# Secondary Predication in $L_2$ Grammar: A Minimalist Account[*]

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## 1. Introduction

A persistent question in the SLA (second language acquisition) research concerns the status of the involvement of the native language (i.e. $L_1$ transfer). Inquiry into the question has been made on the basis of a variety of linguistic frameworks, such as contrastive analysis (Lado, 1957), $L_2$ (second language) generative parametric approach (Flynn, 1987; White, 1989; Schwartz, 1996),[1] and the more recent generative inquiry into the initial state of $L_2$ acquisition (e.g., Vainikka and Young-Scholten, 1994, 1996, 1998; Eubank, 1994; Schwartz and Sprouse, 1994, 1996; Schwartz, 1998). A clear settlement does not seem to be forthcoming soon, although some advances have been made. There appears to be very little consensus among $L_2$ researchers on the nature of $L_1$ transfer in $L_2$ acquisition. The question itself is so puzzling that it qualifies as what Pinker (1989: 1) eloquently describes as a research scenario, and one in which we must have missed some profound principles because "nature does not go out of its way to befuddle us". In this paper we make an attempt that departs fundamentally from the current view on $L_1$ transfer. Central to this proposal is that $L_1$ transfer constitutes the $L_1$ performance systems, external to $L_1$ grammar (i.e. I-language). We employ Distributed Morphology (DM)[2] (Halle and Marantz, 1993; Marantz, 1997; Harley and Noyer, 1998, 1999), a version of the minimalist approach (Chomsky, 1995, 1999, 2001), to account for the results from two experiments designed to examine the function of $L_1$ properties in $L_2$ grammar. Two specific questions were addressed: What is the nature of $L_1$ transfer? Assuming that the final state constitutes an I-language and an E-language system, do the $L_1$ properties observed in $L_2$ spontaneous and experimental data come from the E-system or the I-system? A hypothesis called the *Relativized $L_1$ Transfer Condition* ($RT_{L1}C$) was tested in the experiments. This hypothesis conjectures that an $L_1$ property is subject to transfer if and only if there is no such item that consists of more canonical morphosyntactic features. The $RT_{L1}C$ predicts that non-canonical $L_1$ features are often left untouched. Furthermore, the $RT_{L1}C$, if verified empirically, indicates that $L_1$ transfer is external to $L_1$ grammar in the sense as defined in Chomsky (1991: 9). Consequently, the ultimate $L_2$ attainment (i.e. $L_2$ I-language) is incomplete, or a proper subset of that mastered by the native speakers, in that it falls short of the exhaustive paradigms of all the possible $L_2$ SDs (structural descriptions, Chomsky, 1995),[3] which we attribute to the long-lasting effects of $L_1$ involvement. However, the $L_2$ computational procedures are immune to such effects. A group of adult Mandarin $L_2$ speakers of English, whose $L_2$ development had reached the steady state, were tested and their knowledge of *resultatives* (*Mary painted the house red*) and *depictives* (*John ate the meat raw*) in English was measured. A second related question explored here concerns the nature of adult $L_2$ learners. We hypothesize that they are by and large conservative, a result stemming from the maturation of their general cognition and the existence of an I-language system.

[1] For a review of parameter resetting-based $L_1$ transfer studies, see Towell and Hawkins, 1994, Chapter 6; Schwartz, 1996).

[2] For arguments why DM has advantages, see Marantz (1997), Harley and Noyer (1998, 1999) and Shi (2003).

[3] The notion of *incomplete* signifies something different from Selinker's (1972) fossilization and Schachter's (1990) view.

## 2. L₁ transfer theories

Numerous hypotheses have been entertained to account for $L_1$ transfer in the recent generative $L_2$ inquiry. The summary given below does not intend to be complete, but to highlight some of the current ideas. Zobl (1980: 47) claims that $L_1$ transfer is not involved at the onset of $L_2$ acquisition; rather, it is induced by developmental and formal factors. He proposes that $L_1$ properties are triggered only in the context where certain $L_2$ grammatical properties have been attained. Zobl, nonetheless, echoes the traditional view that $L_1$ transfer has a transitory effect, as he claims that it does not affect "synchronic grammar of L2 adult competence," but the interlanguages of L2 learners (p. 47). In the current study, in line with Zobl, we wish to show that not all transferable $L_1$ properties, even at the right developmental stages, actually go through the process. On the other hand, we do wish to show that, contra Zobl, $L_1$ transfer can have long-lasting effects, which may impede further development of an $L_2$.

Adjemian (1983) presents a lexicalist approach to $L_1$ transfer motivated by Chomsky's (1970) lexicalist hypothesis. The idea is that $L_1$ transfer results from the restrictions imposed by the existing $L_1$ lexical properties such as subcategorization frames and the lexical redundancy rules (Jackendoff, 1975: 254). It assumes that $L_2$ learners have full access to the $L_1$ lexicon at the outset of $L_2$ development. Adjemian claims that "learners will use ready-made hypotheses wherever they perceive them to fit the available primary data" (p. 255). If the $RT_{L_1}C$ condition is supported empirically in our study, the results would provide counterexamples against such a hypothesis.

