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11 The Tense Puzzle in Second Language Acquisition

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The development of grammatical morphemes has had a central place in first (L1) and second (L2) language acquisition research since the early "morpheme studies" of the 1960s and 1970s (R. Brown, 1973; Dulay & Burt, 1974), yet many issues surrounding the acquisition of morphosyntax remain unanswered and have generated much debate (see Hawkins, 2009; Hopp, 2013). The debate matters because morphosyntactic development bears on important theoretical questions regarding the mental representation of learners' grammars, the role of Universal Grammar (UG), and, in the case of L2 acquisition, the influence of the L1 in L2 grammar construction (for an overview, see Epstein et al., 1996; Schwartz & Sprouse, 1996; White, 2003).

At issue are the well-documented errors of omission and commission for grammatical markers such as tense, aspect, gender, and number, errors that often persist even in advanced L2 learners' production (e.g., Hawkins & Chan, 1997; Lardiere, 1998a, 1998b, 2000, 2007, 2008). In generative SLA, nontarget use of grammatical morphemes by L2 learners has by some been seen as an indicator of deficient representations of the L2 (e.g., Beck, 1998; Hawkins & Liszka, 2003) or initial L1 grammar transfer (e.g. Schwartz & Sprouse, 1994). In this chapter we challenge these claims and explore an alternative model wherein nontarget behavior is explained by nonrepresentational or "performance" factors that interact with an otherwise stable representation of core grammar. Our claim is based on the assumptions that any model of language acquisition will include both a representational component and a performance component and that, in advance of empirical data, there is no basis for preferring one or the other as the source of errors (see e.g., Klein & Martohardjono, 1999). Recent investigations of L2 processing factors in near-native speakers parallel the approach we are taking (see Hopp, 2013; Sorace, 2011), but in contrast to those studies, we focus on beginning learners and examine in detail how a syntactic deficit model (Hawkins & Liszka, 2003) might deal with patterns we observe in a group of Chinese speakers learning L2 English. Specifically, we investigate the acquisition of

tense markers and argue that these learners' representation of tense (in particular, the feature [past]) must be present in the learners' grammar, in spite of the fact that they come to English from a language that lacks overt tense markers and arguably does not instantiate formal features such as [past]). We provide new, comprehensive data to that effect and propose that irregularities in learners' productions can be traced to a variety of factors interacting with syntactic representation rather than to the representation itself. Methodologically, we argue that conclusions about learners' syntactic representations and their access to those representations require more evidence than has been offered so far by proponents of deficit accounts.

We begin with a brief overview of representational deficit models of L2 errors and present an alternative, performance-based model. We then discuss the limitations of using production data as evidence for (absent) representation and motivate a new comprehension task for this purpose. In our experimental study we use this comprehension task to tap tacit knowledge, and supplement a controlled production task (elicited imitation) to provide further evidence of performance effects. The final section provides a general discussion and conclusion.

Approaches to Variability

Grammatical Explanations of Variability

In the generative SLA literature, several competing hypotheses have been advanced to explain morphosyntactic variability. Broadly speaking, these can be classified into the following categories: syntactic deficit accounts, phonological accounts, and mapping accounts.[1]

Syntactic deficit accounts provided the first grammar-based explanations of L2 errors, claiming that syntactic representation is compromised during L2 grammar construction. This deficit was described in terms of failure to project full trees (e.g., Vainikka & Young-Scholten, 1998) or failure to instantiate or assign syntactic features (e.g., Beck, 1997; Hawkins & Chan, 1997; Hawkins & Liszka, 2003). These approaches often use oral production data as a source of evidence, on the assumption that automaticity in production is a reliable indicator of underlying syntactic representation. Hawkins and Liszka, for example, use results from a spontaneous oral production task to argue that their L2 learners' syntactic representation diverges from that of native speakers. While a written task is also given, its results are used as evidence of explicit morphological knowledge. We will return to this below (in "The Role of Representation in a Performance Model").

Phonological deficit accounts explain L2 morphosyntactic variability through transfer of L1 phonological constraints (e.g., Goad et al., 2003; Solt

et al., 2004). While addressing issues related to articulation and perception (thus, arguably, performance), these approaches also view divergence from the target as a difference in representation between the L1 and the L2. For example, Goad et al. (2003) and Goad and White (2005) propose that inconsistent use of inflectional endings in the L2 English of Chinese speakers is caused by differences in the prosodic constraints on the two languages. Specifically, they claim that English, but not Chinese, allows adjunction to the prosodic word, which would account for the observed difficulty Chinese learners of English have in producing inflections, especially when they consist of word-final consonant clusters (for an OT-theoretic explanation, see Broselow, 2004; Broselow et al., 1998).

Mapping accounts hypothesize variability to be the result of difficulties in the computational space between the lexicon and syntax (for early accounts, see Lust, 1994, for L1; Flynn and Martohardjono, 1994, for L2). The missing surface inflection hypothesis, or MSIH (Prévost & White, 2000a, 2000b), for example, explained variability through underspecification of forms in the learner's lexicon. Under minimalism, lexical insertion in the syntactic tree takes place when features of a lexical item (e.g., *watched*: V [+fin+past]) are matched to the terminal node in the syntax, in this case the tense node, bearing the same features. The MSIH proposed that the learner's grammar contains fully specified syntactic nodes but that individual items in the lexicon may be underspecified. To explain patterns of errors in L2 French and German, Prévost and White (2000b) posited underspecification of finiteness in the learner's lexicon: nonfinite forms are not specified for finiteness (i.e., neither +/—finite) and may be inserted into nodes bearing the feature [+finite]. Finite forms, on the other hand, are always fully specified (i.e., [+finite]) and cannot therefore be inserted into [–finite] environments. The MSIH predicted an asymmetry of error patterns: nonfinite forms will be substituted for finite forms in early L2 acquisition, but finite forms will never replace nonfinite forms. This prediction was borne out in data from L2 learners of French and German. Perhaps the most widely cited example of a mapping hypothesis is Lardiere's feature reassignment model (Lardiere, 1998a, 1998b, 2000, 2007), which relies primarily on transfer of lexical features from the L1.

Implicit in all of the above models is the primary influence of the learner's L1 (i.e., transfer of grammar). Transfer models propose that L1 grammars constrain a learner's hypotheses about the L2 at the initial state of L2 acquisition, thereby explaining the common occurrence of L2 errors that resemble L1 outputs. Transfer models diverge with regard to the resolution of L2 errors: in the most widely adopted transfer model, full transfer / full access (FTFA; Schwartz & Sprouse, 1996), L2 input that contradicts or conflicts with L1 constraints eventually triggers reanalysis. Since L2 grammars have full access to UG,

restructuring of the developing L2 grammar and eventual resolution of errors is possible. Thus, the FTFA offers a grammar-based account of two aspects of L2 acquisition: both initial divergence from and development toward target-like language use are explained via the representation of the interlanguage (for a fuller discussion of transfer models, see White, 2003).

Not all transfer models, however, allow for resolution, and many incorporate a critical period component (e.g., Johnson & Newport, 1989; but see Birdsong & Molis, 2001). One such example is found in Hawkins and Liszka (2003), who propose a syntactic deficit account wherein L1 transfer occurs at the level of formal features and is irretractable in the adult learner's L2 grammar. When instances of target-like performance do occur, they are explained as explicit knowledge of the L2—that is, conscious, metalinguistic knowledge that is nonrepresentational.

A Performance-Based Model of L2 Errors

In contrast to the models described above, performance accounts (e.g., Carroll, 2001; Epstein et al., 1996; Klein, 2004; Klein & Martohardjono, 1999) look to domains outside grammar and representation, such as processing or input factors, as significant sources of L2 error patterns. Unlike constructivist or connectionist accounts, the performance approaches mentioned do not deny the important role representation plays in acquisition. The approach we propose here, for example, assumes that L2 learners have full access to UG, including features that are not instantiated in the L1. This is not to say that the L1 plays no role at all in L2 acquisition, only that it is not the critical factor in the generation of L2 errors.[2]

Our view, that performance effects might be the primary source of L2 errors, is related to a growing body of work that looks to processing to explain differences between native and nonnative speakers. For example, early work by Juffs (Juffs & Harrington, 1995; White & Juffs, 1998) compared reaction times to violations of subjacency in advanced learners of English and native speakers and showed that while patterns of knowledge were similar between the two groups, reaction times were delayed in the learner group. Kessler et al. (2004) looked at EEG responses to word order and inflectional violations in beginning and advanced learners of English and found brain signatures similar to those of native speakers, but with considerable time delay (see also Hahne, 2001). Hopp (2010, 2013) investigated knowledge of German inflectional markers by near-native speakers who had learned German post–critical period and found that they were indistinguishable from native speakers in off-line tasks but different in online tasks that were more sensitive to processing. Similar to the position we take in this study, this body of work appeals to differences in

processing and performance, rather than grammar and competence, to explain divergent nonnative behavior.

