

Young Children's Understanding of Present and Past Tense

Virginia Valian
Hunter College
CUNY Graduate Center

Three age groups were tested for their understanding of present and past tense in the auxiliaries *will* and *did*, copula *be*, and progressive *be*. Children saw scenarios or pictures and responded to an experimenter's "show-me" requests based on the tense—non-past or past—of the verb in the request. For two groups (sixty-four 2- and sixty-four 3-year-olds), some children also heard temporal adverbs. The 2-year-olds successfully distinguished auxiliaries *will/did* and copula *is/was*, performing marginally on the progressive; adverbs produced no additional benefit. The 3-year-olds successfully distinguished all contrasts and showed more benefit of adverbs. The nine 4-year-olds performed at ceiling on all contrasts. The results suggest that knowledge of tense is neither localized to special lexical elements nor semantically based. From the beginning of combinatorial speech, children's grammars include a syntactic tense marker that is independent from aspect and include the syntactic category verb.

What do very young children understand about the tense of a verb? The present experiments with 2-, 3-, and 4-year-olds pose that empirical question to address controversies about the nature of children's early syntactic representations. One controversy is whether children begin combinatorial speech with abstract syntactic elements like tense and verb or whether those elements are constructed later out of either semantic knowledge or local, lexically specific routines. A second controversy is whether children's frequent failure to include tense in their early productions is due to the absence of a tense marker in their grammar or to another source, such as an optional rule or the difficulty of integrating tense with other sentence elements. A third controversy is whether children initially conflate tense with aspect and must then correct their grammar, or whether they understand tense as a separate element from the outset.

What are tense and aspect? Tense markers, such as the past tense *-ed* in English, are syntactic devices used to place an event in time. More precisely, as Comrie (1976) puts it, “tense relates the time of the situation referred to to some other time” (pp. 1–2). The range of times conveyed by the present tense in English is extremely broad, as Examples 1 through 6 show. Although the range conveyed by the past tense is highly restricted, as in Examples 7 through 9, it includes timelessness, as in Example 8, and a hypothetical future, as in Example 9.

1. The pitch is low [a description of a baseball just thrown by a pitcher]
2. She likes raspberries [a description of a fact about someone]
3. She is happy [a description that is vague with respect to length of time]
4. We go to Grandma’s tomorrow [future]
5. She calls on me and I’m not prepared [narrative past]
6. 2 + 2 makes 4 [atemporal truth]
7. She played baseball [past event]
8. If I were [for some speakers: was] not a native speaker, these facts would drive me crazy [atemporal counter-factual event]
9. That itinerary wasn’t going to let me visit Paris until after I had gone to London (so I changed it) [hypothetical event]

Languages vary in the number of tenses they have. English has only two—present (or “non-past”) and past. (See Enç, 1996, for some discussion of whether English has a present tense in addition to a past tense.) In English, future time is often conveyed via the present tense, especially through the modal *will* (see Appendix A for evidence that *will* is morphologically present tense) and the verbs *go* or *be going to*. Many different temporal interpretations are shoehorned in English into two tenses. (Because *will* is hard to accept as a present-tense element, I will frequently refer to the non-past/past distinction, rather than the present/past distinction.)

Some languages (e.g., Mandarin) lack overt tense markers, and even in English syntactic tense need not be present for a speaker or listener to assign a temporal interpretation to an utterance (e.g., “Pick up your ID card tomorrow”). Nevertheless, for English-speaking children, a full temporal interpretation of the description of an event and the assignment of nominative case to subjects require a syntactic representation of tense.

Verb inflections can also convey information about grammatical aspect, the temporal contour of the event being described. To quote Comrie (1976) again, “aspects are different ways of viewing the internal temporal constituency of a situation” (p. 3). The progressive *-ing* in English does not mark tense, only the aspect of ongoing action, as in Example 10; *is* or *was* tells us the tense. Although the basic separation between tense and aspect is clear, the interaction of tense and aspect is complex. Consider Example 11. Each verb phrase in isolation suggests a completed action with a definite endpoint (a telic event), but thanks to *while*, Example

11 as a whole suggests a continuous ongoing tableau in the past. Completion of neither fence-painting nor dinner-cooking need have occurred.

10. She is/was hopping
11. Jane painted the fence while Tom cooked dinner

The temporal interpretation of a sentence is thus a complicated integration of, *inter alia*, a verb's meaning, its complement(s), tense operators, aspect operators, constituents like adverbs, and overall syntactic structure. In the syntax, tense and aspect are markers within the verb's inflection system; each may have its own node. In the semantics, tense and aspect are operators. (There is a wide range of theoretical approaches to tense and aspect. The approach here is most influenced by de Swart, 1998, but see also Bach, 1986; Binnick, 1991; Comrie, 1976, 1985; Hornstein, 1990; Klein, 1994; Olsen, 1997; Smith, 1991; Vendler, 1967.)

The present comprehension experiments focus on English-speaking children's interpretations of tense in three contrasts—auxiliary *will/did*, copula *is/was*, progressive *is/was*—to draw inferences about whether the child's early grammar includes an abstract syntactic marker for tense. By using three contrasts, we can determine the abstractness and generality of the child's knowledge. (The issue is whether children's grammars contain an abstract tense marker, rather than whether children know, about a given morpheme, what tense it encodes. You can know what a noun is without being able to categorize every new noun that you hear.)

Three lines of research are relevant to the current experiment. One has investigated why tense (or agreement) is often absent in the speech of children, particularly those acquiring nonnull subject languages (Ingham, 1998; Meisel, 1994; Schütze & Wexler, 2000; Wexler, 1998; Wexler, Schütze, & Rice, 1998). English-speaking 2- and 3-year-olds often produce verbs with no visible tense marking, whether in spontaneous speech (Valian, 1991; Wexler, 1998), imitation (Valian & Aubry, 2005, where 2-year-olds with mean lengths of utterance [MLUs] between 1.5 and 2.5 imitated regularly inflected past tense verbs only 2% of the time and those with MLUs between 2.5 and 4.6 imitated them 14% of the time), or elicited production (Wexler et al., 1998, where 3-year-olds produced the past tense about half the time; Schütze & Wexler, 2000, where 2-year-olds produced the past tense less than half the time). Further, early in acquisition, both copula and progressive *is/was* are often absent (Valian, 1992; Wilson, 2003) and the growth rates for *is/was* and third person *-s* are distinct, perhaps suggesting the lack of an abstract tense marker (Wilson, 2003). Children's sporadic inclusion of tensed verbs in English is compatible with at least two interpretations, (a) that children represent tense syntactically but do not always lexicalize it (either because of an optional rule or because of performance difficulties or both) and (b) that children do not include tense in their grammars but instead have formulaic or lexically specific

usage. On the latter interpretation, children construct categories rather than begin acquisition with them. The present experiments are designed to choose between the two interpretations.

A second line of research explicitly considers whether children's early uses of tense markers might encode aspect rather than tense or be preferentially used with verbs of a particular aspectual class (Bloom & Harner, 1989; Bloom, Lifter, & Hafitz, 1980; Li & Shirai, 2000; Shirai & Andersen, 1995; Smith, 1980; Wagner, 2001; Weist, 1986, 2003; Weist, Pawlak, & Carapella, 2004). Young children who do not consistently include tense in their sentences use the irregular past and past tense *-ed* preferentially with verbs representing punctual and completed actions (Bloom et al., 1980; Shirai & Andersen, 1995). They similarly use the aspectual marker *-ing* preferentially with verbs representing ongoing action. Such patterns may reflect confusion about the syntactic status of tense (or aspect) markers, the outcome of an initial prototype linking certain tense–aspect–verb combinations (Li & Shirai, 2000), or contextual demands. If either of the first two possibilities were the case, children's grammars would not independently include tense markers but would contain an incorrect hypothesis that later input would have to correct. Children's grammars would thus not demonstrate continuity. The present experiments test whether children represent tense independently of aspect.