Schachter (1993) presupposes that $L_2$ learners are active hypothesis testers, just like child language learners. As such, Schachter claims that $L_1$ transfer is an artifact of the previously developed linguistic knowledge, which functions as "a constraint on the learner's hypothesis testing process" (p. 2). She conjectures that $L_2$ learners form hypotheses by choosing an $L_1$ domain. Supposing Schachter's hypothesis is on the right track, if a domain, whatever that is, exists both in the $L_1$ and the $L_2$, then positive transfer should be expected. Our study shows that this is not the case. Compatibility of an $L_1$ property with the target language does not give rise to positive transfer or even transfer at all.
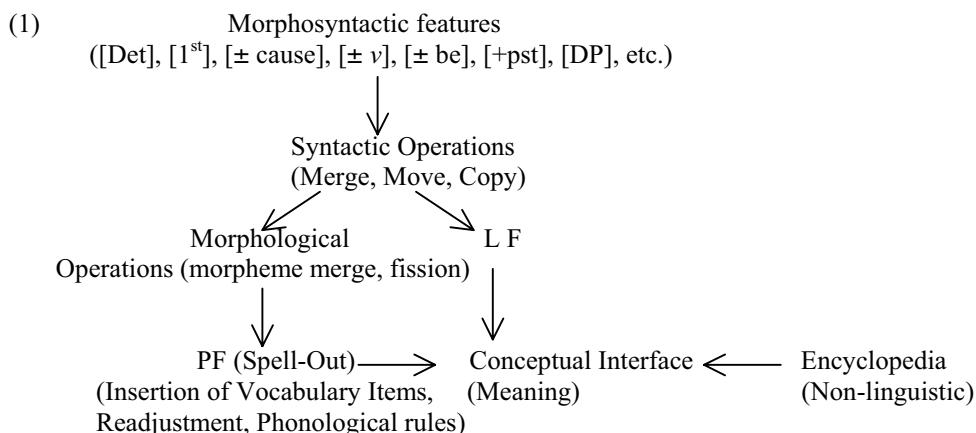
Finally, Juffs (1996) proposes a semantic parameter account for $L_1$ transfer, which he argues constrains the Chinese $L_2$ learners of English. The parameter takes the form of +/- [ACT[GO[STATE]]]. Juffs claims that English contrasts with Chinese in that the former selects a positive value whereas Chinese selects a negative value. Consequently, for English, lexical causative verbs (e.g., *disappoint, interest*) exist, but not for Chinese; compounds are used in Chinese in their stead. Through empirical measurements, Juffs shows that Chinese lexical properties control the early $L_2$ stage, but wanes at the more advanced stage, implying that $L_1$ transfer is developmental in character. Juffs' semantic parameter is problematic in and of itself, in the sense it does not meet descriptive adequacy. Chinese—at least Mandarin—not only has lexical causative verbs, their number is anything but marginal. The semantic complexities associated with the English causatives, including entailment and ambiguity, is true of Chinese causatives (For a critique of Juffs, see Shi, 2003).

In sum, the current $L_1$ transfer theories seem to share a few common assumptions. First, $L_1$ transfer, defined in Corder's (1993) terminology as *structural transfer*, is transitory. It correlates with the $L_2$ proficiency level, dominant at the early stage but withering away at more advanced stages. Second, $L_2$ learners have access to $L_1$ grammar, the I-language system of their native language, which enables them to detect the "distance" between their $L_1$ and the $L_2$. Third, correspondence between $L_1$ and $L_2$ entails effortless and easy learning, but lack of congruence means laborious and difficult learning. The final assumption, which actually underlies all previous assumptions, is that $L_2$ learners are active hypothesis formulators and testers.

Contra these assumptions, we show that experimental data indicate that none of these is necessarily true. In particular, in what follows a few points will be entertained. First, $L_1$ transfer is a property of the performance systems and thus has permanent effects. Second, $L_1$ transfer is selective in that only the canonical properties get accessed and transferred. And third, adult $L_2$ learners are basically conservative. In addition, we wish to show that these characteristics contribute to the problem of incompleteness in $L_2$ acquisition, as widely observed (e.g., Bley-Vroman, 1989, Schachter, 1990, among others). Our study also differs from the other studies in the sense that we looked at the final state of $L_2$ acquisition rather than the interim stages. A prominent advantage is that the potential confounding variables can be adequately controlled for, including lack of sufficient $L_2$ positive evidence, insufficient $L_2$ proficiency, and lack of familiarity with the target culture. In so doing, we hope to discover the true nature of $L_1$ transfer.

# 3. Distributed Morphology

In this section, we elaborate briefly on Distributed Morphology (DM) as presented in Halle and Marantz (1993), Marantz (1997), Harley and Noyer, 1998, 1999). In a non-trivial way DM departs from the conventional assumption internal to the P&P (Principles and Parameters) model and the lexical semantics model as presented in Jackendoff (1990, 1995, 1997a), Pinker (1989), Rappoport Hovav and Levin (1993), Levin and Rappoport Hovav (1995, 1996) and Pustejovsky (1995) (among many others), in which word meaning is defined at the LCS (lexical conceptual structure) representation level—a component of the lexicon—the syntactically relevant properties of which are then directly projected onto a syntactic representation. DM, by contrast, rejects such an assumption; rather it assumes that lexical items consist of much less information than previously thought, namely a set of morphosyntactic features (e.g., [CAUSE], [Det], [Root], etc.), which provides important input for syntactic derivation. For example, such morphosyntactic features are employed to "generate" an initial phrase marker by virtue of syntactic operations such as move-α, Merge, etc. Further, given that these features constitute a licensing environment, they are also relevant for lexical insertion. Central to DM is the idea that a derivation does not proceed in a linear manner (see Borer, 1998); rather, it is distributed among various domains. As such, determination of lexical meaning is computational, as lexical items are underspecified, and thus the final meaning of a lexical word is not fixed until it is inserted in a syntactic context, which is also supplemented by the encyclopedic knowledge of the speaker-hearer. In addition, a lexical root—in the sense defined by Pesetsky (1995)—may undergo morphological modifications, even after an initial syntactic configuration is generated (cf. Di Sciullo and Williams, 1987). An LF (logical form) representation is generated in parallel to a PF representation, which then feeds into the performance systems. The architecture of syntactic derivation assumed in DM is illustrated in (1), as given in Harley and Noyer (1998):

(1)                     Morphosyntactic features

        ([Det], [1st], [± cause], [± $v$], [± be], [+pst], [DP], etc.)

