most prominent language properties, and their (re)setting is easier due to the high frequency of occurrence that can serve as positive evidence. Contrastingly, the evidence for microparameter (re)setting can only be found in rather specific contexts. It may prolong the acquisition process because parameter (re)setting can be achieved only if there is sufficient evidence in the input. The parametric differences under discussion in our study should belong to the micro-type and thus needs more L2 exposure for successful acquisition.

7.4 Summary

Through the experimental study, we have observed a general positive developmental trend in the acquisition L2 Chinese CR V-Vs by L1 Portuguese learners. In general, the results of our research favor the Full Transfer Full Access view in L2 acquisition, although the evidence for L1 transfer sometimes can be ambiguous. However, different aspects of L2 grammar may show varied difficulties and may not be acquired at the same speed. We claim that L2 acquisition is a complex process where many factors play a role. We hypothesize that the processing difficulty, the Feature Reassembly, the input quality, the Bottleneck Hypothesis, as well as the distinction between macroparameters and microparameters may provide explanations.

8 Conclusions

8.1 Main findings

8.1.1 The syntactic proposal

The Chinese Causative Resultative V-Vs (CR V-Vs) is a very interesting construction since it shows both lexical and syntactic properties: while exhibiting properties of compounds and words, they are semantically compositional and highly productive. It is for this reason that previous studies generally diverged into two types of accounts: the lexicalist accounts claim that CR V-Vs are formed on the lexical level (e.g., Cheng & Huang, 1994; C. Li, 2007; Y. Li, 1990; Thompson, 1973), while the syntactic accounts argue that CR V-Vs are generated on the syntactic level (e.g., Cheng & Yang 2016; Gao 1997; Huang 1984, 1992; Lu 1977; Sybesma, 1993). It is in this context that our study attempts to provide a solution that enables us to account for CR V-Vs' properties holistically.

Under the framework of Minimalist Program and Distributed Morphology, we claim that CR V-Vs are compounds that are formed syntactically. This is possible under the assumptions of Distributed Morphology that both words and phrases are generated in syntax, and that the lexicon does not consist of categorized words (e.g., V, N, A), but rather, acategorial roots and functional heads (e.g., *v*, *n*, *a*). The category-neutral roots only get categorized when Merging with a functional head. We propose that the structure of a CR V-V involves a verbal head with a causative feature, v_{CAUSE}. Following Pylkkänen's (2002) proposal that v_{CAUSE} may select a root, a VP, or a phase, we claim that it selects a result-denoting root in CR V-Vs, similar to how Japanese lexical causatives are generated. We further propose that the manner-denoting root in CR V-Vs adjoins to v_{CAUSE} via Manner Conflation (see Harley, 2005; Haugen, 2009), inspired by Mateu's (2012) proposal on strong resultatives such as the English resultative *John hammered the metal flat*. Although Mateu (2012) also provided an account of Chinese CR V-Vs, claiming that they share the same syntactic structure with English resultatives, involving Manner Conflation and an embedded Small Clause, we argue that Chinese CR V-Vs do not contain a Small Clause, but a root. One direct consequence is that while English resultatives show non-contiguous word order with the Causee intervening the Manner and the Result, Chinese CR V-Vs show V-V adjacency, disallowing an intervening NP.

On one hand, since CR V-Vs are syntactically formed, their syntactic properties such as productivity and semantic compositionality can be explained. On the other hand, the lexical

properties can also be accounted for because when the two acategorial roots are conflated/incorporated to the head v_{CAUSE}, the formed constituent is a V^0, which is expected to follow the general rules for verbs. For example, CR V-Vs show high integrity, cannot take individual modifiers of V1/V2, have only one aspect and one polarity value, and tend to be disyllabic (the general tendency of words in Chinese).

The thematic flexibility and the semantic ambiguity of CR V-Vs have attracted a lot of attention in the literature. Authors who hold a lexicalist view have proposed argument linking rules in the attempt to offer an explanation (e.g., Y. Li, 1990, ff.). First of all, the lexicalist account cannot explain the productivity of CR V-Vs – there is an unlimited number of possible combinations; for the second, there is a lack of evidence that such linking rules can be applied in other types of constructions or cross-linguistically. For authors who argue for a syntactic account, especially an event-decomposition account (e.g., Basciano, 2010; Liu, 2019), CR V-Vs with different thematic patterns should correspond to distinct syntactic structures; that means, the semantic ambiguity of a CR V-V is produced by their capability of forming distinct structures. Then what is left unexplained is why some CR V-Vs do not show ambiguity or shows less ambiguity than others? Why is it not so that every CR V-V could correspond to all the theoretically possible patterns? In other words, if all those structures exist in Chinese, how can we explain the constraint – for example, when a CR V-V is theoretically compatible with four patterns but only allows two or three of them?

In our account, all CR V-Vs are generated in the same way, with two roots conflated/incorporated to the head. As a V^0, depending on the semantic meanings, a CR V-V may show an unaccusative behavior (similar to *melt* in English) or an accusative behavior (similar to *kill* in English). We claim that the Causee is always generated at the internal argument position, and if the Causer is present, it is generated at Spec, VoiceP (following Kratzer, 1996). When a CR V-V has unaccusative properties, it undergoes causative alternation and can form both Inchoative and Causative CR V-Vs; when it has accusative features, it only has a transitive use and forms Accusative CR V-Vs. We hold that the thematic flexibility and the semantic ambiguity are due to the simplicity or under-specificity of CR V-Vs' syntactic structures. The semantic meaning expressed by the syntactic structure is that the Causee underwent a change into the state denoted by V2 via the eventuality encoded in V1, and if Causer is present, it is understood as the initiator of the whole caused-result event. Note that the structure does not specify any thematic roles of the causing subevent denoted by V1, and the Causer does not have to be an Agent or even a participant of this subevent – the only requirement is that it is a possible initiator of the whole caused-result event. This is a major

reason why semantic ambiguity may occur. We hold that the complexity in semantics does not necessarily be an indicator of syntactic complexity. A construction's syntactic structure sets the basic frame for the theoretically possible semantics, and other factors, such as world knowledge and people's experience, do the rest of the work. The syntax should not be the only bearer of the burden in explaining semantics.