The first two lines of research have overlapped recently, with spontaneous speech analyses of the cross-cutting matrix of tensed and untensed verbs on the one hand and aspectual class (e.g., telic vs. atelic) on the other hand (in Brun, Avrutin, & Babyonyshev, 1999; Gavrusseva, 2003; Hyams, in press; Torrence & Hyams, 2004). The latter regularities are complex and vary cross-linguistically but suggest that children do represent tense syntactically.

Children's representation of tense also has implications for a third line of research, that on syntactic categories. If a child does represent tense syntactically, she must also represent the category verb, because tense is a verbal inflection. Thus, the study of tense bears on claims that very young children do not have the category verb in their grammars (e.g., Olguin & Tomasello, 1993; Theakston, Lieven, Pine, & Rowland, 2001; Tomasello, 1992). Previous work on tense and aspect has tacitly assumed that children represent verbs as members of a syntactic category rather than as lexical items that occur in certain frames. The wider significance of work on tense and aspect for the dispute about the category verb has not been noted. A further implication of children's representation of tense concerns the interpretation of the variability in their productions. Although those adopting a lexical-frame approach attribute the variability to lack of knowledge, it could as well be attributed to extrasyntactic processes. Output, rather than knowledge, may be lexically based. The present experiments test the abstractness of children's early representations.

Some of the uncertainty about the status of tense in children's early grammatical representation is no doubt due to the fact that tense and aspect interact differ-

ently depending on the verb phrase, the rest of the sentence, the relevant pragmatics, and the state of affairs being described. Even a child who does represent tense syntactically and independently of aspect could provide unclear data. Difficulty integrating the different requirements could mask a syntactic representation of tense.

Because tense and aspect are intertwined in discourse and often in the same sentence, teasing them apart experimentally has been difficult. In comprehension tasks, 2-year-olds have sometimes appeared to understand tense and temporal adverbs and sometimes not. Weist, Wysocka, and Lyytinen (1991) contrasted the past tense and *will*. Children successfully pointed to one of two drawings after hearing a sentence with a verb either in the past tense (e.g., *threw*—the example provided) or with the modal *will* (e.g., *will throw*), suggesting comprehension of tense. Adverbs were difficult to interpret.

Wagner (2001) contrasted the present progressive, the past progressive, and the present progressive of *go*. Children saw a toy animal perform the same action at three different locations along a road. At the second location, where the action was taking place, the child was asked where the animal *was Xing, is Xing, or is gonna X*; half the verbs were telic and half atelic. The 2-year-olds did not differentiate the present progressive from the past progressive, even with the help of adverbs, whereas 3-year-olds did (Wagner, 2001, Experiment 1, Bonferroni corrections). When 2-year-olds interpreted the past progressive for completed or interrupted events using solely telic predicates, they succeeded only when the past events being demonstrated had been completed, perhaps suggesting a conflation between tense and aspect (Wagner, 2001, Experiment 2).

This study compares 2-, 3-, and 4-year-olds' comprehension of three contrasts—copula *is/was*, auxiliary *will/did*, and progressive *is/was*—to assess the variation across different tense carriers and to determine whether children represent tense syntactically. No previous experiment has investigated tense contrasts over so broad a range of tense carriers. Because a different tense–aspect interaction occurs with each tensed item, a range is required to arrive at a full understanding of children's representations. Children could succeed or fail on any single contrast without that meaning that they do—or do not—understand tense. One tense–aspect interaction might support children's performance whereas another might depress it. The three contrasts used in this study vary the extent to which tense is interwoven with aspect or with lexical meaning.

Copula *is/was* is the cleanest test of the child's understanding of tense, but its comprehension has never been tested. The copula is inherently stative (e.g., de Swart, 1998) and has no lexical meaning independent of the meaning carried by tense. To the extent that aspect can be considered neutral, *is/was* has neutral aspect. If children distinguish *is* and *was*, they are likely to represent tense in their grammars; if they fail to distinguish them, they are unlikely to represent tense syntactically. Children's ability to distinguish *is* and *was* bears on claims that the

forms, when used by young children, are lexically specific or formulaic (Wilson, 2003).

In the case of auxiliary *will/did*, *will* is a non-past tense stand-alone morpheme that lexically conveys the future; *did* is a past tense stand-alone morpheme. *Will* has meaning independent of its tense; *doidid* does not. (Because *will* is in the irrealis mood, it may further cause problems for very young children.) Neither form has a clear aspectual interpretation. Children's understanding of *did* has never been assessed; *will* has been contrasted with the past tense (Weist et al., 1991, where children performed well), but not with a free-standing morpheme carrying the past tense.

Given the tense–aspect interaction, it is not surprising that 2-year-olds have had difficulty with progressive *is/was* (Wagner, 2001). The progressive marker *-ing* on the main verb represents ongoing action, independent of tense. Although ongoing action can take place either in the present or the past, it seems easier to conceptualize as occurring in the present. In spontaneous production, children include progressive *is/was* less often than copula *is/was* (Valian, 1992; Wilson, 2003). Children might thus encode *-ing* as carrying tense plus aspect, or, because *-ing* marks current ongoing activities, it might carry an implicature of the present. On either interpretation, one would predict that children hearing sentences with the progressive would often ignore *be*.

The task here used either pictures or scenarios acted out with props; 2-, 3-, and 4-year-olds pointed to a picture or prop after hearing requests like, “Show me the bear that *is/was* happy,” “Show me the shoe I *will/did* tie,” or “Show me the ball that *is/was* rolling.” Each request incorporated contrastive stress to maximize the chances that children would attend to the tensed element. Three linguistic contrasts—copula *be* (*is/was*), auxiliary *will/did*, and progressive *be* (*is + Ving/was + Ving*)—provided a test of the generality of children's knowledge.

Some children heard adverbs, as a test of whether a lexical cue to tense would improve performance. In children's spontaneous productions, temporal adverbs occur later in development than do verb inflections (Smith, 1980), so it is not clear how much 2-year-olds understand about temporal adverbs. If children do understand adverbs, they should improve performance. Two temporal indicators in a sentence (tense plus adverb) should provide more information than one. Full details of the procedure and scoring are provided in the methods.

The experiment asks three specific empirical questions. (a) At what age can children represent tense independently of aspect? (b) How broad is children's knowledge of the distinction between present and past tense? (c) What is the contribution of temporal adverbs? The empirical questions are aimed at wider theoretical questions about children's early syntactic representations. Do children have abstract syntactic categories, including tense and verb, at the outset of combinatorial speech? Do they represent tense independently from aspect? Is children's first grammar continuous, in the sense of using the same elements, with their later grammars?

METHOD

Participants and Settings

All children. Seventy-three monolingual English-speaking 2-, 3-, and 4-year-olds with middle- to upper-middle-class parents, who were recruited through day care centers, personal contacts, and direct marketing mailing lists, provided the comprehension data. Children were tested at home, at day care centers, or in the laboratory. Pilot testing with 32 other 2-year-olds determined the choice of stimuli and procedures. An additional twenty-seven 2-year-olds were excluded because of failure to complete the task or failure to provide enough responses; most of them had been introduced earlier to an imitation task that they did not find compelling.

The 2-year-olds. Thirty-two children provided data. The children ranged in age from 2;0 to 2;11 with a mean of 2;5 ($SD = 2.9$ months). Children's speech was audiotaped and transcribed; the children's spontaneous MLUs (calculated following Brown's, 1973, rules) ranged from 1.53 to 5.11, with a mean of 2.69 ($SD = .98$). For the 21 children who received no adverbs, the mean age was 2;5 and the mean MLU was 2.81; for the 11 children who received adverbs, the mean age was 2;4 and the mean MLU was 2.47. Age and MLU were highly correlated ($r = .61, p < .001$). A subset ($n = 19$) of the 32 children had previously completed an imitation task.