                                Syntactic Operations

                              (Merge, Move, Copy)

                   Morphological           L F

         Operations (morpheme merge, fission)

                   PF (Spell-Out) ⟶ Conceptual Interface ⟵ Encyclopedia

        (Insertion of Vocabulary Items,    (Meaning)         (Non-linguistic)

        Readjustment, Phonological rules)

It is important to reiterate that DM has reallocated some of the elements previously thought to be internal to the syntax-semantics domain to what is called "encyclopaedia," a domain constituting non-linguistic information. Accordingly, sentences like *The rock sang a song* are only considered infelicitous, but not ungrammatical (see Harley and Noyer, 1999 for more examples). From a grammatical perspective, the sentence is rejected because it conflicts with what we believe about the universe. This component of DM is not new; rather it has resurrected an almost forgotten phenomenon brought to attention by Chomsky in 1957 in the example of *colorless green ideas sleep furiously*, which is grammatical but ill-formed semantically. Harley and Noyer (1999) reanalyze the classic example of the contrast between *grow* and *destroy* (see Chomsky, 1970) and point out that the impossibility of the nominalization of *grow* is not due to linguistic properties, but rather to the encyclopedia involved in our judgments (see Pesetsky, 1995 for a different analysis). What this entails is that a large number of non-existing sentences, as often given in the lexical semantics literature (e.g., Simpson, 1983; Levin and Rappaport Hovav, 1995; Jackendoff, 1997b), are well-formed structurally but rejected due to conflicts with the researchers' encyclopedia.

# 4. Depictives and Resultatives in English and Mandarin

## 4.1 Resultatives

In this section we look at resultatives and depictives, the constructions under analysis in the experiments to be presented in section 5. We start with an overview of the existing theories and then proceed to present a DM-based minimalist account. Halliday (1967) first identifies, in his seminal paper, what he calls the resultative construction (2). A resultative construction consists of two events, with the first headed by the matrix verb denoting an action or process and the second headed by a resultative phrase indicating the result of that action or process.

(2)  He painted the door green. (Halliday, 1967: 63)

The sentence in (2) is interpreted as *He painted the door and as a result the door became green*.

From the very start, linguists have focussed their attention on the properties of verbs permitted to participate in resultatives and the paradigms of resultatives (see Halliday, 1967; Green, 1973; Simpson, 1983; Hoekstra, 1988, 1992; Roberts, 1988; Jackendoff, 1990; Carrier and Randall, 1992; Levin and Rappaport Hovav, 1995; Rothstein, 2000; Rappaport Hovav and Levin, 1998, 2001). The following consists of the resultative paradigms as seen in the literature (cf. Levin and Rappaport Hovav, 1995; Rappaport Hovav and Levin, 2001), where resultatives are categorized on the basis of the properties of the matrix verbs:

(3)  (a) Mike licked his finger *clean*. (transitive verb + an L-marked NP + $XP_{Result}$)
(b) Bill shouted himself *hoarse*. (unergative verb + a fake reflexive + $XP_{Result}$)
(c) The dog barked Mike *awake*. (unergative  verb + a non-L-marked NP + $XP_{Result}$)
(d) The little girl cried her eyes *out*. (unergative verb + a non-L-marked inalienably possessed NP + $XP_{Result}$)
(e) The old man drank himself *silly*. (transitive + a non-L-marked NP + $XP_{Result}$)
(f) The boxer was knocked *unconscious*. (passive verb + $XP_{Result}$)
(g) The can broke *open*. (unaccusative verb + $XP_{Result}$)

Another aspect that has been extensively studied concerns the combinatorial constraints of the $XP_{Result}$ with the matrix verb. A variety of accounts have been proposed. Hoekstra (1988) proposes that licensing of the resultative phrase has to do with the property of the verb in that only stage-level verbs (e.g., *kick, cry*) may select an $XP_{Result,}$ and individual-level verbs (e.g., *love, hate*) are not permitted. Rappaport Hovav and Levin (1998) further claim that verbs of directed motion (e.g., *arrive, come*) cannot assign a resultative phrase. According to this semantic account, perception verbs, causative verbs, and achievement verbs are all excluded from resultatives (see Rapopport, 1993). Snyder (1995, 2001) presents a morphological account in which he claims that crosslinguistically, combination of the matrix verb and the $XP_{Result}$ correlates with the existence of compound nominals. Rothstein (2000), on the other hand, argues that resultatives should be best described as a PART-OF relation in the sense that the culmination of an activity is a part of the event denoted by the resultative secondary predicate. Simpson (1983), and then Levin and Rappaport Hovav (1995), present a syntactic constraint called DOR (direct object restriction), which explains the non-existence of an $XP_{Result}$ predicating a grammatical function in the subject position. Finally, Rappaport Hovav and Levin (1998) argue that any predicate may be augmented into a more complex template insofar as the resulting form does not violate the well-formed conditions. All these accounts are inadequate to satisfy the requirements of descriptive and explanatory adequacy (see Shi, 2003 for an account).