More importantly, instead of proposing syntactic structures which seem to be Chinese-specific or can barely find echo cross-linguistically, our proposal takes into account cross-linguistic variations. Following Mateu (2012), we claim that the possibility of Manner Conflation explains the distinction between satellite-framed languages and verb-framed languages (see Talmy, 1985). That is to say, while language such as English and Chinese are [+Manner Conflation] and can form true resultatives, Romance languages such as Portuguese have the feature [-Manner Conflation] and are restricted in forming resultatives. However, English and Chinese resultatives differ in the embedded domain – it is a Small Clause in English but a root in Chinese. We further claim that the root-selecting v_{CAUSE} is not allowed in Portuguese. In Portuguese, v_{CAUSE} may embed a Small Clause[68] (similar to English), but since Manner Conflation is not allowed, only simple resultatives with light verbs are attested. Therefore, while Chinese v_{CAUSE} has the features [+Manner Conflation] and [+Root-selecting], Portuguese v_{CAUSE} has the features [-Manner Conflation] and [-Root-selecting].

8.1.2 The empirical study

Based on the theoretical proposal, we suggest that for L1 Portuguese learners to acquire L2 Chinese CR V-Vs, parameter resetting and feature reassembly are needed. More specifically, the learners have to turn the values of [Manner Conflation] and [Root-selecting] from "-" to "+" and acquire other related properties of L2 Chinese, such as the semantic constraint on V2, the V-V adjacency, the V-V integrity, the small-size constraint, the constraint in Type VIII, and the constraints related to causative alternation.

In the attempt to find out the accessibility of Universal Grammar (UG), the role of L1, and the attainability of parameter resetting and feature reassembly in L2 acquisition, we conducted an experiment investigating Chinese CR V-V's acquisition by 27 L1 Portuguese learners. The experiment consists of a Semi-Production Task (SPT), a Grammaticality Judgment Task (GJT), and a Comprehension Task (CT).

[68] It can also embed a VP or phase, forming causatives (see §4.6.1 in Chapter 4).

The results provide strong evidence of UG access since the L2 learners showed a general positive developmental trend in CR V-Vs' production and comprehension, as well as in judging the grammaticality of the experimental items. They also have successfully acquired some CR V-V constraints, such as the semantic constraint on V2, the V-V integrity, and the constraints related to causative alternation. Besides, native-like or near-native-like performances have been observed among the L2 learners, which suggests that parameter resetting is attainable.

The results of our study provide evidence of L1 transfer of both lexical and functional categories. However, the evidence of functional category transfer sometimes may be inconclusive. For instance, the high frequency of coordinating clauses in the L2 learners' production seems to be consistent with L1 properties because, in their L1 Portuguese, the Manner and the Result tend to be expressed in separate domains, and the coordination is one possible strategy. However, it is unclear whether the usage of coordination in L2 learners' production is a real case of L1 transfer or simply a retreat to UG options. Another ambiguous case is the learners' lower acceptance towards the Causative CR V-Vs than the Inchoative counterparts. It may be interpreted as a case of L1 transfer since the learners' L1 Portuguese does not allow zero causatives. However, at the same time, zero causatives are detected in the learners' production, and thus the results are rather mixed. To make the results more ambiguous, the zero causatives in the production task may also be considered a case of L1 lexical transfer or L2 overgeneralization. Nevertheless, despite some ambiguous evidence, it is evident that the L1 transfer of both lexical and functional categories takes place in L2 acquisition.

Therefore, in general, the results of our study support Schwartz & Sprouse's (1994, 1996) Full Transfer Full Access view of L2 acquisition.

However, it has been observed that different aspects of the L2 grammars may have different levels of acquisition difficulties. Contrasting to the constraints mentioned above that showed successful acquisition, the "small-size" constraint had not been fully acquired by the time of the experiment. However, it showed a proficiency effect, and thus its acquisition is promising. The V-V adjacency and the constraint in the Type VIII of C V-Vs seem to impose the greatest difficulties. The advanced learners did not show sensitivity, and no proficiency effect was detected. Therefore, the L2 grammars form a hierarchy in terms of the difficulty of acquisition. We claim that the Feature Reassembly Hypothesis (Lardiere, 2005, 2008, 2009a, b) can provide an explanation. The easy-to-acquire L2 properties include those that can be automatically acquired once the parameter resetting is completed. In contrast, those that require not only parameter resetting but also successful acquisition of other bundles of features may impose more difficulty. To successfully acquire these L2 grammars, the L2 learners should not

only set the correct values for the parameters but also know how the bundles of features are realized in L2.

In addition, the processing difficulty also plays in role in L2 acquisition. Through the results of the GJT and CT, it has been observed that a particular thematic pattern imposes great difficulty for L2 acquisition. We claim that this is due to its processing difficulty – this thematic pattern needs more working memory than other patterns.

Moreover, input quality is another important factor. Chomsky's (2005) three factors direct people's attention to not only language faculty but also factors such as experience and data processing efficiency in language development. As frequency plays an important role in language acquisition (Yang, 2010), ambiguous input may complicate and prolong the process. We claim that it is the ambiguous input that impedes the efficient acquisition of the "small size" constraint and the word order of L2 Chinese CR V-Vs (i.e., the V-V adjacency and the canonical SVO word order).