The 3-year-olds. The thirty-two 3-year-olds ranged in age from 3;0 to 3;11, with a mean of 3;4 ($SD = 2.8$ months). Because the children's speech was so advanced, it was not audiotaped and MLUs were not calculated. The 18 children who did not receive an adverb had an average age of 3;4 ($SD = 2.4$ months), as did the 14 children who received an adverb ($SD = 3.3$ months).

The 4-year-olds. The nine 4-year-olds ranged in age from 4;0 to 4;10, with a mean of 4;5 ($SD = 1.3$ months). The children's speech was not audiotaped and MLUs were not calculated.

Pilot Testing

Pilot work with thirty-two 2-year-olds helped develop materials. We needed (a) to have the same scenario as a frame for contrasting tenses within a verb type; (b) to act out or pictorially represent the contrasts; (c) to find objects and drawings that would engage the child, be equally plausible in both present and past tense forms, and be varied enough to lessen the likelihood of the development of a nonlinguistic strategy; (d) to use words that 2-year-olds would know; and (e) to provide few if any nonlinguistic cues.

Modal contrasts (*can/could*, *may/might*, *will/would*, and *shall/should*) were excluded because the interpretations of the non-past and past tense in each pair overlap too much with each other. The simple present and past (*-s/-ed*) was excluded because English speakers use either copula or progressive *is/was* to describe a here-and-now condition (although some verbs, such as *know*, require the simple present).

For pictures, we first tested a version in which we had two sets of pictures in an attempt to mimic change. For example, for the crying girl, we first accompanied our narration, "I know two girls who cry. Cry, cry." with pictures of two girls with tears and then showed pictures with one girl with tears and the other smiling. The 2-year-olds seemed to be confused by this technique, unable to make the leap from the first set of pictures to the second set. We thus eliminated the setup pictures and the children appeared to find the task easier.

General Procedure

For 27 of the thirty-two 2-year-olds there were two audiotaped sessions lasting 45 min to an hour (the first session being used to gather spontaneous speech and attempt an imitation task); 5 children were audiotaped once. At Session 1 the experimenter introduced himself or herself to the child, brought out *Richard Scarry's Best Word Book Ever* (Scarry, 1963/1991), and used the book to develop rapport with the child and gather spontaneous speech so that MLU could be calculated. After approximately 20 min of conversation, the experimenter introduced an elicited imitation task as a game. The comprehension task was also completed on Session 1 for 5 children and in Session 2 for 27 children. The interval between sessions averaged 6 days. The imitation data are not reported.

The 3- and 4-year-olds were seen once and were not audiotaped. The experimenter used *Richard Scarry's Best Word Book Ever* (Scarry, 1963/1991) to develop rapport with the child and then introduced the comprehension task.

Transcription

The experimenter noted the child's comprehension for each item online via a prepared form that required only the circling of an item. For 2-year-olds, sessions were audiotaped and were transcribed by one experimenter and completely reviewed by at least one other person. The transcriber and checker then reviewed the transcript together to reach consensus on a final version.

Stimuli and Procedure

The task here was more similar to Weist et al.'s (1991) than Wagner's (2001). Weist et al. had children point to a picture. Wagner had children point to a location where an activity had taken place, was taking place, or would take place.

Ten practice items and 48 experimental items were constructed. See Appendix B for all items. The practice items were designed to accustom the child to using contrastive stress to point to a prop (typically a small toy or animal) or a picture (a hand-colored line drawing). Props were kept in shoe boxes; pictures were arranged in a predetermined order in an 8 1/2-in. × 11-in. binder. The stimuli were very popular with the children.

In general with props, the items were either identical or similar in all but one respect. For example, a scenario involving fish kissing a frog had two fish of the same size and texture but slightly different shape and coloring. A scenario involving toothpaste had two small tubes of the same size but different brands. In general with pictures, the two items came from the same basic drawing but were colored differently in order to make clear that there were two different entities.

The experimenter and child sat opposite each other on the floor. We provided a small pillow for the child to sit on, which we called the "surprise seat." The experimenter provided a minimal introduction to the task, saying he or she had a game with a lot of things to show the child. If the child wandered, we asked him or her to return to the surprise seat for the next item.

In a typical practice item using props, the experimenter placed a large and a small fire truck on the floor in front of the child and said, "Look, two different fire trucks. Show me the *little* one," stressing the word *little*. In a typical practice item involving pictures, the experimenter opened a binder that showed the child two pictures of bears, one on each side of the binder. In one the bear was wide awake, in the other it was sleeping. The experimenter said, "Look, two bears. Show me the one that *sleeps*," stressing the word *sleeps*. Most children heard eight practice items before moving on to the experimental items, in order to become accustomed to using the stressed item as the critical word for directing the point. Stress may not be well understood by young children (Cutler & Swinney, 1987; McDaniel & Maxfield, 1992). The practice items implicitly taught the use of contrastive stress and accustomed the children to the game. An additional two items were used if the child seemed to require more time to understand the task.

For the experimental sentences, we employed contrastive stress on the tensed element. Sentences with *did* are grammatical only if *did* is stressed; stressing only one tense-carrying element among the set of six was undesirable. Further, because the tensed elements used here are often hard to hear, we wanted to reduce the possibility of failure due to low detectability of the element carrying tense. For the adverb condition, we continued to apply contrastive stress to the tensed form, while also applying secondary stress to the adverb.

For the 48 experimental items, each of 24 template items existed in present (or non-past) or past tense form. There were 8 templates for each of the three types of tense carriers (auxiliary *will/did*, copula *is/was*, progressive *is/was*). One example from each tense carrier will indicate how the props and pictures were used. For one item for *will* and *did*, the experimenter brought out two baby shoes, both of which

were untied, placed them side by side before the child on the floor, and said, “Look! Two shoes. I want to tie both of them.” The experimenter proceeded to tie one of the shoes. After tying a shoe, she or he said either, “Show me the one I *did* tie” or, “Show me the one I *will* tie,” depending on what was determined for that session. In all cases, the event (e.g., of tying the shoe) was completed before the child was asked the question. The auxiliary contrast allows a test of tense where lexical meaning supports one member of the contrast (*will*).

For copula *is/was* the states depicted were temporary (although in other contexts could be permanent), such as being *happy, little, wet, sunny*. In an example contrasting *is* and *was*, the experimenter brought out two small cardboard bears whose body parts could be separately removed and said, “See these two teddy bears? See how happy?” Next the experimenter replaced the happy face on one of the bears with a sad face. Then the experimenter said either “Show me the bear that *is* happy” or “Show me the bear that *was* happy.” Two-year-olds are somewhat less likely to include the copula in their spontaneous speech if the predicate reflects a temporary rather than a permanent state, though the difference is relatively small and varies substantially across children (Becker, 2004). If spontaneous production is relevant to comprehension, children should have a tendency to ignore the copula in our sentences. The copula allows a test of tense where aspect is neutral.

All of the scenarios and pictures with progressive *is/was* demonstrated ongoing actions for atelic verbs with no inherent stopping point (activities rather than accomplishments), such as *cry, roll, run, hide, and ride*. In an item with props, the experimenter showed the child two crayons and then simultaneously rolled each of them back and forth, one under each hand. After stopping rolling one of the crayons, the experimenter asked the child either to show the one that *is* rolling or *was* rolling. In an item with pictures, the experimenter opened a binder to two blue blank pages and said, for example, “I know two girls who cry. Cry, cry.” The experimenter then turned the page to display colored line drawings of two girls, identical in almost all respects but with differently colored clothing, one on each side of the binder. One girl had tears on her cheeks; the other had a dry face and a smile. The experimenter asked either “Show me the one that *is* crying” or “Show me the one that *was* crying.”

We expected the progressive to be particularly difficult for 2-year-olds, both on the basis of earlier research (Wagner, 2001) and because the aspect marker *-ing* suggests ongoing activity. In each pair of pictures or props one action was ongoing when the experimenter queried the child. The past progressive allows an assessment of how well children can do when tense and aspect are implicitly at odds.