Briefly, the problem boils down to the fact that non-linguistic elements are often used to account for "ill-formed" resultatives. Under a DM-based derivational account, which strives to exclude those elements, we first argue that all monomorphemic verbs are subject to expansion, except in cases where the derived meaning conflicts with the original meaning, a condition that does not require additional grammatical apparatus but constitutes the economy condition. This would exclude verbs of directed motion from selecting an $XP_{Result}$, but not perception verbs, which is verified in Mandarin Chinese (*John kan-de Mary buhayisi-le*, John saw Mary embarrassed') . In English, the same construction has been treated as non-existent, which, under the DM approach, is simply an interfering effect of the encyclopaedia.

Under DM, a verb entry like (4) is the starting point for the syntactic derivation of a resultative sentence involving *cry*, as in *John cried himself to sleep*:

(4) *cry*: [+ *v*], [+ DP], [+ cause], [+ SP$_R$]

The selected features signify how the syntactic structure is derived. The [+ *v*], for instance, means that the target sentence is eventive, and [+ cause] is selected to indicate that the verb *cry* will be projected into a causative configuration (see Hale and Keyser, 1991, 1993). Existence of [+ cause] in the internal structure of *cry* is determined by the general theorem on lexical expansion. Two arguments are also selected, [+ DP] indicating that a nominal of some kind will be inserted and [+ SP], that a secondary predicate is selected. The external argument is not included in the LA (lexical array), since it is determined structurally (see Hale and Keyser, 1993; Harley and Noyer, 1998).

The syntactic derivation proceeds as follows. First, select *cry* marked with features [+ *v*] and [+ cause] and Merge it with the feature [+ SP$_R$]. The merged node takes either *cry* or [+ SP$_R$] as its identification and, we assume, following Chomsky (1995, 1999), that *cry* is the head. Based on Harley and Noyer (1998: 123), the projected node has an option of selecting a SPEC, and in our case, it apparently requires since the feature [+ DP] is Merged with the projected *cry*. And then the combined configuration is further Merged with the feature [+ *v*], giving out a higher *v* that is then Merged with a SPEC under which a lexical item expressing Causer is eventually inserted. This whole process observes the *inclusiveness condition* (Chomsky, 2001: 4), as illustrated in (5)

(5)
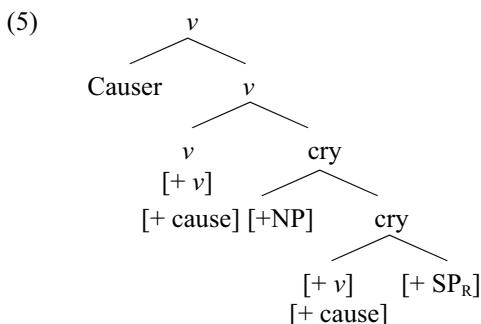


(5) represents the initial derivation of the resultative *cry*. The next step is that, given that *cry* is accompanied with additional features, these need to be checked before SPELL-OUT. Thus, *cry* raises upwards to the *v* node to check features in accordance with the HMC (head movement constraint), as proposed in Travis (1984) and Baker (1988). The resulting configuration looks like (6):

(6)
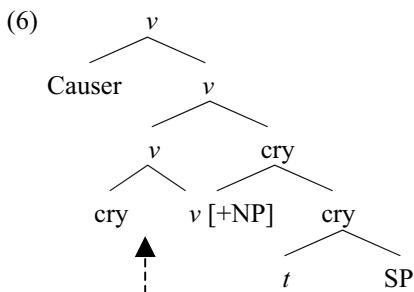


In the process of lexical insertion, any lexical item that has the compatible licensing environment is permitted to be inserted, as such both sentences below are well-formed even though they may be rejected on non-linguistic grounds:

(7)  (a) John cried himself to sleep.
     (b) John cried Mary scared.

Resultatives are productive in Mandarin, just as in English. In fact, for each sentence in (3) there is a Mandarin equivalent. Nonetheless, Mandarin resultatives differ from their English counterparts in that there is an overt morphological change to the matrix verb when an $XP_{Result}$ phrase is combined with the matrix verb (see the example given above).[4, 5]

## 4.2 Depictives

According to Halliday (1967:63), in the *depictive* construction as in (8), the secondary predicate, *black*, is "an attribute which characterizes the attribuant (i.e. the direct object) in relation to the process, but as a concomitant, not a result, of the process." Thus, (8) means that "he drinks his coffee, and at the time he drinks it, it is black."

(8) He drinks his coffee black.

Semantic and syntactic accounts of depictives have been offered, as in Jackendoff (1990) and Rapoport (1993, 1999), but we have good reasons to believe that neither is adequate enough to differentiate the two types of depictives identified by Halliday (1967): conditional and attributive. Therefore, we propose that a depictive construction is derived as a full clause, but then undergoes syntactic operations. Ambiguity derives because a speaker-hearer can reconstruct a depictive to generate either a conditional or an attributive reading. What this entails is that depictives are derived from a matrix clause and a subordinate clause by virtue of head movement and lexical incorporation. In other words, at the initial stage of derivation, either a conditional or attributive clause is generated with no lexical words inserted, which is followed by an incorporation process of the secondary predicate, as shown in (9) (For discussion, see Shi, 2003):

(9)
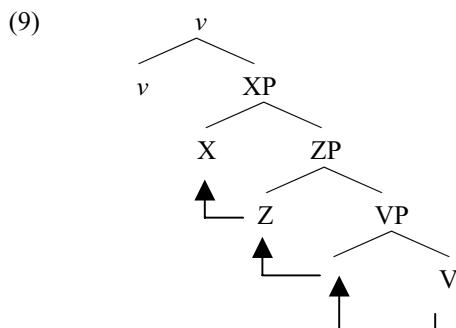


Mandarin does not allow depictives except for a few formulaic expressions. For object-hosted depictives, as in (10), no equivalent is possible for Mandarin.

