

# Temporal Cognition and Temporal Language the First and Second Times Around. Commentary on McCormack and Hoerl

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He had complimented me on how I spoke Italian, and we talked together very easily. One day I had said that Italian seemed such an easy language to me that I could not take a great interest in it; everything was so easy to say. "Ah, yes," the major said. "Why, then, do you not take up the use of grammar?" So we took up the use of grammar, and soon Italian was such a difficult language that I was afraid to talk to him until I had the grammar straight in my mind. (Hemingway, 1927)

McCormack and Hoerl's state of the art review of the development of temporal concepts from the end of infancy to the end of the fifth year shows that young children's conception of time is quite different from that of adults. Adults and 5-year-old children can construe an event from a range of temporal perspectives and can describe it from a variety of reference times (RTs) that may not coincide with the time of the event itself (ET) or with the time of speaking (ST). Younger children are incapable of such temporal decentring. Two-year-olds' use of tense suggests that although they do understand that events can occur before now (as in *I ate*) or after now (*I will eat*), thus coordinating ET and ST, the complexities of ST > ET > RT (*I will have eaten*) or ET > RT > ST (*I had eaten*) demand additional sophistications. The developmental progression is that RT is first freed from the here-and-now of ST to permit an additional perspective from ET (e.g., *I was eating*), and eventually it is loosed from ET too. These milestones mark the slow realization of abstract abilities of *perspective-taking*, rather than *perspective-switching*, and demonstrate the appreciation of

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systematic relationships between the different temporal perspectives possible on the same chronological event sequence. First comes the appreciation of the “causal arrow of time,” the flow of events leading up to a particular state, and then the development of means of bending descriptions from a variety of perspectives upon it: As Groucho Marx observed, “Time flies like an arrow. Fruit flies like a banana.”

McCormack and Hoerl show that the development of temporal cognition extends over several years: It is initially heavily reliant upon adult scaffolding; its first expressions are tied to particular familiar sequences and routines (they are event based); and its subsequent use as event-independent, generalized coordinations emerges first from learner’s analyses of sequences of past concrete events rather than future hypotheticals.

There are clear parallels with general aspects of child language development. Two examples will suffice. The first relates to the progression from concrete operations to formal reasoning. In language too, abstract constructions emerge from the conspiracy of concrete exemplars of usage, thus constructionist perspectives on first language acquisition describe the progression from formulaic expressions describing familiar routines and meanings, through limited scope patterns, eventually to abstract schematic constructions. The second relates to the social construction of language: Social coordination of attention, scaffolding, and the reading of others’ intentions are all paramount. There are many such aspects of learning and development that are domain-free and that apply equally to the understanding of sequences of events and the understanding of sequences of language.

However, the content of these two cognitive domains is very different indeed, and so learning to refer to time in language must build upon the separable sources of temporal cognition and linguistic cognition, as well as on the relations between these as experienced in contextualized spoken usage, all messy, noisy, abbreviated, and referentially indeterminate.

The influence of semantics on language acquisition is universal. The Aspect hypothesis (Andersen & Shirai, 1994) is a clear case in point. Child language learners are initially influenced by the inherent semantic aspect of verbs in the acquisition of tense and aspect morphology affixed to these verbs. Thus, (perfective) past emerges earlier for telic verbs (achievements and accomplishments with a clear end point, like *retire*, *wake*, *disappear*) and progressive for verbs associated with dynamic atelics (e.g., activities such as *play*, *walk*, and *look*). One interpretation of such aspect-before-tense phenomena is that children’s understanding of time in language is closely tied to their representations of time and event sequences.

There are two different strategies of testing this hypothesis. One, clearly exemplified by McCormack and Hoerl, is to set up elegant assessments of children's cognition where the task demands are as language-free as possible. The experiments on time by McCormack and Hoerl, like those she reviews within Theory of Mind (TOM) research, are cleverly crafted. Developmentalists are really good at this sort of thing. I am reminded of the classic off-the-cuff designs of Piaget (1928) and Bryant (1974) and the TOM tasks of Meltzoff (Meltzoff & Moore, 1995) and Baron-Cohen (Baron-Cohen, Cosmides, & Tooby 1997) testing complex notions like *I think that you think that . . .* in young children. McCormack's work shows that you can make children's temporal cognition observable thus to empirically assess the likelihood of several competing hypothetical interpretations.

However, there is another strategy for determining the degree to which temporal language development is constrained by temporal understanding or, alternatively, to the relations of time and language in *thinking for speaking* about time (Slobin, 1996)—that is to compare first language acquisition (L1A) with second language acquisition (L2A) in adult learners who have fully developed temporal cognition. In the remainder of my comments I will focus on two phenomena of L2A of tense and aspect, which talk to these issues.

The first is the aspect hypothesis, again, but this time as it applies in L2A. Adults have developed sophisticated understandings of time and they know all about expressing time in their L1. Nevertheless, aspect-before-tense phenomena also prevail in L2A (Andersen & Shirai, 1994; Bardovi-Harlig, 2000; Li & Shirai, 2000). Adult language learners, too, are sensitive to the lexical aspects of verbs, initially using combinations of lexical and grammatical aspect that are maximally compatible, with telicity being a particularly salient feature. Thus, L2 learners from a wide variety of L1/L2 combinations first use perfective past marking on achievements and accomplishments, and only later do they extend this to activities and state. Similarly, in L2s that have the progressive aspect, progressive marking begins with activities and only extends slowly thereafter to accomplishments and achievements. If aspect-before-tense characterizes adult L2A too, then these patterns of language development do not reflect thinking about time but rather thinking for speaking about time.