Before presenting the study itself, however, we address a major methodological issue—namely, the use of production data, in particular spontaneous production, as a reliable source of evidence for grammatical deficit. We will use Hawkins and Liszka (2003; henceforth HL), which exemplifies a syntactic deficit account, to illustrate our point.

Production Data in the Syntactic Deficit Account

The extant data demonstrate clearly that Chinese learners of L2 English have difficulty marking some tense features in production (for a possible phonological reason, see Broselow et al., 1998; C. Brown, 1998). In HL's view, this difficulty is due to the absence of the syntactic feature [past]. They examined elicited and spontaneous production by two Chinese, five Japanese, and five German adult advanced speakers of L2 English and found that the Japanese and German speakers outperformed the Chinese speakers. They adopt the interpretability hypothesis (Tsimpli, 2003; Tsimpli & Roussou, 1991), whereby interpretable, but not uninterpretable features, are transferable from the L1. Chinese, unlike Japanese and German, does not select the formal feature [past], which is a requirement for the morphosyntactic marking of tense (HL, p. 36).[3] Since this feature is critical to the generation of past tense forms and cannot be reconstructed (or accessed) post–critical period, the interpretability hypothesis predicts difficulties for Chinese speakers, even when they are at an advanced stage of L2 proficiency. In contrast, Japanese and German learners should perform well: their L1s include the feature [past], in turn licensing its selection in the L2. Phonology is ruled out because HL's Chinese learners perform worse on inflectional endings than on monomorphemic words containing the same or similar consonant clusters. The missing surface inflection hypothesis is also rejected, since variability would be expected for all three learner groups yet, in their study, is only seen for the Chinese group.

HL use two tasks that provide contrasting results: a written task showed no differences among the Chinese, Japanese, and German speakers in their production of past tense, while spontaneous oral production showed the Chinese speakers to be considerably less accurate than the other groups, and only just above chance. The authors reconcile the conflicting results by suggesting that the written task taps explicit morphological knowledge (the Chinese learners had acquired "vocabulary items with past tense forms, and use them (at least superficially) in a highly target-like way" [p. 36]), while the oral task requires access to the formal feature [past]—that is, syntactic knowledge. In their study, oral production is given privileged status for syntactic evidence.

One more apparently contradictory fact has to be reconciled: Chinese learners occasionally produce past tense morphemes. This is explained as a *postsyntactic* operation rather than as a reflection of *syntactic* knowledge. When tense markers occur correctly, it is because L2 learners are applying semantic "pastness" to the verbs through the use of context rather than through syntactic knowledge. Learners monitor their output for appropriate usage of past tense forms when they can detect the need for pastness. This monitoring process is unstable, giving rise to random L2 past tense production (HL, pp. 39–40).

To sum up Hawkins and Liszka's syntactic deficit account, post–critical period learners for whom the L1 does not provide the relevant syntactic feature [past] can no longer generate tense markers through the syntax; they produce tense markers only through an unstable monitoring operation, and therefore only variably.

HL's account raises two methodological points that we challenge. The first is the claim that the spoken task shows L1 syntactic transfer, with occasional correctness due to postsyntactic monitoring. While this is an intriguing idea, it appears ad hoc and difficult to test: How would one systematically distinguish between the results of syntactic and postsyntactic processes? Learners who produce tense accurately and consistently, for example, could simply be very good postsyntactic monitors, regardless of their L1.

Equally problematic is the proposal that spontaneous oral production constitutes reliable evidence for syntactic representation. For all beginning learners, production itself makes heavy cognitive demands. Production requires discourse and message planning and lexical lookup in addition to phonological-phonetic output mechanisms, and it requires integration of all those systems. All these aspects of speech production are known to be difficult, resulting in a commonly observed phenomenon among L2 learners: they are generally more accurate in identifying missing tense inflections in written material than in producing the very same items in speech (e.g., Szupica-Pyrzanowski, 2009).

Instead of positing a priori which particular domain of language (morphology or syntax) a given task taps primarily, as HL do, we propose to use converging evidence from both receptive and productive tasks to support claims about mental representation and performance effects. Since all tasks necessarily involve integration of different grammatical and extragrammatical systems and are therefore sensitive to processing effects, we further propose the use of tasks that have a reduced processing load. This is particularly important in the case of beginning learners, the population we target in this study.

The Role of Representation in a Performance Model of L2 Errors

As an initial hypothesis we propose that the syntactic mechanisms necessary to instantiate temporal markers (e.g., nodes, features, and so on) *should* be available to learners: tense is a universal syntactic category (even if it is not morphologically overt) and should be generatable in L2 regardless of a learner's L1. We thus adopt a full access position for Universal Grammar (see Epstein et al., 1996; Schwartz & Sprouse, 1996; White, 2003) and assume that all syntactic features made available by UG underlie all linguistic performance, whether the performance is comprehension, production, elicited imitation, grammatical judgment, or some other linguistic task. Factors that are specific to the performance mode will also have an effect on the final behavior and may be difficult to tease apart from syntactic knowledge. In aural comprehension, for example, perceptual factors will play a role, while in oral production, articulatory factors will be important. But these are factors that play a role over and above the grammar.

We thus agree with HL that accessibility of the feature [past] is necessary for accurate production of the past tense, but our objection is that production data tend to be riddled with extragrammatical factors. More importantly, if syntactic features are necessary for production, they must also be necessary for comprehension. In fact, a feature-driven account of L2 errors should be blind to performance mode (comprehension or production) and to structural complexity, predicting that consistent accuracy on any sentence requiring the feature [past], even a simple one such as "John walked the dog," crucially relies on the accessibility of that feature. Without it, neither the production *nor the comprehension* of the pastness of the verb [walked] should be possible. This is the premise underlying the research method we adopt in our study. To avoid the problematic aspects of (uncontrolled) production we mentioned earlier, we use a comprehension task to investigate whether beginning adult Chinese learners of L2 English have access to a syntactic feature that is not instantiated in the L1.

Properly questioning the role of syntactic features in learners' comprehension requires the investigation of at least two issues: (1) Can L2 learners distinguish between present and past tense in the L2, even if the L1 does not mark that distinction morphologically, and (2) can they do so based solely on the morphosyntax instantiating the feature [past] (and, importantly, without any nonsyntactic indices of temporality, such as lexical or discourse material, e.g., temporal adverbials, a context placing the narrative in a specific time frame)? Investigating a performance-based explanation of errors requires an exploration of intervening factors that could, given the particular task, be likely candidates for leading learners astray. This we do in experiment 1. In the second part of the study,

experiment 2, we use a production task (albeit a much more controlled one than in previous studies) to look for further, converging evidence on the performance factors we postulate.

The Study

Experiment 1 uses a comprehension task to investigate a performance mode that has not been explored much in the experimental SLA literature. The task is designed to provide no extrasyntactic cues about temporality, thereby circumventing HL's monitoring strategy. It also uses simple sentences with familiar lexical items so as to minimize difficulties that cannot be attributed to the syntax.

Experiment 2 tests oral production and uses an elicited imitation task with simple sentences in order to compare behavior in the two performance modes. Elicited imitation has two advantages over spontaneous production: it allows testing of forms that learners might not spontaneously produce, and it does not require the learner to resort to discourse planning. The items provide no contextual clues about temporality and thus rule out potential monitoring for pastness. Both tasks qualify as measuring implicit, rather than explicit, grammar (Ellis, 2005) since they involve meaning more than form.