Another possible contributor to difficulty with the past progressive is that the girl who is crying also, by inference, had been crying; the crayon that is rolling had been rolling. A similar difficulty holds for the copula. The bear that is happy also had been happy. To be successful with *was*, the child must recognize the contrast implied by the stress and follow the logic out—was but is not now. Whether chil-

dren, especially 2-year-olds, can follow the involved logic of this situation is not known.

There were four sets of stimuli, comprising two different orders of each of two counterbalanced sets. Pilot testing eliminated item pairs where children showed a marked preference for one or the other item. Across children, items were counterbalanced so that each sentence appeared in present or past tense an equal number of times and so that each correct choice appeared on the right or left an equal number of times. Within a session, items were arranged in pseudorandom order, so that (a) the first 12 sentences included two examples of each combination of tense and type of tense carrier, (b) no tense or carrier occurred more than two times in a row, and (c) no more than two pictures or props occurred in a row.

For children who heard the requests with adverbs, the stimuli, procedure, and scoring were identical, except that adverbs were added to the end of each sentence. For the auxiliary *will/did* contrast, we added *next* to *will* sentences (Wagner, 2001, used *next* with *is gonna*) and *already* to *did* sentences (Wagner used *already* with *was Ving*). For the copula and progressive contrasts, we added *right now* to *is* sentences (Wagner used *right now* with *is Ving*) and *just before* to *was* sentences (Wagner used *before* with *was Ving*).

Design

For each of the four versions of the experiment, the experimenter had a printed form indicating the order of stimuli, whether the stimulus was a prop or picture, which prop in each pair should be placed on the right (the pictures were prearranged in the correct order in binders), and which tense to use. She or he circled on the form which item the child chose. If a child did not point to a prop or picture after the first presentation, the experimenter repeated the item a maximum of two additional times.

For 2-year-olds who did not hear an adverb, 11% of items to which the child provided a response had been presented two times, and less than 1% had been presented three times. For 2-year-olds who heard an adverb, double presentations of the items occurred for only 3% of the children's responses and triple presentations less than 1%. For the 3- and 4-year-olds, double presentations were necessary less than 1% of the time and triple presentations never.

Scoring and Dependent Measures

Scorable responses. To be included in the experiment, the child was required to provide a minimum of 2 scorable responses to each of the six tense/tense-carrier categories for a total of at least 12 scorable responses out of 24. Responses were noted online on the score sheet by the experimenter. The experimenter also noted any interesting features of the child's response. Failures to re-

spend, responses that occurred before the experimenter finished his or her request, and ambiguous responses were all scored as not applicable.

Dependent measures. As is evident, the task involves numerous cognitive challenges. The child must interpret and remember the statements that set the scene, understand the scenario, interpret the follow-up request, use contrastive stress (or at least not be disturbed by it), have a basic knowledge of present and past tense, overcome any tendency to point to the stimulus which may be more compelling for that child at that time, and overcome any conflicting aspectual interpretations. Given the difficulty, children are likely to use some nonsyntactic strategies. An obvious strategy to use with the copula or progressive is to match the post *-be* predicate to the scenario or picture. If, for example, the child hears "Show me the one that *is/was* happy" and selectively attends to *happy*, she will pick the bear with a smile regardless of the tense of the verb. Similarly, if the child hears "Show me the one that *is/was* crying" and attends to *crying*, she will pick the girl with tears on her face. In the case of *will/did*, a matching strategy does not yield clear-cut results. If the child hears "Show me the one I *will/did* blow up" and attends to *blow up*, that neither uniformly leads her to choose the balloon which had been blown up nor the one about to be blown up.

Because children might bring various nonsyntactic strategies to the experimental situation, their absolute performance is of less value than their ability to respond differentially to the tenses. If a child uniformly adopts a matching strategy she will not distinguish between the present and past tense in the copula or progressive. If, for example, children respond correctly 100% of the time to *is* but also respond incorrectly 100% of the time to *was*, they are not showing genuine knowledge of either the present or past tense. We thus measure not percentage correct for each item but the extent to which the children treat the two tenses as the same: we measure the percentage of present (or non-past) responses to each morpheme. If the mean difference is significantly greater than zero, the children understand tense.

RESULTS

The 2-Year-Olds

The key questions were (a) whether 2-year-olds would distinguish between present and past tense (which would be revealed by a main effect for tense in an omnibus analysis), (b) whether the children's 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), and (c) whether the children's responses would vary depending on the presence or absence of a

temporal adverb (which would be revealed by a main effect for adverb or interactions involving adverb). In summary, the 2-year-olds distinguished the tenses very well with auxiliary *will/did*, next best with copula *be*, and were unsuccessful with progressive *be*; adverbs generally did not improve performance.

A 3 (tense-carrier type: auxiliary *will/did*, copula *be*, progressive *be*) \times 2 (tense: non-past, past) \times 2 (adverb: no adverb, adverb) analysis of variance (ANOVA) examined children's comprehension of the distinction between the tenses. We compared the percentage of non-past type responses to both non-past (*will*, copula *is*, and progressive *is*) and past tense (*did*, copula *was*, and progressive *was*). Because MLU was not significant for any comparison, the data were collapsed across MLU group.

The omnibus ANOVA revealed a main effect for tense, $F(1, 30) = 25.32, p < .001$. The 2-year-olds appropriately gave more non-past type responses overall to non-past items (79%) than to past tense items (52%). There was also a main effect for type of tense carrier, $F(2, 60) = 21.46, p < .001$, with responses to *will/did* showing the least non-past bias (48%, collapsed across the two tenses) and responses to progressive *is/was* showing the greatest bias (80%). As shown in Figure 1, children distinguished better between the tenses in some contrasts than others; the interaction between tense and type of carrier was significant, $F(2, 60) = 7.78, p$

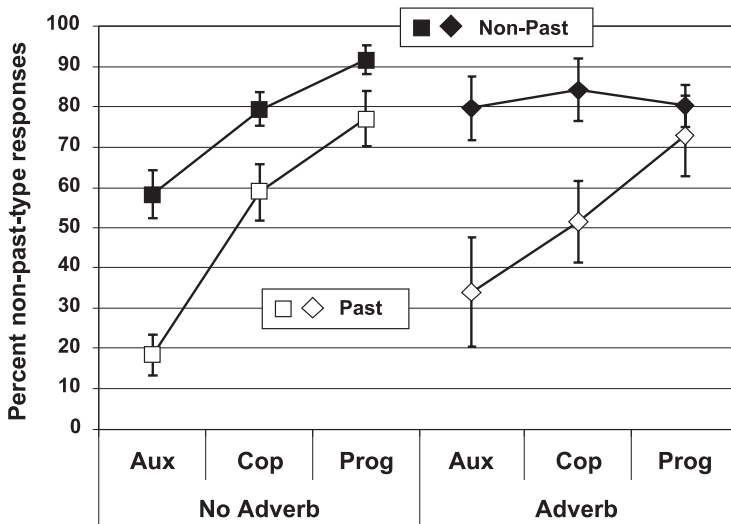


FIGURE 1 Percentage of 2-year-olds' non-past type responses to present and past tense verbs, with and without adverbs (squares vs. diamonds, respectively). Note that Aux(iliary) non-past is *will*, Aux(iliary) past is *did*; Cop(ula) non-past is *is*, Cop(ula) past is *was*; Prog(ressive) non-past is *is*, Prog(ressive) past is *was*.

= .001. Figure 1 also displays the interaction between adverb and type of tense carrier, $F(2, 60) = 3.63, p < .04$. Overall, adverbs had little impact. There was no main effect for adverb presence or absence and no interaction between adverb and tense, only between adverb and type of carrier.

A univariate analysis for the auxiliary *will/did* showed that children drew the distinction easily, 66% non-past responses to *will* versus 24% to *did*, $F(1, 30) = 32.7, p < .001$, with or without adverbs. Adverbs increased the *overall* rate of non-past tense responding from 38% to 57%, $F(1, 30) = 5.26, p < .03$, but did not interact with tense. To the extent that adverbs had an effect, then, it was localized to increasing non-past type responses for both *will* and *did*.