Furthermore, the Bottleneck Hypothesis (Slabakova, 2009, 2014, 2016, 2019) may provide an explanation since the parameters under discussion in our study are related to a null functional morphology, which may be the bottleneck for L2 acquisition. The acquisition difficulty may also find an explanation from the claim that microparameters require more L2 exposure for successful acquisition than macroparameters (see Slabakova, 2019; Tsimpli, 2014), given that the parameters involved in our study belong to the micro-type.

To summarize, our study shows that UG is accessible and parameter resetting is attainable in L2 acquisition. However, the acquisition process is not just about selecting the correct values for the parameters. Language acquisition is a process that involves processing, and therefore, processing difficulty or ambiguous input may set barriers for successful and efficient acquisition. Besides, if bundles of features are required to enable the acquisition of some L2 grammars, difficulty may occur. In this case, the L2 learners not only have to set the correct values for parameters but also should know how these features are realized in L2. Therefore, different aspects of the L2 grammar may form a hierarchy of acquisition difficulty. In all, L2 acquisition is a complex process that involves various factors. Parameter resetting is needed for acquisition, but that alone does not guarantee successful acquisition.

8.2 Limitations and future work

While believing in the explanatory power of our account of Chinese CR V-Vs, we also recognize some challenges. One is related to the CR V-Vs where V2 is transitive, such as (1) below.

(1) a. 妹妹 学 会 算术 了。

Meimei xue hui suanshu le.

sister study know calculation ASP

'The sister got to know how to calculate by studying. / The sister learned calculating.'

b. 我 教 会 妹妹 算术 了。

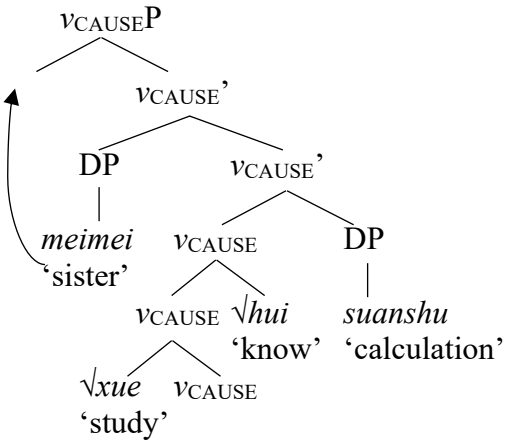
Wo jiao hui meimei suanshu le.

I teach know sister calculation ASP

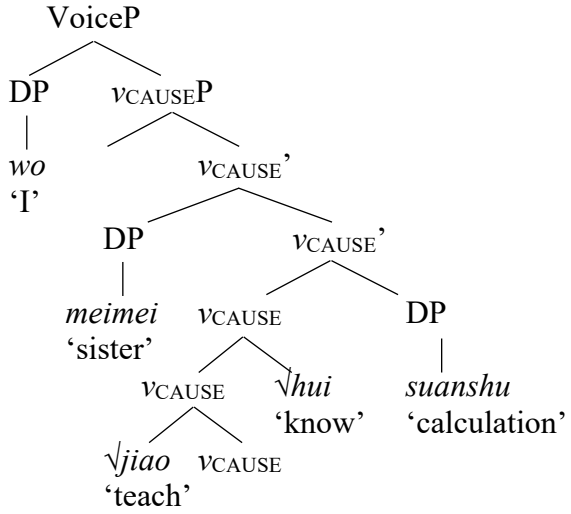
'I made the sister know how to calculate by teaching (her).'

The structure of these examples is still unclear according to our proposal presented in Chapter 4. One solution is to claim that CR V-Vs may include another subtype (besides the Inchoative, Causative, and Accusative ones), namely a benefactive type, which takes two internal arguments, echoing verbs such as *give*. The sentences in (1) thus have the structures in (2a), where the Causee 妹妹 *meimei* 'sister' is an indirect argument of the V-V, and the DP 算术 *suanshu* 'calculation' is generated at a direct argument position. When the Causer is present, it is generated at Spec, VoiceP, as in (2b).

(2) a.



b.



An alternative solution is to exclude these instances from CR V-Vs (and resultatives in general). Note that Chinese also exhibits verb compounds like those in (3), where V2 is a transitive action verb, and V1 specifies the Manner. Some of them may have been lexicalized, such as (3a), but are still analyzable.[69] With sentences such as those in (3) attested, it seems that Manner Conflation not only can apply to v_{CAUSE} but also v_{DO} in Chinese.

(3) a. 那 个 人 刺杀 了 国王。

Na ge ren ci-sha le guowang.

that CLF person stab-kill ASP king

'That person assassinated the king / That person killed the king by stabbing (him).'

b. 我们 坐 等 结果。

Women zuo deng jieguo.

we sit wait result

'We are waiting for the result, being seated.'

The examples in (1) denote causative and resultative meanings but may be considered in line with those in (3), involving Manner Conflation to v_{DO}. A systematic analysis of Chinese verb compounds is needed to find out an optimal solution.

Regarding the empirical study, one limitation is the limited number of participants. Due to the complexity of the construction under investigation, we set the criteria that the L2 learner participants in our study should hold a minimum level of HSK III. The practical difficulty is that the number of L1 Portuguese learners above this level within our reach is quite limited. Even though every effort was made to reach as many as possible, the number of L2 learners that agreed to participate was only 27. We believe that had there been a bigger number of participants, the results could represent the population more accurately.