Experiment 1's comprehension task is a slight modification of one that Valian (2006) developed for two-, three-, and four-year-olds. An advantage of the present study is that it uses for L2 learners materials and procedures that are very similar to those used with L1 learners. Without such methodological similarity, it is difficult to analyze possible differences in results between L1 and L2 learners.

In Valian's (2006) comprehension task, children watched scenarios that experimenters acted out, or they viewed pictures. They were asked to point to an object or picture based solely on the tense of the verb that was being used. For example, the child might see two cardboard bears, both of which had smiling faces. The experimenter said, "See these two bears? See how happy? Watch." Then the experimenter detached the smiling face from one of the bears and replaced it with a frowning face. The experimenter said either "Show me the one that *is* happy" or "Show me the one that *was* happy," stressing the tensed element to ensure that the child attended to it.

To succeed in this task, the learner must distinguish between present and past tense, linking the scenario to the appropriate tense. Consider this now from the perspective of syntactic feature assignment. If the L2 grammar has access to syntactic features and maps these to morphemes, the tense morpheme of a verb should be sufficient to identify which of two scenarios is being described. If that particular formal feature is absent, the grammar will not be able to

systematically distinguish between the morphosyntactic forms that are the (phonetic) instantiations of that feature. The absence of the feature [past], which distinguishes present from past forms, for example, should result in nondistinction, which behaviorally translates into the similar treatment of past and present tense inflections. Thus, the past tense might get a present tense interpretation half of the time and a past tense interpretation the other half of the time, and similarly for the present tense.

Since all tasks have characteristics that are unique to the task at issue, and since representation of features alone does not entail *accessibility* of that representation in all contexts, we do not predict perfect comprehension behavior on the part of learners. Valian (2006) found that two-year-olds showed a present tense bias for copula and progressive *be*, apparently relying in part on matching the predicate with the scene. In the case of the scenario with bears, "happy" describes the bear with a smiling face better than the one with a frowning face. If the learner ignores much of the sentence except for the predicate, there will be a present tense bias. But if learners show a significantly greater present tense bias for verbs that are actually in the present tense compared to verbs that are in the past tense, that difference demonstrates learners' ability to distinguish the tenses. Even two-year-olds could do so in Valian's experiment, producing more present tense–type responses for *is* than for *was*.

Experiment 1: Comprehension

Experiment 1 tests our prediction that adult L2 learners whose L1 lacks an overt grammatical distinction between tenses can, nevertheless, acquire that distinction in the second language based solely on morphosyntax. A secondary question is whether performance on tense varies depending on the carrier (copula, progressive, auxiliary). The task contrasts present and past tense with three types of tense carriers: copula *is*/*was*, progressive *is*/*was*, and auxiliary *will*/*did* (see appendix 11.1 for experimental stimuli). Observers saw a scenario acted out and then circled their choice between two alternatives on an answer sheet:

1. Lead-in sentence: See these two flowers? They are both in a cup.

   Action: Experimenter shows two cups, each of which has a flower in it. Experimenter removes the flower from one cup and places it alongside the cup.

   Test sentence: Circle the one that *is*/*was* in the cup. [copula is stressed]

2. Lead-in sentence: See these two planes? They both fly.

   Action: Experimenter has both planes mock-flying in the air and then stops one.

   Test sentence: Circle the one that *is*/*was* flying. [progressive is stressed]

3. Lead-in sentence: See these two boxes? I want to close both of them. Watch.

   Action: Experimenter closes one box.
   Test sentence: Circle the one I *will*/*did* close. [auxiliary is stressed]

By including different tense carriers we can determine whether learners' understanding of tense is general or whether performance varies depending on the type of tense carrier. The tensed element is stressed so that the listener knows what part of the sentence to attend to, reducing the cognitive demand of the task and facilitating perception, which is critical to this task. In addition, in the case of *did*, the tensed element must be stressed for full grammaticality.[4]

Copula *is*/*was*, as in 1, examines tense where the carrier is inherently stative (e.g., De Swart, 1998) and has no lexical meaning independent of the meaning carried by tense. Progressive *is*/*was*, as in 2, involves a more complicated interaction between tense and aspect: the *-ing* on the main verb represents ongoing action, independent of tense. For young L1 learners, progressive aspect and past tense are hard to negotiate (e.g., Valian, 1992, 2006; Wagner, 2001; Wilson, 2003).

The third contrast, auxiliary *will*/*did*, as in 3, involves two free morphemes, the first of which lexically conveys the future and the other the past. *Will* is in the irrealis mood, has no clear aspectual interpretation, and has future meaning independent of its tense, which in English is present (cf. *would*). *Did* conflates past tense and perfective aspect.

We also included simple past V-*ed* items in this task, although they were not presented in a tense contrast (for more details, see "Materials" below).

Participants Participants were eighteen adult native speakers of Chinese (both Mandarin and Cantonese) enrolled in beginning classes of English as a second language in a trade school (accounting, receptionist skills) in Flushing, NY, an area with a predominantly immigrant population from East Asia. All had begun learning English post–critical period. Participants completed a test of English proficiency modified from the Michigan Test of English Language Proficiency (MTELP) prior to formal testing. Scores were at a mean of 47.8 percent, placing participants at relatively low levels of L2 proficiency.

An additional twenty-two monolingual native English speakers (mean age twenty-seven, mean correct on MTELP 95 percent) performed a computerized version of the task and were at ceiling on all contrasts, averaging 94 percent correct. The computerized version included video clips of the demonstrations of the scenarios and was developed after the L2 learners had been tested.

Materials There were forty test sentences: eight contrasted tense via copula *is* and *was*, eight via progressive *is* and *was*, eight via *will* and *did*, and eight

via *-ed* and *didn't*. The last contrast is not temporal but was used so that for half the items the choice in which the event had occurred would be correct and for half the items the choice in which the item had not occurred would be correct. The materials did not allow an *-ed*/*-s* contrast, but *-ed* was included to test perceptual saliency of the bound morpheme, in comparison with the freestanding morphemes *was* and *did*. As a bound and unstressed morpheme, *-ed* is easily overlooked and is the past tense morpheme most likely to be dropped in production. Data for *-ed* are not included in the statistical analyses, and the percent correct response for these items is reported separately.

Eight practice sentences were used to demonstrate the task and to accustom the participants to the use of contrastive stress highlighting the area of the sentence that would be relevant; verbs were never stressed in the practice sentences. For example, the experimenter showed two toy fire trucks of different sizes and asked participants to indicate the *larger* one. Experimental sentences were ordered quasi-randomly; across four test batteries each sentence occurred in each of its two possible forms (present or past tense) an equal number of times, but each participant heard a given sentence frame only once.

Participants received all vocabulary items along with their translation equivalents for review in advance of the experiment.

Procedure Participants were tested in groups of eight to ten each in classrooms at the school they attended. One experimenter, a native speaker of Chinese, was present at the introduction of all test sessions to ensure that participants understood the task. Participants had answer sheets with forty numbers and two choices (*A* and *B*) for each item, one of which they were to circle, as appropriate. An experimenter demonstrated a scenario on a table at the front of the room, using the props for each trial. One side of the table had a card labeled *A* and the other a card labeled *B*. The experimenter indicated the number of the trial, showed a set of props, said a lead-in for the test sentence, demonstrated an action, and then said the test sentence.

For example, the experimenter contrasting *is* and *was* showed two bears, each with a smiling face, one on each side of the table, and said, "Look! Two bears. See how happy? Watch!" She then replaced one of the happy faces with a sad face. Immediately after the action the experimenter asked the participants either to "Circle the one that *is* happy" or "Circle the one that *was* happy," and the participants circled *A* or *B* as appropriate. Across participants, each sentence occurred roughly equally in present and past tense.