(10) John bought his books used.

Detail aside, the exclusion does not seem to do with the Mandarin conceptual structures, given that the proposition expressed in (10) is certainly conceivable to a native Mandarin speaker; therefore, the fact that it is inexpressible may be due to lexical and structural properties in Mandarin.[6]

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[4] Unlike English, Mandarin has a derived construction in which the resultative XP is incorporated or conflated into the matrix verb (Talmy, 1985; Baker,1988).
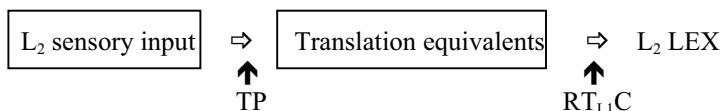[5] See Huang, 1988; Li, Y. H., 1990; Li Y.F., 1995; Sybesmy, 1999 for alternative analyses of Mandarin resultatives.
[6] For an alternative account, see Zhang (2001).

# 5. The Relativized $L_1$ Transfer Condition ($RT_{L1}C$)

As indicated above, we propose that $L_1$ transfer constitutes the performance systems developed as an integral part of the $L_1$, which is extrinsic to the I-language. Employment of an $L_1$ system is often made possible by what we call the translation process (TP), whereby $L_2$ speakers process the sensory $L_2$ input and subsequently decipher its linguistic properties. This process is illustrated in (10):[7]

(10) The Translation Process (TP) Model

| $L_2$ sensory input | ⇨ | Translation equivalents | ⇨ | $L_2$ LEX |
| --- | --- | --- | --- | --- |
| ⬆ | | ⬆ | | |
| TP | | $RT_{L1}C$ | | |

What differentiates the theory of $L_1$ transfer we propose here from the other proposals is that occurrence of $L_1$ transfer depends on the other related properties, rather than the degree of correspondence between the $L_1$ and the $L_2$ properties. It is thus relativized. Formally, the Relativized $L_1$ Transfer Condition is defined as follows:

(11) *The Relativized $L_1$ Transfer Condition ($RT_{L1}C$)*

An $L_1$ lexical item *x* with a feature set $\{\alpha, \beta, \gamma\}$ transfers to the $L_2$ lexicon only if there is no such an *x'* with an alternative set $\{\pi, \sigma, \psi\}$ that is more canonical, where a set consists of a semantic, morphological, and selectional matrix.

Canonicality of lexical properties, as encoded in the performance systems, is defined in the following terms:

(12) *Definition of Canonicality* (cf. Chomsky, 1970; Grimshaw, 1981; Levin and Rappaport Hovav, 1995: 86; Jackendoff, 1975: 644; Roeper, 1999)

Verb roots are defined as the base variants if they impose less stringent c-selection on its arguments and constitute the *canonical* syntactically relevant semantic and argument structure information. A root variant gives rise to the derived variants.

According to (11), resultatives and depictives are derived constructions, whereas their alternatives, such as those in (13), are canonical structures:

(13) (a) Mike licked his finger until it became clean.
    (b) The dog barked until Mike was *awake*.
    (c) He drinks his coffee only if it is black.
    (d) John bought his books while they were used.

# 5. Experiment
## *5.1 Goals*

The overall goal of the experiments is to determine the nature of $L_1$ transfer. We would also like to know, by measuring the final state, what this can tell us about the nature of adult $L_2$ learners. Three null hypotheses were tested: (a) The $RT_{L1}C$ has no effect on adult $L_2$ learners. They can acquire both the root forms as well as the derived forms; (b) $L_1$ transfer is not permanent; and (c) $L_2$ learners are active and attentive as the native child learners of English are.

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[7] See Shi (2003) for a detailed discussion.

## 5.2 Subjects

Twelve Mandarin speakers of English formed the experimental group, all but two lived or went to college in Beijing for an extended period of time. Seven of them are native Mandarin Chinese speakers.[8] Their ages ranged from 24 to 46 with an average of 36;5. Their first exposure to English was after puberty and in a formal ESL setting, in China. All but three had earned graduate degrees from an American university, with four earning doctoral degrees and the rest, Master degrees. The other three earned bachelor degrees and were working toward graduate degrees at the time of the study. All $L_2$ participants had been living in the US for a period of time ranging from 3;5 to 12;0 years, with an average of 8;6. All $L_2$ subjects are immersed in the mainstream American culture, in the fields of computer engineering, education, and business. On the basis of these characteristics, we assume that the subjects' $L_2$ development had reached the final state.

Twelve native speakers of English constituted the control group. They were enrolled in an introductory linguistics class at the University of Arizona. All the native participants were seniors and at the time of the experiment had not been introduced to the *depictive* and *resultative* constructions yet.

## 5.3 Constructions

A total of six resultative constructions were tested, as given in (14)-(19), along with the canonical constructions. One depictive construction was measured, as in (20), along with a canonical alternative.

(14) (a) The audience laughed themselves silly. (unergative + reflexive + XP)
       (b) The audience laughed until they became silly. (canonical use of *laugh*)
(15) (a) John drank himself under the table. (transitive + non-L-marked NP+XP)
       (b) John drank until he went under the table. (canonical use of *drink*)
(16) (a) The news excited Mary to tears. (transitive + L-marked NP + XP)
       (b) The news excited Mary until her tears ran down. (canonical use of *run*)
(17) (a) The coach ran the players around the track. (unergative + non-coreferring NP + XP)
       (b) The coach made the players run around the track. (canonical use of *run*)
(18) (a) The prisoner froze to the ground. (unaccusative + XP)
       (b) The prisoner was frozen to the ground. (canonical use of *freeze*)
(19) (a) The boxer was knocked unconscious by his opponent. (passive + XP)
       (b) The boxer was knocked by his opponent and became unconscious. (canonical use of *knock*)
(20) (a) The hungry man ate the fish raw. (*depictive* use of *eat*)
       (b) The hungry man ate the fish while it was still raw. (canonical use of *eat*)

To ensure that the $L_2$ subjects had acquired the syntax of secondary predication, an adverbial construction (AC) was also included, as illustrated in (21):

(21) Phil opened the door wide.