Another challenge is the definition of levels. We classified the L2 learners into two groups depending on their HSK level. However, the HSK examination is a written exam with quite a big portion focusing on Chinese reading and writing. The HSK level may not accurately reflects the L2 learners' knowledge of L2 grammar. For example, if an L2 learner speaks fluent Chinese but has not put much effort in learning reading and writing Chinese characters, this learner's knowledge of L2 grammar would be underestimated if we only look at his/her HSK level. Note

[69] The compound 'stab-kill' has been lexicalized into a verb denoting the meaning of 'to assassinate'.

that among the L2 learner participants in our study, one intermediate learner achieved 85% CR V-V frequency in production (the frequency range in the control group is 70%-100%), surpassing all the advanced learners. This learner, coded as PT-20-INT, had obtained HSK III and was studying for level IV at the time of the test. According to a follow-up interview, we acknowledged that this learner had never lived in a Chinese-speaking region but had been talking to some Chinese friends in Portugal regularly. In the comprehension task, two L2 learners achieved 100% accuracy, and one of them (the participant PT-04-INT) is an intermediate learner according to the HSK examination. We do not want to exclude the possibility that these two learners may not have a high L2 proficiency but somehow have great knowledge of the construction under investigation. However, it is also possible that their proficiency in L2 grammar is underestimated through the official examination. Another problem exists in the timing of the examination. Some of the learner participants took the HSK examination more than one year ago.[70] After obtaining the certificate, some learners may have continued to put effort into learning the language, while others might have stopped due to lack of time or motivation and thus gradually forgot a certain portion of knowledge. In both cases, the HSK level may not correctly reflect their current Chinese proficiency, which may bring a challenge to the results of our study. If possible, future studies may carry out an independent proficiency test prior to the experiment.

Furthermore, the role of a third language (L3) may also be taken into account in future studies. The L1 Portuguese L2 Chinese learners in our study all had acquired English prior to Chinese. Since English exhibits resultative constructions, these learners may have transferred English properties to their Chinese grammars. It might be the reason why the L2 learners in our study showed no sensitivity to the V-V adjacency constraint (see §6.2.5.2 in Chapter 6) – since English resultatives have the non-contiguous word order, they may have transferred this property to Chinese.

Lastly, an interesting line of future study may involve learners of different L1s, especially L1s of different typological groups. In our study, some evidence of L1 transfer is quite ambiguous. By including participants of different L1s, it would be promising to achieve clear results.

[70] This information was not included in the questionnaire (see Appendix 4). We acknowledged that during the post-test conversation with the participants.

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Appendix 1 Items in the Semi-elicited Production Task (SPT)

Target items:

	Video description	Words presented	Target sentence
1	A person stained the table by accident.	她 *ta* 'ela' 桌子 *zhuozi* 'mesa' 脏 *zang* 'sujo/a'	她 弄/搞 脏 了 桌子。 *Ta nong/gao zang le zhuozi.* she make dirty ASP table 'She stained the table.'
2	A person wiped the stain off the table.	她 *ta* 'ela' 桌子 *zhuozi* 'mesa' 干净 *ganjing* 'limpo/a'	她 弄/擦 干净 了 桌子。 *Ta nong/ca ganjing le zhuozi.* she make/wipe clean ASP table 'She made/wiped the table clean.'
3	A woman broke a glass by accident.[71]	她 *ta* 'ela' 杯子 *beizi* 'copo' 碎 *sui* 'partir-se, partido/a'	她 弄/打 碎 了 杯子。 *Ta nong/da sui le beizi.* she make/hit break ASP cup 'She broke the cup.'
4	A woman opened a box.[72]	她 *ta* 'ela' 盒子 *hezi* 'caixa' 开 *kai* 'aberto/a'	她 打/弄 开 了 盒子。 *Ta da/nong kai le hezi.* she hit/make open ASP box 'She opened the box.'
5	A person killed an insect.	她 *ta* 'ela' 虫子 *chongzi* 'inseto' 杀 *sha* 'matar' 死 *si* 'morrer, morto/a'	她 杀 死 了 虫子。 *Ta sha si le chongzi.* she kill die ASP insect 'She killed the insect to death.'
6	A person cooked rice, and then the rice was ready.	她 *ta* 'ela' 大米 *dami* 'arroz' 煮 *zhu* 'cozer' 熟 *shu* 'cozido/a'	她 煮 熟 了 大米。 *Ta zhu shu le dami.* she cook cooked ASP rice 'She cooked the rice.'
7	A woman cut a branch into pieces.[73]	她 *ta* 'ela' 树枝 *shuzhi* 'ramo' 切 *qie* 'cortar' 断 *duan* 'quebrar-se, quebrado/a'	她 切 断 了 树枝。 *Ta qie duan le shuzhi.* she cut snap ASP branch 'She cut the branch.'
8	A boy dragged a girl on the floor, and then the girl cried.	哥哥 *gege* 'irmão mais velho' 妹妹 *meimei* 'irmã mais nova' 哭 *ku* 'chorar'	哥哥 弄/欺负 哭 妹妹 了。 *Gege nong/qifu ku meimei le.* brother make/bully cry sister ASP 'The brother made the sister cry.'
9	A person made a box fall by accident.	她 *ta* 'ela' 盒子 *hezi* 'caixa' 掉 *diao* 'cair'	她 弄/碰 掉 盒子 了。 *Ta nong/peng diao hezi le.* she make/touch drop box ASP 'She made the box drop.'

[71] This video clip is from Bowerman & Majid (2003).
[72] This video clip is from Bowerman & Majid (2003).
[73] This video clip is from Bowerman & Majid (2003).