Dependent measure: Percent present tense–type responses to items in tense contrasts Individuals who cannot use syntactic features to identify the

temporality of lexical items can adopt various response strategies. Consider the item in figure 11.1. With a purely pragmatic matching strategy, a learner would attend only to the end of the sentence and match the predicate noun, adjective, or main verb. If the participant hears "Circle the one that *X* happy," the matching strategy will lead to 100 percent correct performance with *is* and 100 percent incorrect with *was*. In that case, correct responses to *is* are uninformative and cannot be taken to reflect genuine knowledge. For that reason we did not measure percent correct but percent present tense responses for all items. That is, we measured how often participants selected the answer scenario matching the present tense regardless of whether the test item is in the present or past. For the bear scenario, we measured how often participants correctly selected the scenario of the smiling bear upon hearing the sentence "Show me the bear that *is* smiling" and how often they incorrectly selected that same scenario for the sentence "Show me the bear that *was* smiling." If our participants' grammars do not contain the feature [past], they should not be able to distinguish between the two sentence types and should respond with similar percentages to the happy bear regardless of the sentence they hear. If their grammars contain and assign [past], participants should respond significantly more often with a present tense scenario if the sentence is actually

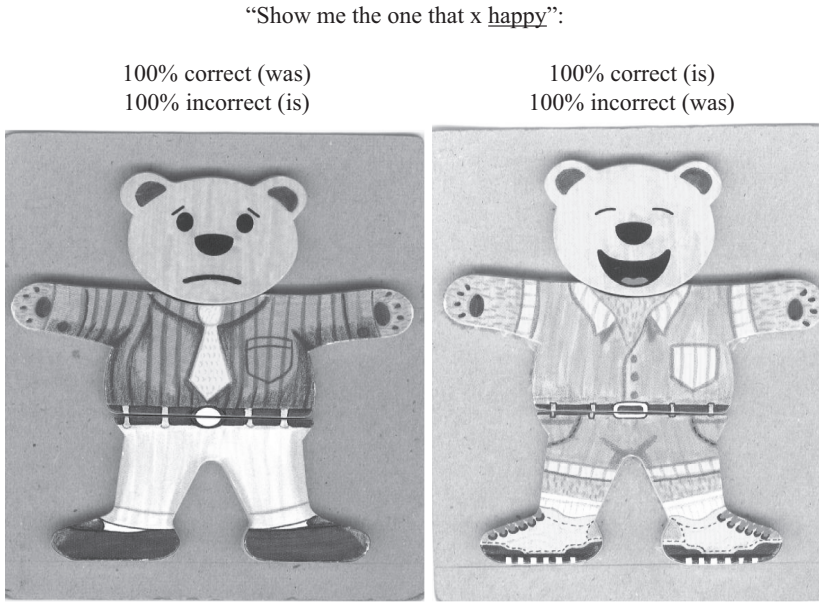

Figure 11.1
Example of pragmatic strategy: focus on predicate adjective "happy."

in the present tense compared to one in the past tense. The ability to distinguish between present and past on the basis of morphosyntax carrying the feature [past] is therefore the primary evidence we look for.

Results: Experiment 1 The key questions for experiment 1 were (1) whether beginning adult Chinese learners of L2 English could systematically distinguish between present and past tense (which would be revealed by a main effect for tense in an omnibus analysis of variance [ANOVA]) and (2) whether performance on tense would differ depending on the particular verbal element carrying the tense (which would be revealed by an interaction between tense and type of tense carrier). The results show that participants clearly distinguished between tenses with all three tense contrasts, copula *is*/*was*, progressive *is*/*was*, and aux *will*/*did*.

We conducted omnibus ANOVAs using participants (*F1*) and items (*F2*) as random effects for the copula, progressive, and auxiliary (*-ed* did not have a syntactic contrast). For the analysis by participants, carrier type (copula, progressive, auxiliary) and tense (present, past) were the within-subjects variables. For the items analysis, carrier type was a between-items variable and tense was a within-items variable. ANOVAs compared the percent of present-type scenario selection for present tense items (correct responses) with the percent of present-type scenario selection for past tense items (incorrect responses).

Figure 11.2 shows the mean present tense–scenario selection for each carrier for the participants analysis (scores for the items analysis were similar).

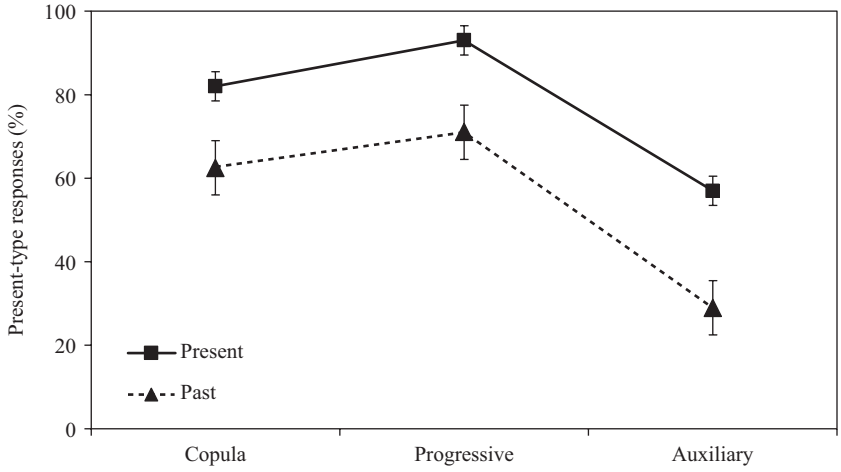

Figure 11.2
Experiment 1: Mean percent present-type responses to present and past tense items.

Participants appropriately chose more present-type scenarios overall for present tense items (77 percent overall) than for past tense items (54 percent overall).

There was a main effect for tense ($F1(1,17) = 9.33$, $p = .007$; $F2(1,21) = 27$, $p < .001$; $min\ F'(1,28) = 6.93$, $p < .02$), showing that participants treated tenses differentially. The main effect for tense carrier was also significant ($F1(2,34) = 18.74$, $p < 0.001$; $F2(2,21) = 22.09$, $p < .001$; $min\ F'(2,54) = 10.14$, $p < .001$), showing that participants treated carriers differentially. But there was no interaction: participants distinguished equally well between present and past tense for all three contrasts.

While the tense distinction was clear for all three carriers, responses to copula and progressive *is*/*was* showed a strong present tense bias: copula *was* received a present tense interpretation 63 percent of the time, and progressive *was* received a present tense interpretation 71 percent of the time. Learners made the greatest distinction between *will* and *did*, giving *did* a present-type interpretation only 29 percent of the time.

On the bound morpheme *-ed* (not included in figure 11.2), participants performed very well, giving it the correct past tense interpretation 86 percent of the time, consistently assigning the feature [past] to the inflected form. Since it had no genuine syntactic or semantic contrast item, it was not included in the ANOVAs.

Discussion: Experiment 1 We proposed that previous research questioning L2 learners' syntactic representation was methodologically limited by primarily using production tasks. In contrast to those studies, we used a comprehension task and were able to show systematic knowledge of past tense by beginning ESL learners whose L1 does not instantiate tense. In particular, our participants were clearly able to distinguish between present and past tense morphemes without the help of contextual clues. This would not be possible if, as proposed by syntactic deficit models, learners' grammars lacked the syntactic features that must be assigned to the morphosyntax of past tense. Our results further show that selection and assignment of the feature [past] was possible for all three types of verb carriers we tested, in addition to verbs with the past tense inflection *-ed*. Furthermore, knowledge of tense was not compromised by aspect: even the most challenging comparison—progressive *be*, where the *-ing* suggests continuing action—did not mislead our participants.[5] High performance on the simple past tense *-ed* (86 percent correct) further suggests that even bound morphemes, which are perceptually less salient, do not hinder the selection and assignment of tense features. We conclude that, when tested with an appropriate task, learners are able to demonstrate knowledge of tense, which we argue is impossible without the feature [past].

Nonetheless, there were certain difficulties for our participants. Perfect performance, which native speakers demonstrated for *be*, would have yielded a difference score of 100 for each contrast. Instead, the difference score was 19.5 percentage points for the copula, 22 percentage points for the progressive, and 28 percentage points for the auxiliaries *will* and *did*. That is, learners had a bias to give a present tense interpretation to both copula and progressive *was*. Learners also had some difficulty assigning the correct scenario to *will*, doing so only 57 percent of the time, without showing this difficulty with *is*.

But if the differential treatment of present and past is due to the presence of syntactic features, as we argue, what accounts for the difficulties we observe? Here we turn to performance factors and consider three: pragmatics, frequency, and a tense-aspect interaction.