## 5.4 Tests

Two tests were used: a guided production (GP) test and a grammaticality judgment (GJ) test, both of which were designed based on Gropen, et al. (1989). The GP test consists of 8 short narratives. Subjects were instructed to answer a question posed for each narrative by constructing as many answers as they could, using the words provided. The subjects were anticipated to produce both the canonical and the non-canonical constructions. When the latter was produced, a score of +1 was given, but when a former was produced, a -1 was granted. For each test item, an average score was granted. The ideal score was 0. A minus score meant that the subject produced more canonical constructions, but a positive score indicated that the subject constructed more of the non-canonical structures that are

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[8] This clarification is critical. In the generative $L_2$ literature, subjects from China were often lumped together as Mandarin speakers, as in Juffs (1996), Chen (1996), Wang and Lee (1999), which is problematic, because many of them were not exposed to Mandarin until their elementary school years and the exposure was often marginal.

under analysis. Verbs measured in the GP test included *eat, laugh, drink, excite, march, freeze, knock,* and *break*.

The GJ test was composed of 27 test sentences. Subjects were asked to evaluate each sentence on a 7-point scale, with +3 meaning completely grammatical, -3, completely ungrammatical, and 0, no opinion. Subjects were further instructed to underline the word(s) that they felt were problematic whenever they chose a number other than +3. This is illustrated in (22):

(22)  (a) The police <u>arrived the criminal tired</u>.          ⊖-3  -2  -1  0  +1  +2  +3
      (b) The poor man drank himself sick.          -3  -2  -1  0  +1  +2  ⊕+3

Sixteen verbs were tested, including *cut, drink, bore, scare, cook, shout, yell, run, bark, shake, knock, swing, drop, cut,* and *open*. They appeared either in (a)-sentences or (b)-sentences as given in (14)-(20). In addition, 11 fillers were also used: *break, arrive, laugh, mop, tear, dance, eat, say, come,* and *wipe*. Each sentence was scored with a possible maximum of 6 points.

## 5.5  Results

The results from the GP test are summarized in Figure 1 and Table 1, both of which illustrate the group average scores on various resultative and depictive constructions, with the scores on the canonical constructions being left out since no difference has been found between the NS and NNS groups:

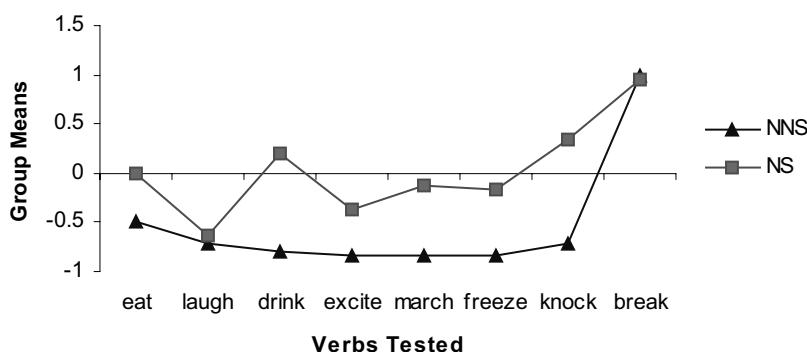**Figure 1** Group means from the GP test



**Table 1** Group means from the GP test with *sd* given in parentheses

| C types | eat/DC | laugh/RC | drink/RC | excite/RC | march/RC | freeze/RC | knock/RC | break/AC |
|---|---|---|---|---|---|---|---|---|
| NNS | -0.5 | -0.708 | -0.792 | -0.833 | -0.833 | -0.833 | -0.708 | 0.958 |
| (*n* = 12) | (0.272) | (0.066) | (0.203) | (0.106) | (0.152) | (0.333) | (0.248) | (0.021) |
| NS | 0 | -0.625 | 0.208 | -0.375 | -0.125 | -0.167 | 0.333 | 1 |
| (*n* = 12) | (0) | (0.188) | (0.521) | (0.278) | (0.369) | (0.652) | (0.242) | (0) |

*Notes*: C types stand for construction types. The number represents the mean score of a group. For DC and RC, the ideal mean is zero. A minus indicates the subjects produced more canonical constructions than the target constructions in question.

A *t*-test was first conducted on the adverbial construction involving the verb *break* taking a secondary predicate, as in (21), which showed that the NNS and NS groups behaved comparably, with no significant difference found ($t = -1$, $df = 22$, $p < .01$). This result suggests that the NNS subjects had mastered the syntax of secondary predication. With this, two more statistical procedures were

conducted. First, a one-way ANOVA was implemented to detect within group variations across resultatives and depictives. The results showed that for the Mandarin group, no variation was found (F (6,77) = .895, $p$ < .01). Given their average scores were consistently in the minus range, we take this as evidence showing that the NNS subjects failed to produce the target constructions, but had no problem forming the canonical constructions (the (b)-sentences in (14)-(20)).