10	A girl was playing with a washing machine, and later the washing machine did not turn on anymore.	她 *ta* 'ela' 洗衣机 *xiyiji* 'máquina de lavar' 玩 *wan* 'brincar' 坏 *huai* 'avariado/a'	她 玩 坏 了 洗衣机。 *Ta wan huai le xiyiji.* She play damaged ASP washing.machine 'She made the washing machine damaged by playing (with it).'
11	The sun was shining, and then the ice cubes started melting.	太阳 *taiyang* 'sol' 冰块 *bingkuai* 'cubos de gelo' 晒 *shai* 'brilhar' 化 *hua* 'derreter, derretido/a'	太阳 晒 化 了 冰块。 *Taiyang shai hua le bingkuai.* sun shine melt ASP ice-cubes 'The sun made the ice cubes melt by shining (on them).'
12	A man made funny sounds to a baby, and the baby kept on laughing.	爸爸 *baba* 'pai' 孩子 *haizi* 'criança' 逗 *dou* 'brincar' 笑 *xiao* 'rir'	爸爸 逗 笑 了 孩子。 *Baba dou xiao le haizi.* dad tease laugh ASP child 'The dad made the child laugh by teasing (the child).'
13	A contestant was singing on the stage, and then the judges got emotional and started to cry.	他 *ta* 'ele' 评委 *pingwei* 'juiz' 唱 *chang* 'cantar' 哭 *ku* 'chorar'	他 唱 哭 了 评委。 *Ta chang ku le pingwei.* he sing cry ASP judge 'He made the judge cry by singing.'
14	A girl drank alcohol and then got drunk.	她 *ta* 'ela' 酒 *jiu* 'álcool' 喝 *he* 'beber' 醉 *zui* 'bêbedo/a'	她 喝 醉 酒 了。 *Ta he zui jiu le.* she drink drunk alcohol ASP 'She got drunk by drinking alcohol.'
15	A girl was listening to the radio, and then nodded to show understanding.	她 *ta* 'ela' 广播 *guangbo* 'rádio' 听 *ting* 'ouvir' 懂 *dong* 'compreender'	她 听 懂 广播 了。 *Ta ting dong guangbo le.* she listen understand radio ASP 'She got to understand the radio by listening to it.'
16	A person kicked a door open.	她 *ta* 'ela' 门 *men* 'porta' 踢 *ti* 'pontapear' 开 *kai* 'abrir, aberto/a'	她 踢 开 了 门。 *Ta ti kai le men.* she kick open ASP door 'She kicked the door open.'
17	A girl was crying, making the clothes wet.	她 *ta* 'ela' 衣服 *yifu* 'roupa' 哭 *ku* 'chorar' 湿 *shi* 'molhado/a'	她 哭 湿了 衣服。 *Ta ku shi le yifu.* she cry wet ASP clothes 'She made the clothes wet by crying.'
18	A runner was racing; then she stopped and leaned on the fence.	她 *ta* 'ela' 跑 *pao* 'correr' 累 *lei* 'cansado/a'	她 跑 累 了。 *Ta pao lei le.* she run tired ASP 'She got tired by running.'
19	A man was teaching a boy how to ride a bike, and then the boy managed to ride the bike on his own.	爸爸 *baba* 'pai' 教 *jiao* 'ensinar' 会 *hui* 'saber' 骑车 *qi che* 'andar de bicicleta'	爸爸 教 会 儿子 骑车 了。 *Baba jiao hui erzi qiche le.* dad teach know son ride-bike ASP 'Dad made the son know how to ride a bike by teaching (him).'

20	A girl was eating, and then she leaned back on the chair showing satisfaction.	她 *ta* ‘ela’ 饭 *fan* ‘arroz’ 吃 *chi* ‘comer’ 饱 *bao* ‘cheio/a’	她 吃 饱 饭 了。 *Ta chi bao fan le.* she eat full rice ASP ‘she got full by eating rice (meal).’

Distractor items:

	Video description	**Words presented**
21	A man took a shower.	他 ta ‘ele’, 洗澡 *xizao* ‘banhar-se’, 家 *jia* ‘casa’
22	A girl went to bed to sleep.	她 *ta* ‘ela’, 床 *chuang* ‘cama’, 睡觉 *shuijiao* ‘dormir’
23	A man is running fast.	他 *ta* ‘ele’, 跑 *pao* ‘correr’, 很 *hen* ‘muito’, 快 *kuai* ‘depressa’
24	A singer is singing.	她 *ta* ‘ela’, 唱 *chang* ‘cantar’, 很 *hen* ‘muito’, 好 *hao* ‘bem’
25	A singer is singing and dancing.	她 *ta* ‘ela’, 唱歌 *changge* ‘cantar’, 跳舞 *tiaowu* ‘dançar’
26	A girl started eating, and one hour later she finished eating.	她 *ta* ‘ela’, 午饭 *wufan* ‘almoço’, 吃 *chi* ‘comer’, 一小时 *yi xiaoshi* ‘uma hora’
27	A group of kids are dancing happily.	他们 *tamen* ‘eles’, 跳舞 *tiaowu* ‘dançar’, 开心 *kaixin* ‘feliz’
28	A girl played mobile games every day.	她 *ta* ‘ela’, 玩 *wan* ‘jogar’, 游戏 *youxi* ‘jogo’, 天天 *tiantian* ‘todos os dias’
29	A girl sighed when looking at the pile of files.	她 *ta* ‘ela’, 工作 *gongzuo* ‘trabalhar, trabalho’, 很多 *henduo* ‘muito’
30	A girl is eating while watching TV.	她 *ta* ‘ela’, 看 *kan* ‘ver’, 电视 *dianshi* ‘televisão’, 吃 *chi* ‘comer’

Appendix 2 Items in the Grammaticality Judgement Task (GJT)

Target items:

	Sentence	Words presented
1	她 弄 脏 了 手。 *Ta nong zang le shou.* *she make dirty ASP hand* 'She made (her) hand dirty.'	弄 *nong* 'fazer, mexer' 脏 *zang* 'sujo/a' 手 *shou* 'mão'
2	她 弄 哭 了 弟弟。 *Ta nong ku le didi.* she make cry ASP brother 'She made the brother cry.'	弄 *nong* 'fazer, mexer' 哭 *ku* 'chorar' 弟弟 *didi* 'irmão mais novo'
3	她 打 哭 了 弟弟。 *Ta da ku le didi.* she hit cry ASP brother 'She hit the brother, and this made the brother cry.'	打 *da* 'bater' 哭 *ku* 'chorar' 弟弟 *didi* 'irmão mais novo'
4	她 画 脏 了 手。 *Ta hua zang le shou.* she paint dirty ASP hand. 'She painted (her) hand dirty.'	画 *hua* 'pintar' 脏 *zang* 'sujo/a' 手 *shou* 'mão'
5	他 杀 死 了 那 条 鱼。 *Ta sha si le na tiao yu.* he kill die ASP that fish 'He killed that fish to death.'	杀 *sha* 'matar' 死 *si* 'morrer, morto/a' 那条鱼 *na tiao yu* 'aquele peixe'
6	她 哭 湿 了 衣服。 Ta ku shi le yifu. she cry wet ASP clothes 'She cried, and this made the clothes wet.'	哭 *ku* 'chorar' 湿 *shi* 'molhado/a' 衣服 *yifu* 'roupa'
7	这 个 歌手 唱 哭 她 了。 *zhe ge geshou chang ku ta le.* this singer sing cry she ASP 'This singer's singing made her cry.'	歌手 *geshou* 'cantor/a' 唱 *chang* 'cantar' 哭 *ku* 'chorar'
8	这 个 歌手 把 她 唱 哭 了。 *Zhe ge geshou ba ta chang ku le.* this singer BA she sing cry ASP 'This singer's singing made her cry.'	歌手 *geshou* 'cantor/a' 唱 *chang* 'cantar' 哭 *ku* 'chorar'
9	这 本 书 看 哭 她 了。 *Zhe ben shu kan ku ta le.* this book read cry she ASP 'Reading this book made her cry.'	书 *shu* 'livro' 看 *kan* 'ver, ler' 哭 *ku* 'chorar'
10	这 本 书 把 她 看 哭 了。 *Zhe ben shu ba ta kan ku le.* this book BA she read cry ASP 'Reading this book made her cry.'	书 *shu* 'livro' 看 *kan* 'ver, ler' 哭 *ku* 'chorar'

11	这 个 工作 累 哭 她 了。 *Zhe ge gongzuo lei ku ta le.* this work tired cry she ASP 'The work made her so tired that she cried.'	工作 *gongzuo* 'trabalho' 累 *lei* 'cansado/a' 哭 *ku* 'chorar'
12	她 看 懂 这 本 书 了。 *Ta kan dong zhe ben shu le.* she read understand this book ASP 'She read this book, and this made her understand (it).'	看 *kan* 'ver, ler' 懂 *dong* 'compreender' 书 *shu* 'livro'
13	狮子 跑 赢 了 马。 *Shizi pao ying le ma.* lion run win ASP horse 'The lion won the horse in running.'	狮子 *shizi* 'leão' 跑 *pao* 'correr' 赢 *ying* 'vencer' 马 *ma* 'cavalo'
14	她 吃 饱 饭 了。 *Ta chi bao fan le.* she eat full rice ASP 'She got full by eating rice(meal).'	吃 *chi* 'comer' 饱 *bao* 'cheio/a' 饭 *fan* 'arroz, refeição'
15	她 喝 醉 酒 了。 *Ta he zui jiu le.* she drink drunk alcohol ASP 'She got drunk by drinking alcohol.'	喝 he 'beber' 醉 zui 'bêbedo/a' 酒 jiu 'álcool'
16	她 看 哭 了。 *Ta kan ku le.* she read cry ASP 'She read, and this made her cry.'	看 *kan* 'ver, ler' 哭 *ku* 'chorar'
17	她 饿 晕 了。 *Ta e yun le.* she hungry dizzy ASP 'She was so hungry that she got dizzy.'	饿 *e* 'com fome' 晕 *yun* 'desmaiado/a'
18	她 累 哭 了。 *Ta lei ku le.* she tired cry ASP 'She cried due to tiredness.'	累 *lei* 'cansado/a' 哭 *ku* 'chorar'
19	手 画 脏 了。 *Shou hua zang le.* hand paint dirty ASP 'The hand got dirty from painting.'	手 *shou* 'mão' 画 *hua* 'pintar' 脏 *zang* 'sujo/a'
20	她的 衣服 哭 湿 了。 *Tade yifu ku shi le.* her clothes cry wet ASP 'Her clothes got wet because of (her) crying.'	衣服 *yifu* 'roupa' 哭 *ku* 'chorar' 湿 *shi* 'molhado/a'
21	*她 看 扔 这 本 书 了。 **Ta kan reng zhe ben shu le.* she read throw this book ASP 'She read this book, and this made her throw (it) away.'	看 *kan* 'ver, ler' 扔 *reng* 'atirar' 书 *shu* 'livro'