Recall first our discussion of the L1 child learners in Valian's (2006) study, who followed a pragmatic matching strategy in their responses. The adult learners in our study may have used this same matching strategy to reduce cognitive demands when trying to understand a sentence. Another possible source of the present tense bias is that learners find it counterintuitive for someone to ask about an immediately past event with the past tense instead of about the result of that event with the present tense. For example, a learner might expect the experimenter to ask about which bear *is* now sad rather than about which bear *was* happy.

Another obvious candidate for a performance effect favoring the present is frequency: *is* might be more frequent than *was* in the input. A summary survey of the literature shows that, overall, the present tense in speech is more frequent than the past tense. However, the extent of the difference varies from corpus to corpus and from tense carrier to tense carrier. On some analyses, the present in all forms is about twice as frequent as the past (Biber, 1993), and the present progressive is used more than twice as often as the past progressive (Biber & Reppen, 2002). If frequency matters, the present tense bias seen for *is*/*was* might be a performance effect.

To verify this hypothesis for the actual forms used in this experiment, we performed a frequency analysis on a native speaker corpus of English, the Santa Barbara Corpus of Spoken American English, and on an ESL corpus of written English, the International Corpus of Learner English (ICLE). The results partially support our hypothesis that frequency affects error rates. In the Santa Barbara Corpus we found a higher token frequency for *is* than for *was*, both in the copular and progressive forms (4451 vs. 2086 and 449 vs. 328, respectively; see table 11.1). Higher frequency of the present is also reflected in learners' writing: the ICLE showed that L2 learners of English use *is* in writing seven times more often than *was* (77,869 vs. 10,936 occurrences; see table 11.2).

Table 11.1
Santa Barbara corpus of Spoken American English (approx. 249,000 words): Frequency counts for tensed items used in study

Copula BE	***is***	***was***
Uncontracted	1541	1981
Contracted with subject	2840	N/A
Contracted with negative	70	105
Total	**4451**	**2086**
Progressive BE	***is***	***was***
Uncontracted	72	317
Contracted with subject	377	N/A
Contracted with negative	0	11
Total	**449**	**328**
Auxiliary	***will***	***did***
Uncontracted	734	339
Contracted with subject	613	N/A
Contracted with negative	N/A (*won't*, n = 195)	453
Total	**1542**	**792**

Table 11.2
International Corpus of Learner English (ICLE)*: Frequency counts for items used in study

Token	Number of occurrences
is	77,869
was	10,936
will	15,961
did	1834

*Corpus of written essays by undergraduate EFL learners in sixteen countries (200,000 words per subcorpus).

Absolute frequency rates in the two corpora therefore align with our findings and offer a potential explanation for the advantage seen in our learners' comprehension of copular and progressive *be*. The rates we found for the auxiliaries *will* and *did*, on the other hand, did not align with our results. *Will* occurred 1542 times in the Santa Barbara Corpus, more than twice as often as *did*, which occurred 792 times. This pattern is replicated in the ICLE, with 15,961 occurrences of *will* versus 1834 of *did*.

If frequency affects the *is*/*was* contrast, why does it seemingly not affect the *will*/*did* contrast? A potential answer comes from a comparison to the behavior of L1 children. First, returning to figure 11.2, we see that the contrast for *will* and

did has a more complex pattern than for *is* and *was*. On the one hand, participants clearly distinguished the two: *did* received a past tense interpretation 71 percent of the time (marked as a 29 percent present tense response in figure 11.2), indicating solid assignment of the feature [past] to this morpheme. *Will* on the other hand, was correctly interpreted only 57 percent of the time and was therefore much more difficult compared to the present tense forms of *be*, for which participants correctly assigned copula *is* a present tense interpretation 82 percent of the time and assigned progressive *is* a present tense interpretation 93 percent of the time.

Interestingly, we see the same pattern in another group of learners, namely monolingual English-speaking two-year-olds (Valian, 2006). Figure 11.3 shows a comparison of data from two-year-old monolingual children and those of the L2 adults in the current study. The results are strikingly similar. Consider first the results for *be*. Both groups of participants are more likely to provide a present tense interpretation to progressive *is* than copula *is*, suggesting that both groups interpret the aspectual marker *-ing* as signaling ongoing action and thus increasing present-type responses even to the present tense. Both groups are also more likely to provide a present tense interpretation to progressive *was* than to copula *was*, again supporting the idea that they are sensitive to the aspectual marker; here, as well, that sensitivity increases the likelihood of a present tense interpretation, even though tense independently has an effect. We

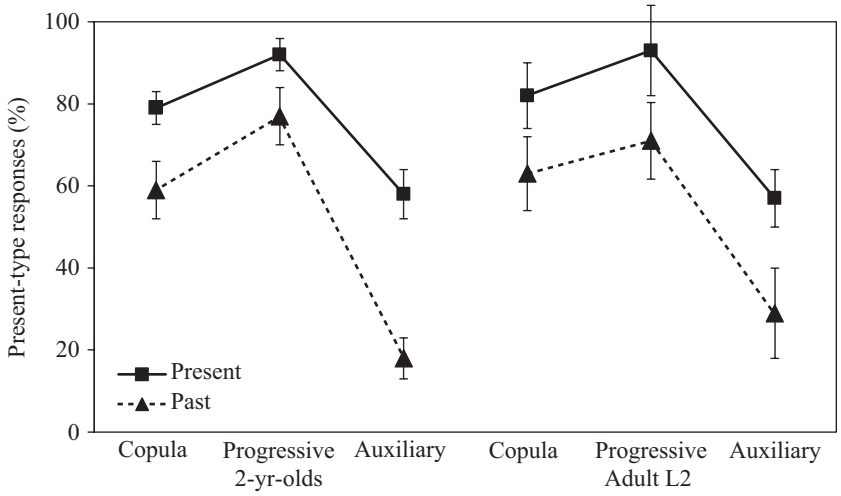

Figure 11.3
Experiment 1: Comparison of present tense responses to present tense items (solid) and past tense items (dashed) by monolingual 2-yr-olds and adult L2 learners.

suggest that both groups interpret tense and aspect in similar ways, with progressive aspect pushing tense interpretation to the present.

Finally, both groups have difficulty with *will*. On the assumption that like results suggest like causes, we rule out two possible analyses. First, it is unlikely that two-year-olds have trouble with *will* because they cannot understand the concept of futurity; adult Chinese speakers can understand the future but still have problems with *will*. Second, it is unlikely that Chinese learners' poor performance is due to properties of Chinese phonology; English-speaking children can pronounce /w/ but still have problems with *will*. Our suggestion is that for both groups of learners, *will* is not fully specified in the lexicon. What makes *will* difficult is three properties that are difficult to reconcile: it is morphologically present tense (contrasting with *would*, the past tense); it is defective (it does not take third-person -*s* in present tense); and it semantically conveys the future. It is thus hard to classify. We propose that, unlike *is* and *was*, and unlike *do*, which inflects for third-person present, *will* is underspecified, which contributes to the difficulty in its interpretation.

In sum, we conclude that the ability to distinguish between present and past demonstrates that both child and adult learners represent tense in their grammars. However, deployment of this knowledge is affected by performance factors. We have suggested various pragmatic strategies, frequency in the input (as partially supported by frequency counts in two corpora), and an interaction of aspect and tense, all favoring a present tense response. This is most clearly seen in the responses to the *is*/*was* contrast. Furthermore, we suggest that lexical underspecification of *will* accounts for the difficulty both adult L2 and child L1 learners exhibit in assigning an interpretation to this form.

Experiment 2: Elicited Imitation

Having established in experiment 1 that learners can demonstrate knowledge of tense through a comprehension task, we investigate in experiment 2 whether learners can generate the same tense morphemes in oral production. Difficulties in this mode are amply documented (e.g., Goad & White, 2004; Hawkins, 2000, 2009; Hawkins & Liszka, 2003; Lardiere, 1998a, 1998b, 2000), but as pointed out earlier, the evidence typically comes from spontaneous or semispontaneous tasks, such as narration. We argued that such tasks make heavy demands on L2 learners because they require creation of a message and the integration of discourse and lexical abilities with phonological skills, in addition to access to syntactic and morphosyntactic representations. The elicited imitation (EI) task we chose for experiment 2 neutralizes message creation and discourse effects by providing the learner with lexical items, yet it still taps

processing skills at the sentence level. Learners will try to understand the sentence and parse its syntactic structure before pronouncing it.