A comparison of copula and progressive *is/was* demonstrated that children distinguished between non-past (85%) and past (66%) tense, $F(1, 30) = 12.01, p = .002$, but there was also an effect of type of tense carrier. Children provided more non-past responses overall to the progressive than the copula, 80% versus 68%, $F(1, 30) = 9.34, p = .005$, showing the impact of *-ing*. Adverb was not a significant main effect nor did it interact with tense or type of tense carrier. The interaction between type of tense carrier and tense was marginal, $F(1, 30) = 3.51, p = .071$. Separate univariate analyses showed a significant effect of tense for the copula, 81% non-past responding to *is* versus 56% for *was*, $F(1, 30) = 17.89, p < .001$, but not for the progressive (88% vs. 76%). Thus, children distinguished between present and past tense better with the copula than the progressive. In neither analysis did adverb play a role.

The 3-Year-Olds

Like the 2-year-olds, 3-year-olds were biased to give non-past type responses and performed best on the *will/did* contrast, as can be seen in Figure 2. Unlike 2-year-olds, however, 3-year-olds performed equally well on copula and progressive *be*. Further unlike 2-year-olds, 3-year-olds benefited from adverbs.

The $3 \times 2 \times 2$ omnibus ANOVA showed that the 3-year-olds produced significantly more non-past type responses to non-past (91%) than past tense (48%) forms, $F(1, 30) = 25.32, p < .001$. They produced more non-past responses overall to copula (81%) and progressive *is/was* (83%) than to *will/did* (45%), as the significant effect for type of tense carrier shows, $F(2, 60) = 21.46, p < .001$. There was also an interaction between tense and type of tense carrier, $F(2, 60) = 7.78, p = .001$. Although there was no main effect for adverb, adverb did interact with type of tense carrier, $F(2, 60) = 3.63, p < .04$, particularly helping children with the copula.

A univariate analysis of the auxiliary *will/did* showed that 3-year-olds produced many more non-past type responses to *will* (81%) than to *did* (9%), $F(1, 30) = 168.99, p < .001$. Like 2-year-olds, 3-year-olds found this distinction the easiest to draw. Adverbs tended to increase the *overall* rate of non-past responding, from 40% to 51%, a

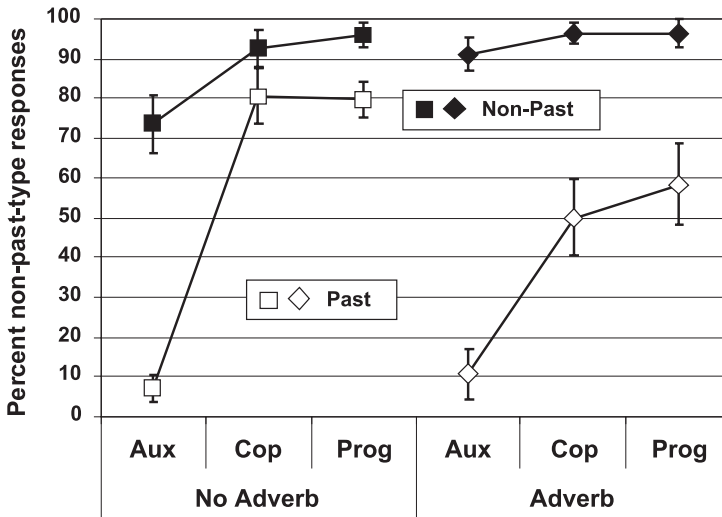


FIGURE 2 Percentage of 3-year-olds' non-past type responses to present and past tense verbs, with and without adverbs (squares vs. diamonds, respectively). Note that Aux(iliary) non-past is *will*, Aux(iliary) past is *did*; Cop(ula) non-past is *is*, Cop(ula) past is *was*; Prog(ressive) non-past is *is*, Prog(ressive) past is *was*.

marginal effect, $F(1, 30) = 3.5, p < .08$. That was again similar to 2-year-olds. Finally, as with 2-year-olds, there was no interaction between tense and adverb.

A comparison of copula and progressive *is/was* found no effect of type of tense carrier and no interaction between type of tense carrier and any other variable. Unlike the 2-year-olds, the 3-year-olds performed equivalently on the copula and the progressive. They properly provided significantly more non-past type responses to copula and progressive *is* (95%) than to copula and progressive *was* (69%), $F(1, 30) = 29.27, p < .001$. The main improvement from age 2 to age 3, then, was increased present-type responding to the present tense.

The 3-year-olds provided more present-tense type responses to *is/was* when they did not hear an adverb (87%) compared to when they did (75%), $F(1, 30) = 4.9, p = .035$. Adverbs depressed present-tense responding. But that main effect was qualified by an interaction between tense and adverb, $F(1, 30) = 7.29, p < .02$. The reduction of present-tense type responses occurred only to past tense items. Even without adverbs, the 3-year-olds distinguished *is* and *was*. An analysis restricted to the no-adverb condition also showed an effect for tense, $F(1, 17) = 6.23, p = .023$, no effect for type of tense carrier, and no interaction.

A univariate analysis for copula *is/was* showed that the 3-year-olds produced more non-past type responses to *is* (94%) than to *was* (67%), $F(1, 30) = 20.34, p < .001$. They also produced more total non-past responses when they did not hear an adverb (87%) than when they heard an adverb (73%), $F(1, 30) = 4.477, p = .043$.

That main effect was qualified by a significant interaction between tense and adverb, $F(1, 30) = 7.04, p < .02$. The addition of the adverb particularly reduced non-past responding to *was*, from 81% to 50%.

A similar analysis for progressive *is/was* showed that the 3-year-olds produced more non-past responses to *is* (96%) than to *was* (70%), $F(1, 30) = 22.77, p < .001$. They also tended to produce more non-past responses when they did not hear an adverb (88%) than when they did (77%), $F(1, 30) = 3.34, p < .08$. Finally, there was a marginal interaction between tense and adverb, $F(1, 30) = 3.7, p < .07$. The addition of the adverb reduced non-past responding to *was* from 80% to 58%.

The 4-Year-Olds

The 4-year-olds showed excellent performance on all three types of tense carriers, as shown in Figure 3. The main effect of tense was significant, $F(1, 8) = 21.53, p = .002$. Children responded with non-past responses 88% of the time to non-past items and only 21% of the time to past tense items. There was no effect of type of tense carrier and no interaction.

DISCUSSION

The experiments here answered three empirical questions. First, at what age can children represent tense independently from aspect? Answer: Even 2-year-olds

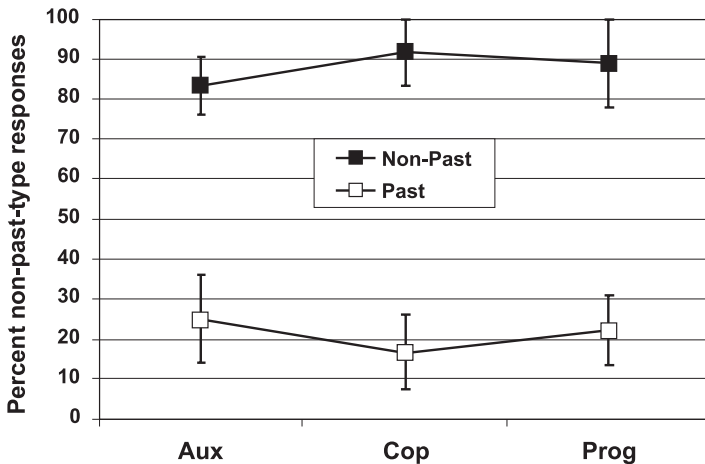


FIGURE 3 Percentage of 4-year-olds' non-past type responses to present and past tense verbs, without adverbs. Note that Aux(iliary) non-past is *will*, Aux(iliary) past is *did*; Cop(ula) non-past is *is*, Cop(ula) past is *was*; Prog(ressive) non-past is *is*, Prog(ressive) past is *was*.

distinguish between present (or non-past) and past tense in comprehension; even 2-year-olds represent tense syntactically and represent tense independently from aspect.