The second issue concerns L2 tense marking and morphology more generally. Adults are very good at thinking about time and very good at talking about time in their native language. However, this sophistication is severely curtailed in languages learned naturalistically in adulthood. Unlike love, temporal reference does not get lovelier the second time around.

All languages have rich means to express the position of events in a time line, including verbal morphology (e.g., *walked* vs. *walk*), lexical adverbs (e.g., *now*, *next*, *yesterday*, *tomorrow*), prepositional phrases (*in the morning*, *in the future*), serialization (presenting events in their order of occurrence), and calendric reference (*May 12*, *Monday*) (Evans, 2003). Any stretch of discourse typically uses a variety of these cues in combination (e.g., *yesterday I walked to the university but next Tuesday I'll ride the bus*). Children acquiring their L1 eventually learn all of these constructions for expressing time. Adults learning an L2 often do not (Bardovi-Harlig, 2000; Noyau, Klein, & Dietrich, 1995; Perdue, 1993; Schumann, 1987). Usage-based L2A is typically limited in its end state, with naturalistic, uninstructed, or communicatively-based L2A stabilizing at levels far short of nativelike ability at a *Basic Variety* of interlanguage, which, although sufficient for everyday communicative purposes, predominantly comprises just nouns, verbs, and adverbs, with closed-class items, in particular grammatical morphemes and prepositions, being rare, if present at all. As Wolfgang Klein has put it, “there is no functional inflection whatsoever: no tense, no aspect, no mood, no agreement, no casemarking, no gender assignment . . .” (Klein, 1998, pp. 544–545). L2 temporal reference is initially made exclusively by the use of devices such as temporal adverbials, prepositional phrases, serialization, and calendric reference, with the grammatical expression of tense and aspect emerging only slowly thereafter, if at all.

Why do adult L2 learners have difficulty attending to and producing verbal inflections? It cannot be their lack of temporal understanding. More likely are alternative cognitive explanations (Ellis, 2006a, 2006b) in terms of form-function contingency, attention, learning, and transfer, particularly the domain general associative learning phenomena of (a) cue salience, (b) cue redundancy, and (c) the attentional blocking of later experienced cues by earlier learned ones:

- (a) *Cue salience*: Lexical cues to time are quite pronounced in the speech stream; verbal inflections are not (consider *yesterday I walked*). The low salience of grammatical cues tends to make them less learnable (Goldschneider & DeKeyser, 2001; Slobin, 1992).
- (b) *Cue redundancy*: On hearing *yesterday I walked*, the morphological tense marker is redundant; successful interpretation of the message does not require its processing, and the lack of processing entails a lack of acquisition (Terrell, 1991; Van Patten, 1996).
- (c) *Blocking*: Learning that a particular stimulus (A) is associated with a particular outcome (X) makes it harder to learn that another cue (B), subsequently paired with that same outcome, is also a good predictor of

it (Kruschke, 2006). Our research has shown its short-term and long-term effects in adult language learning (Ellis, 2007).

Phenomena (a) and (b) apply equally to L1A and L2A. It is phenomenon (c) then, blocking, that may be particularly important in L2A. As McCormack and Hoerl show, when children are acquiring their native language, they are at the same time learning about the world and about various discourse strategies. Young children do not yet know about the custom of recounting events in their usual script order of occurrence, nor do they clearly understand the meaning of temporal adverbs or calendric reference. Studies that have directly compared the acquisition of different systems of marking temporality report morphological means of temporal reference preceding the use of temporal adverbials in children's speech (e.g., Pawlak, Oehlich, & Weist, 2006) with comprehension studies suggesting that 3-year-olds are able to distinguish minimal tense-aspect morphological contrasts but not contrasts between lexical forms such as *when/then*, *before/after* (Weist, Atanassova, Wysocka, & Pawlak, 1999) and that 2-year-olds can differentiate past and present tense on the basis of the auxiliaries *will* and *did*, copula *be*, and progressive but are not aided by the inclusion of temporal adverbials (Valian, 2006). Older learners, however, as a result of their L1 experience, do know these things. Perhaps these already known cues block the L2A of verbal morphology. Adult speakers know that temporal adverbs are more reliable than the nonsalient and ambiguous verbal inflections, and, like Hemingway's speaker of Italian, they can usually get their message across by lexical means alone—however ungrammatical, the Basic Variety is communicatively effective. Thus, adult language learners, in the words of Simon (1957), "satisfice" rather than "optimize." They can get by, and, in the words of Robert Byrne, "Doing a thing well is often a waste of time."

These phenomena show the necessity for the understanding of time and language of different strands of research. Domain general explanations from associative learning theory, cognitive science, and socio-constructive processes apply. However, cognitive content is crucial too, as are functional analyses. An understanding of temporal cognition informs our understanding of the acquisition of temporality in language. However, it is mutual. Studies of L2A inform and constrain our theories of L1A and temporal cognition too.

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