Using a production task enables us to shed further light on performance effects. First, we can see whether the present tense bias partially observed in the comprehension task (and possibly a frequency effect) is also manifested in production. Second, we can identify differential processing effects on various parts of the utterance. To that end we perform three different analyses of the data, which we will describe in more detail in the next section. Finally, using this task allows us to investigate in a more controlled environment learners' phonological abilities with regard to the tense marker itself, abilities that are claimed to be constrained by L1 representation (e.g., Goad & White, 2004, 2006).

Unlike the comprehension task, however, we did not use the EI task to establish whether learners assign formal features to morphemes, as even the correct repetition of present or past tense forms is silent on how those forms are interpreted—that is, whether the event described with these forms is placed in the present or the past.

Participants Nineteen adult learners of English as a second language participated in the experiment. Sixteen had also participated in experiment 1. All were native speakers of Chinese (both Mandarin and Cantonese) enrolled in beginning ESL classes offered by a trade school in Flushing, Queens, NY, and all had begun learning English post–critical period. Participants completed a test of English proficiency modified from the MTELP prior to formal testing. They scored at a mean of 49 percent, placing them at a relatively low level of L2 proficiency. Participants completed the imitation task after completing the comprehension task. The comprehension task may have primed their knowledge of tense across the board but could not have biased performance in favor of either tense. Twenty-four monolingual controls also performed the EI task via a computerized administration (average MTELP score: 96 percent). They scored between 98 and 100 percent correct on all items.

Materials The experimental stimuli consisted of thirty-two sentence types containing four types of tense carriers: copula (*is*, *was*), progressive (*is* V-*ing*, *was* V-*ing*), auxiliary (*will*, *did*), and inflection on main verb (-*s*, -*ed*). Of the experimental stimuli, sixteen tested the present tense (four each with copula *is*, progressive *is*, auxiliary *will*, and main verb inflectional tense marker -*s*), and sixteen tested the past tense (four each with copula *was*, progressive *was*, auxiliary *did*, and main verb inflectional tense marker -*ed*). (See appendix 11.2 for experimental stimuli. *Can* was included to add variety but was not scored.)

The sentences with the inflectional marker on the main verb in the present tense took two forms: the syllabic (or *epenthetic*) form [Iz] as in *washes* and the nonsyllabic form [s] as in *paints*. Similarly, the inflectional marker in the past tense took two forms: the syllabic form [Id] as in *painted* and the nonsyllabic form [t] as in *washed*. The tensed form was always stressed (*be*, the auxiliary, or the inflected verb). Within a tense carrier, each sentence appeared equally often across subjects in present or past form. A given subject heard only one tensed form per frame. Items were presented in pseudo-random order to prevent multiple occurrences of the same tense.

Batteries Six batteries of randomized sentences varied the order of presentation of the sentences and the sentence frames containing the target verb types. In each battery, a sentence frame was presented in either the present or past tense for the sentences containing the copula, progressive, and inflected tense marker, as well as sentences that contained the auxiliaries *can*, *will*, and *did*. Sentences ranged in length from four to eight syllables and four to seven words. Following practice in psycholinguistic experiments, this variation in sentence length allowed for greater naturalness and helped prevent expectations about sentence form. Pilot testing determined that even such relatively short sentences were not perfectly repeated. By having sentences that were roughly within learners' grasp, we increased the likelihood that they would understand the sentences and treat them as linguistically structured rather than as lists of words.

Procedure Each L2 participant was tested individually in a quiet room and audiotaped. After explaining the task and giving a few practice trials, the experimenter read a sentence and asked the participant to repeat it as best s/he could. Each native English speaker was tested in a cubicle, heard the sentences through a headset, and repeated the sentence. The repetitions were audiotaped.

Dependent measures Oral production tasks are well suited to investigations of differential processing effects. For example, elicited imitation has been used to determine whether certain types of complex sentences are easier to process than others (e.g., Flynn, 1984; see also chapter 4 in this volume). In this study, we were interested to see whether there are processing effects on the tensed item itself and whether accessing tenses affects production of the sentence overall. We had three dependent measures: (1) percentage of times participants correctly produced the tensed element, (2) percentage of times they produced the entire sentence completely correctly, and, to avoid a confound between (1) and (2), we also calculated (3) percentage of times participants produced the sentence frame correctly, regardless of the tensed element.

Results: Experiment 2 As for the percentage of tensed elements correctly repeated, native speakers (N = 24) were close to perfect on all measures. They repeated the tensed element correctly 100 percent of the time for all but two forms, *is* and *was* progressive, for which they were 98 percent correct. They produced the entire sentence and frame perfectly 98 percent of the time or better for all carriers.

Accuracy rates were high for learners as well, though their performance was lower than native speakers'. Overall, learners produced tensed elements in the present more successfully (90 percent) than tensed elements in the past (82 percent). Results for each tense carrier separately are shown in figure 11.4.

An omnibus ANOVA revealed a main effect of tense ($F1(1,18) = 7.69$, $p < .02$; $F2(1,32) = 5.19$, $p < .05$; *min* $F'(1,50) = 3.1$, $p < .09$). Learners were also more successful at repeating copula *be* (96 percent) and progressive *be* (92 percent) forms than auxiliary *will* or *did* (84 percent) or the inflections *-es* and *-ed* (72 percent; $F1(3,54) = 8.08$, $p < .001$; $F2(3,32) = 9.41$, $p < .001$; *min* $F'(3,83) = 4.35$, $p < .01$). There was no interaction between tense and carrier type. Across all four tense carriers, then, the present tense forms were uniformly produced more often than the past tense forms. A separate analysis comparing main verb inflections that were epenthetic (e.g., *washes*, *lifted*) or not (e.g., *washed*, *lifts*) found no difference in participants' ability to produce these.

As for the percentage of whole sentences repeated correctly, although the tensed elements themselves were repeated correctly at a high level, imitation of the sentence as a whole was less successful. Sentences in the present tense

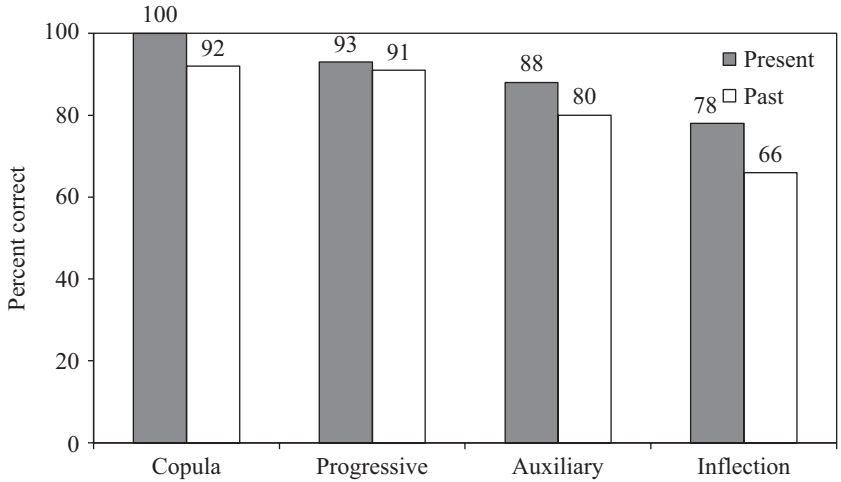

Figure 11.4
Experiment 2: Mean percent correct imitation of tensed element.

were correctly produced only 61 percent of the time, and those in the past tense only 52 percent of the time. Figure 11.5 shows results for each tense carrier separately. Thus, despite the facilitative value of familiar lexical items and short sentences, this task was still a challenge for these learners, demonstrating that elicited imitation does not merely tap mimicking abilities.

An omnibus ANOVA revealed a main effect of tense ($F1(1,18) = 6.51$, $p = .02$; $F2(1,32) = 8.25$, $p < .01$; *min* $F'(1,43) = 3.64$, $p < .07$). Learners were also more successful at repeating sentences with copula *be* (79 percent) and progressive *be* (74 percent) than those with auxiliary *will* or *did* (42 percent) or the inflections *-es* and *-ed* (32%; $F1(3,54) = 32.21$, $p < .001$, $F2(3,32) = 18.89$, $p < .001$; *min* $F'(3,67) = 11.9$, $p < .001$). There was no interaction: sentences in the present tense uniformly showed a higher accuracy rate than sentences in the past tense.