Second, how broad is children's knowledge of the distinction between the present (or non-past) and past tense? Answer: The 2-year-olds' performance was good on auxiliary *will* and *did* and on copula *is* and *was*, but did not extend to progressive *is* and *was*. The 3-year-olds distinguished between present and past on all three contrasts. "Expert" performance appeared at age 4. The 4-year-olds understand the significance of a verb in present or past tense independent of aspect, any other element of a sentence, or any properties of the scenarios being described. They perform equally on all contrasts. There is almost a quantum jump between 3 and 4.

Third, what is the contribution of lexical meanings, either in the form of *will* or temporal adverbs like *right now* and *just before*? Answer: Lexical meanings do not help 2-year-olds to distinguish present and past tense (replicating Wagner, 2001, Experiment 1, Bonferroni results). The 2-year-olds' successes are based on syntax not meaning. First, adverbs only increased variability for 2-year-olds, although they helped 3-year-olds with copula and progressive *was* (as in Wagner, 2001, Experiment 1). Second, 2-year-olds performed very well with *did*, a syntactic element with no inherent meaning; if anything, they performed better with *did* than with *will*. Success with *did* demonstrates that the past tense is not automatically difficult for 2-year-olds (perhaps, in this case, because children were aided by its realis status), and thus is not the reason children had difficulty with progressive *was*. The attention-catching properties of the completed actions with *will* and *did*, such as a blown-up balloon or a tied shoe, are also unlikely to be the reason for good performance with *did*, because the actions with *was* were comparably eye-catching.

After considering some of the details of the results, we will turn to the wider issues that these experiments address. The value of multiple contrasts and multiple items per contrast in a comprehension task is clear from the present experiment. Success or failure on any single contrast or item tells at most a partial story. Depending on the contrast being tested, the child might appear to understand tense or not. When aspect plays a minimal role, as in the test case of the copula, all children successfully distinguish between *is* and *was*. The 2-year-olds' success suggests that, when aspect neither helps nor interferes, children can rely on tense alone. Prior work proposing that children conflate tense and aspect is based in part on spontaneous production, where children show preferred links between different types of inflections and different types of verbs (e.g., *-ing* with durative verbs, Bloom et al., 1980) and in part on a single comprehension contrast where tense and aspect are implicitly in conflict (i.e., the progressive in Wagner, 2001).

The 2- and 3-year-olds' performance was, however, imperfect. They often appeared to interpret sentences with *is* and *was* as if those elements were absent, attending only to the state described by the predicate adjective, noun, or preposi-

tional phrase. For example, with *is/was happy*, both 2- and 3-year-olds often chose the bear bearing a smile at the time of the request “Show me the one that *was* happy.” The relatively high rate of responding to *was* as if it were *is*, especially with the progressive, suggests that the 2- and 3-year-olds often did not attend to the tense carrier.

One possible reason children ignored the copula *is* that the temporary states depicted in the stimuli encouraged such lack of attention (Becker, 2004); another is that the stative character of the copula played a role. For the progressive, a relevant point is that children more frequently omit progressive than copula *is/was* in spontaneous speech (Valian, 1992; Wilson, 2003). Finally, the power of the morpheme *-ing* is apparent: *-ing* not only increased children’s *is*-type responses to progressive *was* compared to copula *was*, but it also increased their *is*-type responses to progressive *is* compared to copula *is*; *-ing* is a compelling suffix. The best explanation for the 2-year-olds’ failure with the past progressive, when considered along with their successes with the auxiliary and the copula, is not that tense and aspect are conflated but that aspect can trump tense. Weist et al. (2004) make a different but related point, that tense contrasts emerge early in development, but are expressed within aspectual types.

The task here required attention to tense as a cue to action. In natural conversation, a very young child can safely ignore that cue much of the time, either because the tense matters little or because it can be inferred from other cues. The experiments here suggest that children frequently do not attend to tense but that they understand it when they do attend. Despite nonlinguistic strategies or preferred tense–aspect matches, even 2-year-olds successfully distinguished copula *is* and *was*, providing strong evidence of knowledge of syntactic tense.

One 4-year-old responded immediately to the first two *was* items that he heard, both progressives, as if they were *is*. With the third *was* item, a copula, he pointed to the incorrect choice, then to the correct choice, then stopped, clearly torn, and said, “I don’t know.” After that he responded correctly to the remaining two progressive and three copula *was* items. (Recall that *was* items were interspersed with other items.) The task requires children to integrate multiple pieces of information and may be difficult in part for that reason. With younger children, we had sometimes observed a child gaze at the correct choice for *was* as she was pointing to the incorrect choice, reminiscent of theory-of-mind work showing that young children’s implicit knowledge is not necessarily translated into action (Clements & Perner, 1994; Garnham & Perner, 2001). Measuring reaction time or gaze would provide a more sensitive measure of children’s knowledge and their decision processes.

We can return now to the three literatures on which the current experiments bear. Do children have abstract syntactic categories, including tense and verb, at the outset of combinatorial speech? The data here say yes. The 2-year-olds’ performance demonstrates abstract syntactic categories early in acquisition. The data ar-

gue against suggestions that children's early knowledge is limited to individual lexical items in particular lexical frames (contra, e.g., Olguin & Tomasello, 1993; Theakston et al., 2001; Tomasello, 1992) or is semantically based. The children here were unlikely to have heard any of our tense carriers in any of the contexts we used; they certainly had never been faced with a task like our comprehension task. A fortiori, if children represent the syntactic feature tense, they also represent the syntactic category verb.

Do children represent tense independently from aspect? Again, the answer is yes. The aspect-first hypothesis receives no support from the data here. Although the children's behavior with the progressive in particular shows that tense and aspect interact, their behavior with the copula *is/was* and with the auxiliary *will/did* shows that tense is separate from aspect in children's grammars even at age 2. Children's spontaneous speech has revealed a preference for using tense and aspect markers preferentially with specific verbs. Very young children tend to use *-ed* or the irregular past tense with verbs that suggest a completed action of short duration, such as *broke*, and *-ing* with verbs that suggest ongoing action (Bloom et al., 1980). Our interpretation is that children prefer to use the past tense marker and the aspectual marker *-ing* when each is maximally compatible with lexical aspect, but that preference does not bespeak an underlying confusion about the syntactic status of either tense or aspect.

The fact that children represent tense independently from aspect also constrains explanations of young children's frequent failure to use overt tense when required in languages like English. The hypothesis that children's speech lacks tense because their grammars lack tense (e.g., Radford, 1990) receives no support from the data here. Variations in children's ability to supply tense correctly in spontaneous speech might be due to an optional representation of tense (e.g., Wexler, 1998), to the difficulty of interpreting tense semantically and pragmatically, or to the difficulty of including tense and other syntactic elements in the production of an utterance. Production presents a complex problem, one which children often appear to solve by leaving elements out.

Is children's first grammar continuous, in the sense of using the same elements, with their later grammars? Again, the answer is yes. Children add items to categories and flesh out their understanding of how particular categories behave in their language, but by the onset of combinatorial speech at around age 2, children's grammars include the same abstract syntactic categories that they will contain at age 4.