No significant within group variation was found with the NS group either, (F (6,77) = 4.037, $p$ < .01). For depictives, the NS subjects' production was balanced, with a zero mean obtained. For two subtypes of the resultatives, this group produced more non-canonical constructions than the canonical constructions, as the mean scores fell in the positive range. Even though minus means were obtained on the other subtypes, compared with the NNS group they were still much closer to the ideal mean score (i.e. zero). In sum, the native speakers group demonstrated their ability to construct both resultatives and depictives in English and their canonical alternatives, whereas their non-native counterparts tended to be restricted to the latter only.

To further detect the differences between the NNS and NS, a series of $t$-tests was conducted. As with the depictive construction, the results showed that whereas for the NS group every participant produced both constructions, only half of the NNS subjects produced the depictive construction. A significant difference was found between the two groups ($t$ = -3.317, $df$ = 22, $p$ < .01). Similar results were derived with the resultative construction. The obtained $t$ value showed a significant difference in behaviors between the NNS and NS groups ($t$ = -7.048, $df$ = 142, $p$ < .01), meaning that while the NS subjects' production was balanced, the NNS subjects' production was, for the most part, limited to the canonical constructions. It is worth noting that the NNS subjects did not fail to produce the non-canonical constructions because they produced fewer sentences than the control group; in fact, the number of sentences produced by the two groups was almost the same, with a total of 300 sentences ($m$ = 25) produced by the NNS group and a total of 317 ($m$ = 26.4) by the control.

Now let us look at the results from the GJ test. As before, a $t$-test was first run on the data to ensure that the NNS subjects had already acquired the secondary predication. The result confirmed the finding obtained from the GP test. However, in contrast to the GP result, which showed that the NNS subjects failed to produce depictives, their judgements on the GJ test showed no difference compared with the control group. Given that only one token was tested, extra care is needed to interpret the result. The analysis of the resultatives focused on several aspects. First, we were interested in knowing if the subjects behaved consistently across various subtype constructions. A one-way ANOVA showed that while consistency was found with the NS group across all 6 subtypes, with means ranging from 4.5 to 5.5, such consistency was lacking with the NNS group, whose means ranged from 2.583 to 5.5. This cross-group comparison is shown in Figure 2:
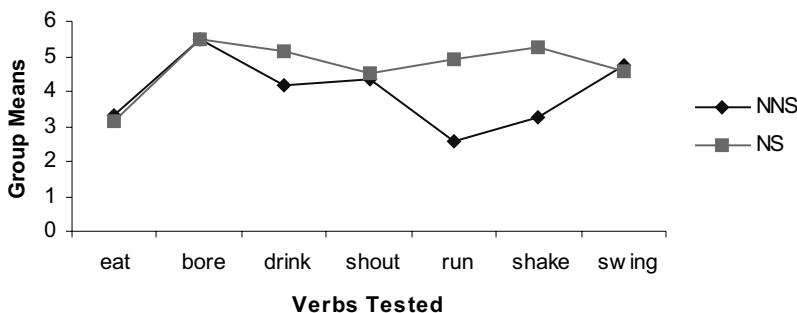
**Figure 2** Group means from the GJ test

**Table 2** Group means from the GJ test with *sd* given in brackets

| C types | eat/DC | shout/RC | drink/RC | bore/RC | run/RC | swing/RC | shake/RC | break/AC |
|---|---|---|---|---|---|---|---|---|
| NNS | 3.333 | 4.333 | 4.167 | 5.5 | 2.583 | 4.75 | 3.25 | 4.458 |
| (*n* = 12) | (3.333) | (3.515) | (3.061) | (1.364) | (2.447) | (2.205) | (5.477) | (2.694) |
| NS | 3.167 | 4.5 | 5.167 | 5.5 | 4.917 | 4.583 | 5.25 | 4.583 |
| (*n* = 12) | (1.970) | (3.727) | (1.97) | (3) | (1.538) | (5.174) | (0.568) | (2.515) |

*Notes*: The coding is the same as given above.

Furthermore, implementation of the *t*-tests also showed that although no difference was observed in the judgments between the NNS and NS groups on the canonical constructions, significant difference was indeed found between the two groups on the non-canonical constructions ($t$ = -2.998, *df* = 142, $p < .01$). However, interestingly enough, such a difference was not distributed evenly across all 6 subtypes. Table 2 in fact shows that 2 subtypes (i.e. *run/RC,* and *shake/RC*) contributed most to the difference. Given that the *run/RC* type differentiated the NNS group from the NS group the most, another *t*-test was run. This time the subtypes were excluded, and the result showed no significant difference between the NNS group and the control group. So it seems that the NNS subjects demonstrated asymmetric performance on resultatives and depictives, in that they failed to produce resultatives and depictives, but they were able, for the most part, to assign grammatical representations to both constructions, just as their native counterparts.

## 5.6 Discussion

The analyses given above indicate that the Relativized $L_1$ Transfer Condition indeed has effects on the Mandarin-speaking subjects of English, in that it restrains them from incorporating resultatives and depictives into their $L_2$ grammar, regardless of the grammatical properties of their native language; this is at least the case in the results from the production task. In other words, availability of an $L_2$ grammatical property in the $L_1$ does not help the $L_2$ subjects attain the relevant $L_2$ grammatical features. In any case, their I-language in the $L_2$ consists of the canonical, but not the non-canonical grammatical properties, which is exactly what the $RT_{L1}C$ predicts. Given the final state of $L_2$ grammar was measured in the study, the results also suggest that $L_1$ influence can last much longer than generally assumed. And finally, this leads us to a tentative conclusion that adult $L_2$ learners are in general conservative, particularly in the domain of lexical acquisition.