The third measure looked only at the frame in order to assess the effect of a present or past tense element on a learner's ability to produce the rest of the sentence. Learners tended to be more successful at repeating the sentence frame when the carriers were in the present tense (69 percent) than when they were in the past tense (63 percent). Figure 11.6 shows results for each carrier separately.

An omnibus ANOVA revealed a marginal effect of tense in the subjects analysis and a strong effect in the items analysis ($F1(1,18) = 3.71$, $p = .07$; $F2(1,32) = 10.49$, $p < .003$; *min* $F'(1,31) = 2.74$, $p = .11$). Learners repeated sentence frames with copula *be* (85 percent) and progressive *be* (82 percent) correctly more often than those with auxiliary *will* or *did* (53 percent) or the inflections

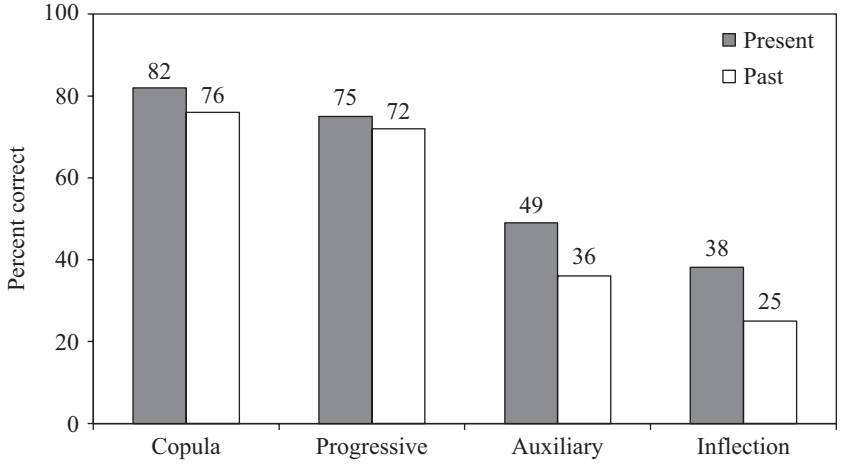

Figure 11.5
Experiment 2: Mean percent correct imitation of complete sentence.

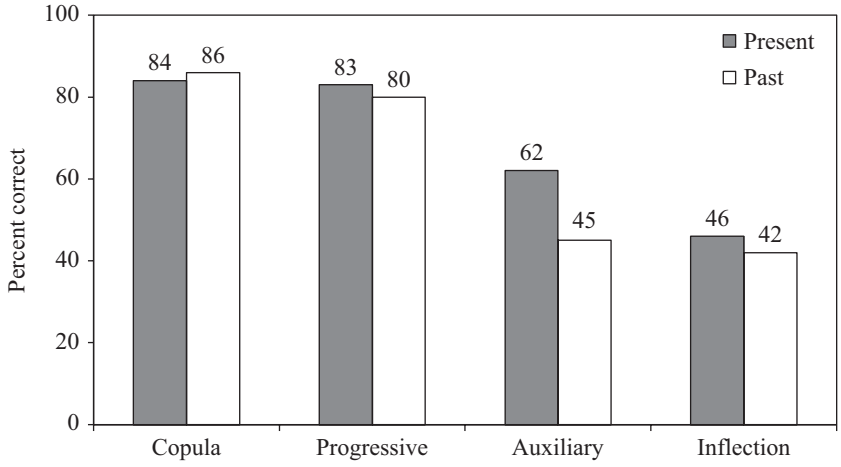

Figure 11.6
Experiment 2: Mean percent sentence frames correctly repeated (without tensed element).

-es and *-ed* (44 percent; $F1(3,54) = 37.79$, $p < .001$; $F2(3,32) = 11.56$, $p < .001$; *min* $F'(3,52) = 8.85$, $p < .01$). There was no interaction.

Discussion: Experiment 2 Results from experiment 2 clearly show that L2 learners can and do produce tense elements when task demands are reduced. In particular, the high performance rates on the tensed elements alone (overall 86 percent) indicate that there is only a minimal processing cost for accurate production. As expected, accuracy varied across different carriers and, at 72 percent, was lowest in the inflected form—that is, when the morpheme was bound. This may be an indication of saliency effects: bound morphemes may be more difficult to perceive in the input, especially as they are unstressed.[6] Interestingly, adding a syllable to the inflection—*lifted* versus *washed*—did not affect the difficulty learners had in reproducing these elements. Such an asymmetry would be predicted by the prosodic account developed in Goad and White (2006).

The present tense advantage observed for *be* in the comprehension task was present for all carriers in the production task: *will* had an 88 percent accuracy rate, higher than *did*, at 80 percent. For the inflected forms, V-*s* surpassed V-*ed* (78 percent vs. 66 percent). Results for the EI task are thus completely in line with the frequency measures we calculated in the Santa Barbara Corpus and the ICLE and with those proposed in other studies reporting higher occurrences for present versus past forms (Biber, 1993; Biber & Reppen, 2002). This result further supports the frequency effect we postulated in the comprehension task and indicates that frequency has a significant influence on production.

Results from the whole-sentence-correct analysis show that imitation is not automatic nor even an easy task for beginning learners. Yet, elicited imitation showed itself to be a sensitive task and responsive to morphosyntactic properties. As others have argued, it reflects a learner's current grammar (Lust et al., 1996; Maratsos & Kuczaj, 1974; Munnich et al., 1994): learners can only produce what they know. Learners do not simply provide a rote repetition, even of short sentences. The structure of the sentences affects their ability to imitate the sentence, as is the case for children. This was made evident by the fact that in our experiment the type of tense carrier affected the degree to which a sentence was repeated correctly. Certain modal auxiliaries (e.g., *will*, *did*) and verbs with tense inflections (i.e., third-person-singular present *-s* and past *-ed*) caused learners more difficulty than did the forms of *be*. Moreover, the difficulty that participants have with accessing lexical forms in the past tense spills over to the rest of the sentence, as shown by the frame analysis. Our explanation is that retrieval difficulties affect processing of the sentence as a whole.

In sum, the oral production task revealed that tense does not carry a high processing cost on the carriers themselves but that present tense items (including *will*) are easier to produce than past tense items, an effect we ascribe to frequency. Bound items *-s*/*-ed* had a significantly lower accuracy rate than free-standing *is*/*was*, possibly an effect of lower saliency in perception. Finally, no phonological advantage was found for syllabic *-es*/*-ed* versus nonsyllabic *-s*/*-d*.

General Discussion

It is axiomatic that speakers of a human language have much more in their linguistic repertoire than they are likely to produce at any given time. In our work, similarly, we claim that examining the *production* of tense among L2 speakers does not necessarily reveal whether tense is represented syntactically in their underlying grammars. While accurate production of tensed forms generally reflects representation of those forms in the grammar, *errors* in production do not necessarily signify gaps in a learner's knowledge of tense. That is because there are intermediate processes between a learner's mental representation and production, notably the processes involved in *accessing* that representation, which—as we have argued—is influenced by external factors. In naturalistic oral production, in particular, the surface morphophonological mapping of inflected forms is rendered more difficult by extrasyntactic factors like discourse planning, lexical lookup, and nonnative phonology. We proposed a new approach to analyzing nontarget behavior: to explain limitations on learners, we focus on processing effects and factors that are relevant to L2 input, such as frequency and saliency. Our study combines representational and

performance-based approaches, relying on the former to explain what learners get right and the latter to explain what they get wrong.

To tap knowledge of tense, we used a unique comprehension task—with no oral production required—to examine whether Chinese learners of English are able to use syntactic features necessary in the L2 even when they are not selected in the L1. Our results show that these L2 learners were able to do so, resulting in a clear differentiation in the temporal interpretation they assigned to present tense morphemes compared to past tense morphemes. This would not be possible if the features linked to the morphosyntax of tense were not accessible to these learners, especially since the sentences used in the test were devoid of contextual and semantic clues regarding the temporality of the event they described. Our findings directly contradict the predictions of a syntactic deficit account like Hawkins and Liszka's (2003), which cannot explain the clear distinction our Chinese learners of L2 English made in the comprehension task. Similar arguments against syntactic or feature deficits in language acquisition were made by Prévost and White (2000b) to explain patterns of errors in L2 French and German.