In conclusion, the comprehension data show that as early as age 2, children represent tense syntactically, differentiate present and past tense, and understand the difference between them. Nonsyntactic aspects of a sentence and surrounding context play a role, but tense independently contributes to children's understanding of a sentence. How should we understand the developmental improvement in children's performance? The task here was clearly challenging. A correct response re-

quired the integration of many different strands, such as the syntax of tense and aspect, individual word meanings and lexical aspect, the semantics and pragmatics of tense and aspect, the situation being observed and described, and the relation between the situation and the description provided. Given the evidence that the children understood tense, a better explanation of their difficulties and apparent lapses than the absence of tense in their syntactic representations is the problem of integrating the various domains to represent the structure of a complex event (Gleitman, Cassidy, Nappa, Papafragou, & Trueswell, 2005). What develops as children age is not their syntactic understanding of tense but their understanding of how to fit together the syntax of tense and aspect with the semantics and pragmatics of temporal and aspectual terms and their ability to integrate information in comprehension and production.

ACKNOWLEDGMENTS

This research was supported in part by Grant RO3MH055353 from the National Institute of Mental Health and in part by grants from The City University of New York PSC-CUNY Research Award Program. For their fine work, I thank the assistants and interns on the project: J. Batke, D. Byrnes, A. Buchwald, S. Madsen, M. Monteleone, C. Mahoney, T. Nicol, and S. Turner. I thank the children and parents who so generously contributed their time and effort. I acknowledge the helpful comments of M. den Dikken, A. Gabriele, G. Martohardjono, and M. C. Potter. Finally, I thank the three anonymous reviewers, the associate editor, and the editor for their comments; rarely has an author received such knowledgeable, thoughtful, and constructive criticism. Potential contributors—take note!

REFERENCES

- Bach, E. (1986). The algebra of events. *Linguistics and Philosophy*, 9, 5–16.
- Becker, M. K. (2004). Copula omission is a grammatical reflex. *Language Acquisition*, 12, 157–167.
- Binnick, R. (1991). *Time and the verb*. Oxford, UK: Blackwell.
- Bloom, L., & Harner, L. (1989). On the developmental contour of child language: A reply to Smith & Weist. *Journal of Child Language*, 16, 207–216.
- Bloom, L., Lifter, K., & Hafitz, J. (1980). Semantics of verbs and the development of verb inflection in child language. *Language*, 56, 386–412.
- Brown, R. (1973). *A first language*. Cambridge, MA: Harvard University Press.
- Brun, D., Avrutin, S., & Babyonyshev, M. (1999). Aspect and its temporal interpretation during the optional infinitive stage in Russian. In A. Greenhill, H. Littlefield, & C. Tano (Eds.), *Proceedings of the 23rd Annual Boston University Conference on Language Development* (Vol. 1, pp. 120–131). Somerville, MA: Cascadilla Press.
- Clements, W. A., & Perner, J. (1994). Implicit understanding of belief. *Cognitive Development*, 9, 377–397.

- Comrie, B. (1976). *Aspect*. Cambridge, UK: Cambridge University Press.
- Comrie, B. (1985). *Tense*. Cambridge, UK: Cambridge University Press.
- Cutler, A., & Swinney, D. (1987). Prosody and the development of comprehension. *Journal of Child Language*, 14, 145–167.
- Enç, M. (1996). Tense and modality. In S. Lappin (Ed.), *Handbook of contemporary semantic theory* (pp. 345–358). Oxford, England: Blackwell.
- Garnham, W., & Perner, J. (2001). Actions really do speak louder than words—but only implicitly: Young children's understanding of false belief in action. *British Journal of Developmental Psychology*, 19, 413–432.
- Gavrusseva, E. (2003). Aktionsart, aspect, and the acquisition of finiteness in early grammar. *Linguistics*, 41, 723–755.
- Gleitman, L. R., Cassidy, K., Nappa, R., Papafragou, A., & Trueswell, J. (2005). Hard words. *Language Learning and Development*, 1, 23–64.
- Hornstein, N. (1990). *As time goes by*. Cambridge, MA: MIT Press.
- Hyams, N. (in press). Aspect matters. In K. U. Deen, J. Nomura, B. Schulz, & B. D. Schwartz (Eds.), *Proceedings of the Inaugural Conference on Generative Approaches to Language Acquisition—North America (GALANA)*. Cambridge, MA: UConn/MIT Working Papers in Linguistics.
- Ingham, R. (1998). Tense without agreement in early clause structure. *Language Acquisition*, 7, 51–81.
- Klein, W. (1994). *Time in language*. New York: Routledge.
- Li, P., & Shirai, Y. (2000). *The acquisition of lexical and grammatical aspect*. Berlin, Germany: Mouton de Gruyter.
- McDaniel, D., & Maxfield, T. (1992). Principle B and contrastive stress. *Language Acquisition*, 2, 337–358.
- Meisel, J. M. (1994). Getting FAT: Finiteness, agreement and tense in early grammars. In J. M. Meisel (Ed.), *Bilingual first language acquisition: French and German grammatical development* (pp. 89–129). Amsterdam: Benjamins.
- Olguin, R., & Tomasello, M. (1993). Twenty-five-month-old children do not have a grammatical category of *verb*. *Cognitive Development*, 8, 245–272.
- Olsen, M. B. (1997). *A semantic and pragmatic model of lexical and grammatical aspect*. New York: Garland.
- Radford, A. (1990). *Syntactic theory and the acquisition of English syntax*. Oxford, England: Blackwell.
- Scarry, R. (1991). *Richard Scarry's best word book ever*. New York: Golden Book. (Originally published in 1963)
- Schütze, C. T., & Wexler, K. (2000.) An elicitation study of young English children's knowledge of tense: Semantic and syntactic properties of optional infinitives. In S. C. Howell, S. A., Fish, & T. Keith-Lucas (Eds.), *Proceedings of the 24th Annual Boston University Conference on Language Development* (Vol. 2, pp. 669–683). Somerville, MA: Cascadilla Press.
- Shirai, Y., & Andersen, R. W. (1995). The acquisition of tense–aspect morphology: A prototype account. *Language*, 71, 743–762.
- Smith, C. S. (1980). The acquisition of time talk: Relations between child and adult grammars. *Journal of Child Language*, 7, 263–278.
- Smith, C. S. (1991). *The parameter of aspect*. Dordrecht, The Netherlands: Kluwer.
- de Swart, H. (1998). Aspect shift and coercion. *Natural Language and Linguistic Theory*, 16, 347–385.
- Theakston, A. L., Lieven, E. V. M., Pine, J. M., & Rowland, C. F. (2001). The role of performance limitations in the acquisition of verb–argument structure: An alternative account. *Journal of Child Language*, 28, 127–152.
- Tomasello, M. (1992). *First verbs: A case study of early grammatical development*. Cambridge, England: Cambridge University Press.

- Torrence, H., & Hyams, N. (2004). On the role of aspect in determining finiteness and temporal interpretation in early grammar. In J. van Kampen & S. Baauw (Eds.), *Proceedings of GALA 2003* (Vol. 2, pp. 481–491). Utrecht, The Netherlands: LOT.
- Valian, V. (1991). Syntactic subjects in the early speech of American and Italian children. *Cognition*, 40, 21–81.
- Valian, V. (1992). Categories of First Syntax: *Be*, *be+ing*, and nothingness. In J. M. Meisel (Ed.), *The acquisition of verb placement: Functional categories and V2 phenomena in language development* (pp. 401–422). Dordrecht, The Netherlands: Kluwer.
- Valian, V., & Aubry, S. (2005). When opportunity knocks twice: Two-year-olds' repetition of sentence subjects. *Journal of Child Language*, 32, 617–641.
- Vendler, Z. (1967). *Linguistics in philosophy*. Ithaca, NY: Cornell University Press.
- Wagner, L. (2001). Aspectual influences on early tense comprehension. *Journal of Child Language*, 28, 661–681.
- Weist, R. M. (1986). Tense and aspect: Temporal systems in child language. In P. Fletcher & M. Garman (Eds.), *Language acquisition: Studies in first language development* (pp. 356–374). Cambridge, England: Cambridge University Press.
- Weist, R. M. (2003). Review of Ping Li & Yasuhiro Shirai, *The acquisition of lexical and grammatical aspect*. *Journal of Child Language*, 30, 237–251.
- Weist, R. M., Pawlak, A., & Carapella, J. (2004). Syntactic-semantic interface in the acquisition of verb morphology. *Journal of Child Language*, 31, 31–60.
- Weist, R., Wysocka, H., & Lytinen, P. (1991). A cross-linguistic perspective on the development of temporal systems. *Journal of Child Language*, 18, 67–92.
- Wexler, K. (1998). Very early parameter setting and the unique checking constraint: A new explanation of the optional infinitive stage. *Lingua*, 106, 23–79.
- Wexler, K., Schütze, C. T., & Rice, M. (1998). Subject case in children with SLI and unaffected controls: Evidence for the Agr/Tns Omission Model. *Language Acquisition*, 7, 317–344.
- Wilson, S. (2003). Lexically specific constructions in the acquisition of inflection in English. *Journal of Child Language*, 30, 75–115.