22	*这 个 歌手 唱 跳 她 了。 *Zhe ge geshou chang tiao ta le. this singer sing jump she ASP Intended: 'This singer's singing made her jump.'	歌手 *geshou* 'cantor/a' 唱 *chang* 'cantar' 跳 *tiao* 'saltar'
23	*她 吃 饱 面包 了。 *Ta chi bao mianbao le. she eat full bread ASP Intended: 'She got full by eating bread.'	吃 *chi* 'comer' 饱 *bao* 'cheio/a' 面包 *mianbao* 'pão'
24	*她 喝 醉 这 瓶 酒 了。 *Ta he zui zhe ping jiu le. she drink drunk this bottle alcohol ASP Intended: 'She got drunk by drinking this bottle of alcohol.'	喝 he 'beber' 醉 zui 'bêbedo/a' 这瓶酒 zhe ping jiu 'esta garrafa de álcool'
25	*她 饿 喊 了。 *Ta e han le. she hungry scream ASP Intended: 'She was so hungry that she screamed.'	饿 *e* 'com fome' 喊 *han* 'gritar'
26	*这 个 歌手 唱 哭泣 她 了。 *Zhe ge geshou chang **kuqi** ta le. this singer sing cry she ASP Intended: 'This singer's singing made her cry.'	歌手 *geshou* 'cantor/a' 唱 *chang* 'cantar' 哭泣 *kuqi* 'chorar'
27	*她 弄 哭 了 一 天 弟弟。 Ta nong ku le yi tian didi. she make cry ASP one day brother Intended: 'She made the brother cry for one day.'	弄 *nong* 'fazer, mexer' 哭 *ku* 'chorar' 弟弟 *didi* 'irmão mais novo'
28	*这个 工作 劳累 哭 她 了。 *Zhe ge Gongzuo **laolei** ku ta le. this work tired cry she ASP Intended: 'The work made her so tired that she cried.'	工作 *gongzuo* 'trabalho' 劳累 *laolei* 'cansado/a' 哭 *ku* 'chorar'
29	*这 个 工作 **太** 累 哭 她 了。 *Zhe ge gongzuo **tai** lei ku ta le. this work **too** tired cry she ASP 'The work made her too tired, and she cried.'	工作 *gongzuo* 'trabalho' 累 *lei* 'cansado/a' 哭 *ku* 'chorar'
30	*感冒 累 哭 她 了。 *Ganmao lei ku ta le. cold tired cry she ASP Intended: 'The cold made her so tired that she cried.'	感冒 *ganmao* 'gripe' 累 *lei* 'cansado/a' 哭 *ku* 'chorar'
31	*弟弟 弄 哭 了。 *Didi nong ku le. brother make cry ASP Intended: 'The brother was made to cry.'	弟弟 *didi* 'irmão mais novo' 弄 *nong* 'fazer, mexer' 哭 *ku* 'chorar'
32	*那 条 鱼 杀 死 了。 *Na tiao yu sha si le. that fish kill die ASP Intended: 'That fish got killed to death.'	那条鱼 *na tiao yu* 'aquele peixe' 杀 *sha* 'matar' 死 *si* 'morrer, morto/a'

33	*她 画 手 脏 了。 *Ta hua shou zang le. she paint hand dirty ASP Intended: 'She painted (her) hand dirty.'	画 *hua* 'pintar' 手 *shou* 'mão' 脏 *zang* 'sujo/a'
34	*她 弄 弟弟 哭了。 *Ta nong didi ku le. she make brother cry ASP Intended: 'She made the brother cry.'	弄 *nong* 'fazer, mexer' 弟弟 *didi* 'irmão mais novo' 哭 *ku* 'chorar'
35	*坏 心情 看 哭 她 了。 *Huai xinqing kan ku ta le. bad mood read cry she ASP Intended: 'Bad mood made her cry from reading.'	坏心情 *huai xinqing* 'mau humor' 看 *kan* 'ver, ler' 哭 *ku* 'chorar'

Distractor items:

	Sentence	Words presented
36	她 哭 了 一 小时。 *Ta ku le yi xiaoshi.* she cry ASP one hour. 'She cried for one hour.'	哭 *ku* 'chorar' 小时 *xiaoshi* 'hora'
37	面包 被 它 吃 了。 *Mianbao bei ta chi le.* bread BEI it eat ASP 'The bread was eaten by it.'	面包 *mianbao* 'pão' 吃 *chi* 'comer'
38	她们 去 商店 买 东西。 *Tamen qu shangdian mai dongxi.* they go shop buy thing 'They went to the shop to buy things.'	商店 *shangdian* 'loja' 买 *mai* 'comprar' 东西 *dongxi* 'coisa'
39	她 唱 得 很 开心。 *Ta chang de hen kaixin.* she sing DE very happy 'She is singing happily.'	唱 *chang* 'cantar' 开心 *kaixin* 'feliz'
40	她 做饭 吃。 *Ta zuofan chi.* she cook eat 'She cooked to eat.'	做 *zuo* 'fazer' 饭 *fan* 'arroz, refeição' 吃 *chi* 'comer'
41	妈妈 把 衣服 洗 了。 *Mama ba yifu xi le.* mom BA clothes wash ASP 'Mom washed the clothes.'	衣服 *yifu* 'roupa' 洗 *xi* 'lavar'
42	她 在 家 工作。 *Ta zai jia gongzuo.* she at home work 'She works at home.'	家 *jia* 'casa' 工作 *gongzuo* 'trabalhar'

43	她 拿 不 到 杯子。 *Ta na bu dao beizi.* she take not arrive glass 'She cannot reach the glass.'	拿 *na* 'tomar, agarrar' 到 *dao* 'chegar' 杯子 *beizi* 'copo'
44	妈妈 和 孩子们 都 在 家。 *Mama he haizimen dou zai jia.* mom and children all at home 'Mom and children are all at home.'	孩子们 *haizimen* 'crianças' 家 *jia* 'casa'
45	她 用 筷子 吃饭。 *Ta yong kuaizi chifan.* she use chopsticks eat 'She eats with chopsticks.'	用 *yong* 'usar' 筷子 *kuaizi* 'pauzinhos' 吃饭 *chifan* 'comer'
46	*她 不 能 拿 杯子。 **Ta bu neng na beizi.* she not can take cup Intended: 'She cannot reach the cup.'	拿 *na* 'tomar, agarrar' 杯子 *beizi* 'copo'
47	*他们 学 中文 了 一 年。 **Tamen xue zhongwen le yi nian.* they study Chinese ASP one year Intended: 'They have studied Chinese for one year.'	学 *xue* 'estudar' 中文 *zhongwen* 'lingua chinesa' 年 *nian* 'ano'
48	*她们 吃 饭 得 很 高兴。 **Tamen chi fan de hen gaoxing.* they eat rice DE very happy Intended: 'They are eating happily.'	吃 *chi* 'comer' 饭 *fan* 'arroz, refeição' 高兴 *gaoxing* 'feliz'
49	*他 把 很多 朋友 认识 了。 **Ta ba henduo pengyou renshi le.* he BA many friend know ASP Intended: 'She got to know many friends.'	很多 *henduo* 'muito' 朋友 *pengyou* 'amigo' 认识 *renshi* 'conhecer'
50	*他们 学习 在 中国。 **Tamen xuexi zai zhongguo.* they study in China Intended: 'They study in China.'	学习 *xuexi* 'estudar' 中国 *zhongguo* 'China'
51	*她 看 书 了 一 小时。 **Ta kan shu le yi xiaoshi.* she read book ASP one hour Intended: 'She read book for one hour.'	看 *kan* 'ver, ler' 书 *shu* 'livro' 小时 *xiaoshi* 'hora'
52	*她 唱歌 和 跳舞。 **Ta changge he tiaowu.* she sing and dance Intended: 'She sings and dances.'	唱歌 *changge* 'cantar' 跳舞 *tiaowu* 'dançar'