We observed a present tense bias for two out of the three contrasts presented in the comprehension task and explained this through performance factors. In particular, we suggested that a pragmatic matching strategy might be at play as well as a frequency effect favoring the present tense.

Since we were looking for converging evidence, we also administered a production task. However, instead of spontaneous production—a task we have argued to deceptively mask underlying knowledge because of the extraneous demands placed on the learner—we used a more controlled elicited imitation task, in which participants tried to repeat short sentences in present and past tense, with very simple lexical items to keep the processing load for this otherwise difficult task as light as possible. The results of this task showed the same present tense bias observed in the comprehension task, further supporting frequency effects. Extending this interpretation to spontaneous production, we might say that this frequency effect of the present tense forms affects learner performance even more when processing load is increased by extragrammatical demands like discourse planning.

We might also postulate that the markedly lower performance on inflected verbs suggests that when tense morphemes are bound, they are typically unstressed in everyday speech and less salient in perception (e.g., Klein, 2004; Solt et al., 2004). Inflections, whether accurately perceived or not, cause a processing overload that spills out to production of the remainder of the sentence, as shown in our finding that processing overload caused by particular tense markers resulted in lower performance in overall sentence imitation, thus

masking the underlying grammatical representations that these learners evidently have.

Importantly, the adult learners in our study followed a similar pattern of variation to that of children (Valian, 2006), indicating no age effects in the development of tense morphology. The pattern of verb-type variability we found was also observed in Paradis et al. (2008), even though the L2 learners in their study were young children with a wide variety of L1s. Similarly, Ionin and Wexler (2002) found greater accuracy for copula and auxiliary *be* than for present tense *-s* and past tense *-ed* among a group of Russian children learning L2 English.

The results of these studies, taken together, suggest that the development of L2 tense across age groups and L1s is a similar process in many ways, although what is produced, at least in spontaneous speech, is more limited than learners' underlying representations would suggest. However, when generation is facilitated, as it was in the production task we used, we found that even beginning learners can produce the tense elements. Contra the predictions of Goad and White's (2006) prosodic account, the Chinese participants in our study did not find inflections with an epenthetic vowel easier to produce than those without.

We have discussed the important question of *why* there is such a disparity between learners' knowledge and their performance. To shed light on this question, we follow others in appealing to input factors and other obstacles to performance, particularly processing overload. Results from our production task showed the same general tendencies seen in the comprehension task (e.g., present being easier than past) but, in addition, helped clarify performance factors that contribute to omission or variability in production. Calculations of frequency rates performed on corpus data from native and nonnative English samples support our hypothesis that input factors such as frequency influence L2 learners' use.

Finally, our results do not support a transfer hypothesis. For the beginning learners in our study, the full transfer / full access hypothesis would predict transfer of the syntactic feature system of the L1 Chinese—that is, the absence of [past]. This, in turn, should have resulted in the random treatment of present and past items in the comprehension task. Since our results show that even beginning learners were able to distinguish between present and past, we conclude that our participants' responses were not based on transfer of their L1 syntactic features.

Conclusions and Implications

When cognitive demands and processing loads are kept at a minimum, learners show systematic knowledge of tense markers both in comprehension and in production in the L2, even when their L1 lacks this distinction or does not

instantiate these markers. We interpret this to mean that the Chinese learners of English in our study have access to the formal features required for the morpho-syntactic instantiation of tense in English, contra representational deficit models in L2 research (e.g., Hawkins & Liszka, 2003; Snape et al., 2009). We show that learners systematically match present and past tense morphemes to their appropriate temporality without recourse to temporal adverbials. The systematicity is shown in the fact that present is coupled with present-type situations more often than past is coupled with present-type situations, an outcome that cannot be explained without access to syntactic features like [past]. On the basis of the evidence reported in this research, we suggest that variability, observed in studies that rely on spontaneous production or other less controlled tasks, is primarily due to input, perception, processing, and other factors more closely related to difficulties in accessing their L2 grammars and producing what they know. We explain learners' increased accuracy rates on present stimuli (or what we call the *present tense bias*) not through the unavailability of syntactic features but through performance factors: predicate matching, input frequency, and aspect-tense interactions.

Early explanations of L2 inflectional variability appealed primarily to representational differences; later investigations of performance factors primarily address the case of advanced learners and near-native speakers (e.g., Sorace, 2011; Hopp, 2013). In this study we extend this perspective to beginning learners, arguing that even for low-proficiency groups, deficit and transfer accounts do not explain the knowledge that is exhibited. While the tense puzzle in L2 acquisition is far from resolved, a more systematic investigation of performance factors is necessary to account for the missing pieces that have often been attributed to gaps in representation.

Appendix 11.1

Experiment 1: Comprehension Stimuli

Stimuli read to participants at close of demonstration of scenario, following "Circle the one (that) . . ."

Copula *be*

1. is/was full.
2. is/was happy.
3. is/was clean.
4. is/was in the cup.
5. is/was yellow.

6. is/was on.
7. is/was a ball.
8. is/was long.

Progressive *be*

9. is/was kissing.
10. is/was flying.
11. is/was standing.
12. is/was running.
13. is/was dancing.
14. is/was sleeping.
15. is/was reading.
16. is/was wearing a hat.

Auxiliary *will/did*

17. will/did jump.
18. I will/did tie.
19. I will/did pick up.
20. I will/did close.
21. I will/did open.
22. will/did drink.
23. I will/did break.
24. will/did sit down.

Past tense/negative past tense

25. waited/didn't wait.
26. I planted/didn't plant.
27. I dropped/didn't drop.
28. talked/didn't talk.
29. stopped/didn't stop.
30. I painted/didn't paint.

31. I lifted/didn't lift.
32. walked/didn't walk.

Appendix 11.2

Experiment 2: Elicited Imitation Stimuli

1. The coffee is/was hot.
2. The water is/was cold.
3. The kitchen is/was dark.
4. The parking lot is/was large.
5. The man is/was nice.
6. The food is/was good.
7. The teacher is/was funny.
8. My daughter is/was happy.
9. A dog is/was walking.
10. The baby is/was playing.
11. The girl is/was singing a song.
12. My brother is/was building a house.
13. A man is/was talking.
14. The boy is/was jumping.
15. My sister is/was dancing.
16. My father is/was cooking dinner.
17. The child will/can/did watch TV.
18. The student will/can/did drink tea.
19. The boy will/can/did help his mother.
20. My sister will/can/did read newspapers.
21. The cat will/can/did sleep.
22. My classmate will/can/did draw a picture.
23. His friend will/can/did buy some apples.
24. Her mother will/can/did find a hat.

25. My cousin will/can/did call me.
26. The driver will/can/did eat lunch.
27. The girl will/can/did run five miles.
28. The woman will/can/did write a letter.
29. My mother paints/painted a door.
30. The neighbor plants/planted a tree.
31. The girl kisses/kissed a boy.
32. The woman washes/washed a window.
33. The boy pushes/pushed a swing.
34. The woman passes/passed a police car.
35. The worker lifts/lifted a box.
36. My uncle waits/waited at the bus stop.

Notes

1. A recent claim, which we will not discuss here, has also been proposed for morphological deficit in L2 representation (VanPatten et al., 2012).

2. In this sense, we diverge from the FTFA in that we do not seek to explain errors by appealing to L1 representation. In addition, our account places L1 influence within the larger domain of cross-linguistic influence (see also Cook, 2003; Flynn et al., 2004), allowing, for example for L2 influence on the L1.

3. In HL, [past] is somewhat controversially considered to be an uninterpretable feature. Hawkins (2009) offers a slightly different account, using the feature [Affix], which is arguably more easily seen as uninterpretable than [past].

4. The use of stress, while making the element more salient for testing purposes, does not convey temporality.

5. This is not to ignore any potential effect aspect might have on the interpretation of tense. We return to this in the general discussion section.

6. Although the carriers were stressed in our experiment, for the inflected forms this meant stressing the verb stem and not the inflected ending itself.

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