The general statements as given in the preceding paragraph imply something significant about the nature of $L_2$ grammar. Specifically, as has been shown above, with certain verbs being excluded from the analysis, an asymmetry has been discovered between the $L_2$ production and grammaticality judgment, in that the $L_2$ subjects consistently failed to construct resultatives and depictives under such a condition where both were adequately elicited, but they succeeded in assigning appropriate representations to these constructions. This asymmetry entails two important findings. First, assuming with Chomsky (1980, 1986, 1995) that sentence construal results from successful assignment of the correct structural representation, the fact that the Mandarin-speaking $L_2$ subjects were able to judge resultatives and depictives as the controls did signifies the possibility that they do indeed have the grammatical apparatus necessary to assign the underlying structures. In other words, adult $L_2$ subjects do have access to the relevant computational procedures, including the morphosyntactic features and head-movement constraints (HMC), which are presumed to constitute the core of the derivation of resultatives and depictives under DM. This is particularly true since the results showed a consistency, across the $L_2$ subjects, in judging the sentences in the same manner as the native speakers of English.

Pursuing this line of thinking further, we are faced with a second question; that is, if adult $L_2$ subjects do have the computational procedures, why were they not able to produce resultatives and depictives and what does this imply about the $RT_{L1}C$ condition? To answer the question, we resort to a hypothesis, originally proposed by Borer (1984) and incorporated into the minimalist analysis (e.g., Chomsky, 1999, 2000), that crosslinguistic variation is a matter of the lexicon; namely, lexical items in different languages may consist of various morphosyntactic features that give rise to different syntactic

structures. Furthermore, in child language acquisition studies, empirical evidence has been found showing that children's departures from the adult grammar are not due to the lack of the relevant syntactic principles, but an incomplete development of the lexicon (see, e.g., Chien and Wexler, 1990, Grimshaw and Rosen, 1990). Along the same line, we would argue that it is very likely that the $L_2$ subjects failed to produce resultatives and depictives because they had not been able to encode the morphosyntacitc features internal to the verbs under analysis. What this entails is that for language learners, including adult $L_2$ learners, use of resultatives and depictives requires them to have access to two things. One is that they need to know that lexical items are subject to expansion, derivation of which is constrained by the general principles. The other is that they have to obtain specific information about the morphosyntactic features of individual verbs. And it is the second that differentiates adult $L_2$ learners from child language learners, in that the former group often resort to their native language via a translation process (TP), a component of the E-language $L_2$ learners have obtained as part of their cognitive maturation (see Shi 2003). Detail aside, in the employment of this TP process, adult $L_2$ learners often select an option that involves the least processing effort, and then incorporate its lexical properties into the $L_2$ lexicon. Given that the canonical constructions consist of the least computation, predicates associated with these constructions are acquired whereas those that require more processing are often not entertained. This accounts for why Mandarin-speaking subjects consistently failed to construct resultatives and depictives even though the experimental context was set up such that they should have done so. Furthermore, this also provides us with an explanation for why the same $L_2$ subjects were able to accurately identify resultatives and depictives as part of the repertoire of English constructions, since it only involves the employment of the computational procedures and the knowledge of lexical expansion.

The results presented above challenge the ongoing $L_2$ research within the semantics-syntax interface framework (e.g., Adjemian, 1983; Juffs, 1996; Yuan, 1999; Montrul, 2001; Inagaki, 2002), which attributes the inadequacies or the non-native-like behavior in $L_2$ subjects to their failure to identify the syntactically relevant lexical properties. Under such an account, the asymmetry shown in the experiments would be untenable. Approaching the analysis from DM, we have shown that $L_2$ acquisition proceeds primarily constrained by UG principles, and the insufficient $L_2$ performance is mainly due to the interference of the $L_1$ performance systems in which the TP process plays a major role. We have shown that this analysis furnishes an explanation for the asymmetry, as exhibited in the experiment, and provides a plausible account for the incompleteness in $L_2$ acquisition, as claimed in Bley-Vroman (1989) and Schachter (1990).

Another implication is related to the question of $L_1$ involvement in $L_2$ acquisition. The preliminary results generated here show that $L_1$ grammar is inaccessible to $L_2$ acquisition; rather, it is some superficial properties constituting the $L_1$ performance systems that get transferred via a translation process. This rather radical hypothesis departs in a non-trivial way from the current views that hold that $L_1$ grammar is involved in $L_2$ acquisition (e.g., Zobl, 1980, Juffs, 1996; Montrul, 2000). We believe that this is a line of analysis worth pursuing seriously. This explanation provides an account for the fact that adult $L_2$ speakers are restrained by their $L_1$ system even in the final $L_2$ state.

## 6. Conclusion

In this study, we proposed the Relativized $L_1$ Transfer Condition and argued that $L_1$ properties are incorporated into the $L_2$ lexicon only if they represent the canonical properties. We also argued that the computational procedures are exempt from such a process; namely, $L_1$ grammar is not accessed at all in $L_2$ acquisition; rather it is the $L_1$ performance systems that are utilized in $L_2$ acquisition. Additionally, the results suggest that a translation-based $L_1$ influence may linger into the final state of $L_2$ acquisition, which, when replicated, would provide an argument against the view that $L_1$ transfer inversely correlates with $L_2$ proficiency. Finally, we suggest that an undesirable side effect of a mature cognitive system at the time a second language is acquired is that the learner becomes conservative in the sense that he or she tends to rely on the existing system to unpack complex lexical properties. Children, by contrast, make no appeal to such a system since it does not exist; therefore, they could focus on the minute details of words in the environment, which makes their I-language different from that attained by adult $L_2$ speakers.

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