APPENDIX A

That *will* and *would* are, respectively, morphologically present and past can be seen by using a sequence-of-tenses diagnostic. Although English does not rigorously demand the same tense in a subordinate and main clause, it tends to do so. Examples A1 and A2 show that only *will* in a main clause is compatible with a present tense verb in the subordinate clause.

- A1. She gorges/*gorged on foie gras when she visits France
 A2. She will/*would gorge on foie gras when she visits France

This is so despite the indefinite possible time conveyed by *would*. Similarly, in Example 7 from the text, the past tense *were* in the first clause demands the past tense *would*, *could*, or *might* in the second clause rather than the present tense *will*, *can*, or *may*. Any past tense modal, but no present tense modal, could be substituted without loss of grammaticality. In turn, *would* but not *will* in the main clause requires the past tense in the subordinate clause, as the contrasts in Example A3 show.

A3. She gorged/would gorge/*will gorge on foie gras when she visited France

The diagnostic requires more subtle judgments with the other modals, especially in the past tense, because of the very complex semantics and pragmatics of modals. Example A4 provides a clear grammatical contrast, but the contrast in Example A5 is less clear because the sense of possibility conveyed by *could* tends to overwhelm the demand for the same tense.

A4. She can gorge on foie gras if she wants/*wanted to

A5. She could gorge on foie gras if she ?wants/wanted to

Note, finally, that if modals did not have tense, all clauses with modals and main verbs would be tense free, because the main verbs themselves are not tensed. That cannot be the case, or there would be no way for sequencing of tenses to operate or for subjects to be cased.

APPENDIX B Comprehension Items

Items use either props or pictures. When props are used the action occurs as the participant watches. When pictures are used the experimenter first reads an orienting sentence, then shows the pictures, and finally asks the participant to point to one of the pictures.

Pretraining items to accustom child to contrastive stress; underlined item is stressed

Props: two fire trucks of different sizes.

Experimenter: Look! Two different fire trucks. Show me the little one.

Props: two pen lights

Experimenter: Look! I have two lights! [turns one on] Show me the one that's on.

Props: two pigs of different texture

Experimenter: Look! Two different pigs! You can pet them. Go ahead! Show me the soft one.

Props: two elephants of different sizes

Experimenter: Look! Two elephants! Show me the baby one.

Pictures: two birds

Experimenter: See these two birds? [shows birds] Show me the one that flies.

Pictures: two turtles

Experimenter: See these two turtles? [shows turtles] Show me the one that swims.

Pictures: two bears, one sleeping

Experimenter: See these two bears? [shows bears] Show me the one that sleeps.

Pictures: two buildings of different heights

Experimenter: See these two buildings? [shows buildings] Show me the tall one.

Extra contrast items if needed:

Props: two fish

Experimenter: See these two fish? Show me the skinny one.

Pictures: two shapes

Experimenter: See these two shapes? Show me the circle.

will/did items; underlined item is stressed; child heard only one version

Props: ducks; baby bottles in experimenter's hands near ducks; bottles are constructed so that contents seem to disappear if they are turned for drinking

Experimenter: Here are two ducks. They both want to drink. Watch! [turns one bottle to mimic giving one duck a drink] Show the one that will/did drink.

Props: two untied baby shoes

Experimenter: Look! Two shoes! I want to tie both of them. Watch. [ties one shoe] Show me the one I will/did tie.

Props: two small tubes of toothpaste, paper towel

Experimenter: Here are two tubes of toothpaste. I want to squeeze some out of both of them. Watch. [squeezes one out on paper towel] Show me the one I will/did squeeze.

Props: two uninflated balloons

Experimenter: Look! Two balloons! I want to blow up both of them. Watch! [blows up one] Show me the one I will/did blow up.

Props: two drawings

Experimenter: Look! See these two pictures? I want to color in both of them. Watch. [colors in one] Show me the one I will/did color in.

Props: two boxes with lids alongside

Experimenter: Look! Two boxes! I want to close both of them. Watch. [closes one]
Show me the one I will/did close

Pictures: one cat on roof, another on ground—not shown until request asked
Experimenter: I know two cats who want to climb. [shows pictures] Show me the one that will/did climb.

Pictures: two boys, one with full ice cream dish, one with empty dish—not shown until request asked
Experimenter: I know two boys who want to eat ice cream. [shows pictures] Show me the one that will/did eat ice cream.

is/was as copula; underlined item is stressed; child heard only one version

Props: two small plastic buckets with monkeys
Experimenter: I have two baskets full of monkeys. [empties one] Show me the one that is/was full.

Props: two teddy bears, one with removable head
Experimenter: See these two teddy bears? See how happy? [replaces happy face with sad face] Show me the one that is/was happy.

Props: two extended pointers
Experimenter: See these two pointers? See? Really long. [closes one] Show me the one that is/was long.

Props: two balls, one of which can turn into a cube
Experimenter: See these two balls? Watch. [turns one into cube] Show me the one that is/was is a ball.

Pictures: two plants, one small—not shown until request asked
Experimenter: I have two little plants. [shows pictures] Show me the one that is/was a little plant.

Pictures: two shots of sun, one obscured by clouds—not shown until request asked
Experimenter: I have two sunny pictures. [shows pictures] Show me the one that is/was sunny.

Pictures: two ducks in two bathtubs, one being showered—not shown until request asked
Experimenter: I know two very wet ducks. [shows pictures] Show me the one that is/was very wet.

Pictures: two girls, one in bed, one standing alongside the bed—not shown until request asked

Experimenter: I know two girls in bed. [shows pictures] Show me the one that is/was in bed.

is/was as progressive; underlined item is stressed; child heard only one version

Props: two crayons which experimenter rolls

Experimenter: See these two crayons? They both roll. [rolls both crayons] Roll, roll. [stops rolling one crayon] Show me the one that is/was rolling.

Props: two fish and a frog in between

Experimenter: See these two fish? They both kiss the frog. Kiss, kiss. [makes both fish kiss the central frog] Kiss, kiss. [stops one fish from kissing] Show me the one that is/was kissing the frog.

Props: two bears, one with removable legs.

Experimenter: See these two bears? They both wear shoes. [replaces one with barefoot legs] Show me the one that is/was wearing shoes.

Props: two puppies, each in front of a small doghouse

Experimenter: See these two puppies? They both hide. Hide, hide. [hides each puppy in own doghouse] Hide, hide. [uncovers one] Show me the one that is/was hiding.

Pictures: two girls, one with tears—not shown until request asked

Experimenter: I know two girls who cry. Cry, cry. [shows pictures] Show me the one that is/was crying.

Pictures: two dogs, one in process of running—not shown until request asked

Experimenter: I know two dogs who run. Run, run. [shows pictures] Show me the one that is/was running.

Pictures: two boys, one riding a bicycle, one next to a bicycle—not shown until request asked

Experimenter: I know two boys who ride bikes. Ride, ride. [shows pictures] Show me the one that is/was riding.

Pictures: two bunnies, one in act of hopping— not shown until request asked

Experimenter: I know two bunnies who hop. Hop, hop. [shows pictures] Show me the one that is/was hopping.