Appendix 3 Items in the Comprehension Task (CT)

Target items:

	Sentence	Words presented
1	女儿 想 哭 妈妈 了。 *Nü'er xiang ku mama le.* □ A filha tem saudades da mãe, e a filha chorou. □ A filha tem saudades da mãe, e a mãe chorou. □ A mãe tem saudades da filha, e a filha chorou. □ A mãe tem saudades da filha, e a mãe chorou. □ Other: _____	女儿 *nü'er* 'filha' 想 *xiang* 'pensar, sentir a falta de' 哭 *ku* 'chorar'
2	医生 等 急 病人 了。 *Yisheng deng ji bingren le.* □ O médico estava a aguardar o doente, e o médico ficou ansioso. □ O médico estava a aguardar o doente, e o doente ficou ansioso. □ O doente estava a aguardar o médico, e o médico ficou ansioso. □ O doente estava a aguardar o médico, e o doente ficou ansioso. □ Other: _____	医生 *yisheng* 'médico/a' 等 *deng* 'aguardar' 急 *ji* 'ansioso/a' 病人 *bingren* 'o/a doente'
3	妹妹 追 累 哥哥 了。 *Meimei zhui lei gege le.* □ A irmã perseguiu o irmão. A irmã ficou cansada. □ A irmã perseguiu o irmão. O irmão ficou cansado. □ O irmão perseguiu a irmã. A irmã ficou cansada. □ O irmão perseguiu a irmã. O irmão ficou cansado. □ Other: _____	妹妹 *meimei* 'irmã mais nova' 追 *zhui* 'perseguir' 累 *lei* 'cansado/a' 哥哥 *gege* 'irmão mais velho'
4	他 骑 累 马 了。 *Ta qi lei ma le.* □ Ele montou a cavalo e ficou cansado. □ Ele montou a cavalo, e o cavalo ficou cansado. □ Other: _____	骑 *qi* 'montar' 累 *lei* 'cansado/a' 马 *ma* 'cavalo'
5	哥哥 打 赢 了 他的 同学。 *Gege da ying le ta-de tongxue.* □ O irmão brigou com um colega. O irmão venceu. □ O irmão brigou com um colega. O colega venceu. □ Other: _____	打 *da* 'combater, brigar' 赢 *ying* 'vencer' 同学 *tongxue* 'colega'

6	他 打 败 了 巨人。 *Ta da bai le juren.* □ Ele combateu com o gigante e perdeu. □ Ele combateu com o gigante, e o gigante perdeu. □ Other: _____	打 *da* ‘combater’ 败 *bai* ‘perder, vencido/a’ 巨人 *juran* ‘gigante’
7	老师 说 哭 学生 了。 *Laoshi shuo ku xuesheng le.* □ O professor falou com o aluno, e o professor chorou. □ O professor falou com o aluno, e o aluno chorou. □ O aluno falou com o professor, e o professor chorou. □ O aluno falou com o professor, e o aluno chorou. □ Other: _____	老师 *laoshi* ‘professor/a’ 说 *shuo* ‘falar’ 哭 *ku* ‘chorar’ 学生 *xuesheng* ‘aluno/a’

Distractor items:

	Sentence	**Words presented**
8	他 没有 不 想 学 跳舞。 *Ta meiyou bu xiang xue tiaowu.* □ Ele não quer aprender a dançar. □ Ele quer aprender a dançar. □ Other: _____	想 *xiang* ‘quer’ 学 *xue* ‘aprender’ 跳舞 *tiaowu* ‘dançar’
9	鸡 不 吃 了。 *Ji bu chi le.* □ A galinha não vai comer mais. □ Não vamos comer mais o frango. □ Other: _____	鸡 *ji* ‘galinha, frango’ 吃 *chi* ‘comer’
10	新年 的 前 一 天 我 在 工作。 *Xinnian de qian yi tian wo zai gongzuo.* □ Eu estava a trabalhar na Véspera do Ano Novo. □ Eu estava a trabalhar no dia seguinte do Ano Novo. □ Other: _____	新年 *xinnian* ‘ano novo’ 天 *tian* ‘dia’ 工作 *gongzuo* ‘trabalhar’

Appendix 4 Personal information and language profile questionnaire

Como te chamas?

_____

Quantos anos tens?

_____

Qual é o teu nível da língua chinesa? (e.g. HSK 2/3/4/5/6 ou A2/B1/B2/C1/C2)

_____

Há quanto tempo aprendes/aprendeste chinês?

_____

Viveste na China? Se for "sim", por quanto tempo?

_____

Género: ☐F ☐M [74]

[74] This is from the researcher's notes.