

Pier Marco Bertinetto

Tense-Aspect acquisition meets typology*

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1 A matter of clarification

Throughout this paper, the semantic domain under scrutiny will be designated by the acronym ATAM (i.e., Actionality / Temporality / Aspect / Modality). This involves a modification of the usual practice, where TAM (or TMA) is routinely used. As will soon become clear, however, the actionality category cannot be neglected, considering its role in the semantics and acquisition of tense and aspect phenomena.

Note further – as the spelling-out of the above acronym suggests – that the term ‘temporality’, rather than ‘tense’, will be used. This is a most important conceptual (even more than terminological) matter. One should best restrain the word ‘tense’ to the morphosyntactic categories to be observed in the grammar of individual languages, rather than to the semantic/cognitive domain of temporality. Consider for instance the Romance Imperfect: in its prototypical uses, this tense conveys the aspectual value ‘imperfectivity’ and the temporal value ‘past’, i.e. it conveys both aspectual and temporal information. Consequently, it would be confusing to use the word ‘tense’ to indicate both a particular grammatical category (in this example, the Imperfect) and the temporality domain at large. Note, further, that the Romance Imperfect is no exception. Any tense conveys both aspectual and temporal information, even though one of the two (or both) may be underdetermined in one way or another. The German Preterite, for instance, conveys the temporal value ‘past’, but is aspectually underspecified for it neutralizes the values ‘perfective’ and ‘imperfective’. Yet, in most cases the language user may assign this tense the relevant aspectual interpretation by exploiting the appropriate contextual cues (Bertinetto 2008). Indeed, all the relevant semantic dimensions (actionality, temporality, aspect and mood) are necessarily detectable in

* The experimental results quoted in this paper stem from an équipe work. I wish to thank my co-workers Maddalena Agonigi, Alessandro Lenci and Sabrina Noccetti. I shall also quote results due to Eva Freiberger (see bibliographical references), gathered within the same methodological framework.

each predicative utterance, although some oppositions may be neutralized, either because of lack of explicitness in the given language, or because of occasional contextual factors. Summing up, in this paper I shall systematically distinguish between ‘tense’ and ‘temporality’.

Finally, it should be stressed that the goal of the present paper is limited to L1 acquisition. One major difference with respect to L2, e.g. in the domain of temporality, is the early use of morphological tools by L1 learners as opposed to L2 learners, who heavily rely on lexical substitutes (Shirai 2009). Obviously, L2-learners master the grammar of their native language and thus filter any new acquisition through an already established competence. L1-learners, by contrast, have no previous grammar to build upon, except of course for the universal predisposition to acquiring language, as shared by all human beings. In this connection, many scholars speak of ‘universal grammar’; this, however, makes no real difference in the problem at issue, for this hypothesized universal device cannot possibly comprise any ATAM category. Most likely, it only contains very abstract stuff, like X-bar structure or recursion (Hauser et al. 2002): namely, objects necessarily presupposed by any human language, whatever its actual grammatical shape. This conclusion is also enforced by the extreme typological variability of human languages in the ATAM domain (perhaps, in any domain). The important thing to be retained is that no macroscopic grammatical category (crucially including the ATAM ones) is listed in the basic “language faculty”; any such category needs to be extracted from the available linguistic input, obviously with the additional help of the human cognitive (hence, extralinguistic) endowment.

2 The current ATAM-acquisition model

The received knowledge in L1-acquisition studies is – as has been for the last three decades – that one out of aspect or actionality (depending on the specific proposal) triggers and drives the acquisition process. Indeed, a great deal of the recent debate has revolved around the individuation of the triggering factor. Despite the risk of oversimplification, I would suggest to divide the main theoretical proposals in two subsets:

- (a) ASPECT PRIORITY: cf. the pioneering work by Antinucci & Miller (1976), “Aspect before tense” (Bloom et al. 1980), “Defective tense” (Weist et al. 1984), “Aspect first” (Wagner 1998);
- (b) ACTIONALITY PRIORITY: cf. “Language Bioprogram” (Bickerton 1981), “Basic child grammar” (Slobin 1982/92), “Prototype account” (Shirai & Andersen 1995; Andersen & Shirai 1996; Li & Shirai 2000).

The temporality component, by contrast, seems to play a secondary role in the initial stage of ATAM acquisition. Nevertheless, a few contributions suggested that temporality may develop independently of aspect and actionality, e.g. Behrens (1993) for German and Spharim & Nunio (2008) for Modern Hebrew. Significantly, these languages either do not mark aspect (Hebrew) or do so very marginally (German).

With the latter exceptions, and despite individual differences, the above proposals converge in suggesting a consistent set of correlations among the main semantic dimensions, as summed up in the following scheme:

- | | | | | |
|------------------|---|---------------------|---|----------------|
| (1) atelic verbs | ™ | imperfective tenses | ™ | Present tenses |
| telic verbs | ™ | perfective tenses | ™ | Past tenses. |

These associations have been repeatedly assessed in a number of languages. As for English, consider at least – besides the above cited works – Tomasello (1992); for Italian, Noccetti (2002); for Turkish, Aksu-Koç (1988); for German, Meisel (1985) and Behrens (1993); for Modern Greek, Stephany (1985); for Russian, Stoll (2001); for Japanese, Cziko & Koda (1987) and Shirai (1998); for Chinese, Li (1989); for French, Meisel (1985) again.

Although this cross-linguistic convergence is very strong evidence, it has long been observed that there seems to be a parallel, and indeed disturbing, convergence between the children’s linguistic behavior and that of the adults interacting with them. This has been labeled the “input problem”. The shared features between child and caretakers may depend on some general tendency of human language and/or on the caretakers’ effort to adjust their language to the child’s linguistic abilities. The countermove consists in detecting significant statistical deviations, at least at the initial stage, between child and caretakers, with subsequent gradual convergence towards the adult language target. It should be stressed, however, that in order to really defend this point, a further step

should be taken. Besides checking whether the child's speech gradually converges towards the adult target, one should also compare the child-directed-speech with the adult-directed-speech as produced by the same persons, in order to see to what extent those particular individuals deviate from their usual linguistic behavior while interacting with the children. Unfortunately, the only work so far available where child- and adult-directed-speech were compared is Boland (2006). Thus, more research is in order (see sect. 5.1).

Let us return to the situation depicted in (1), to analyze its theoretical implications. One crucial consequence, which seems so far to have mostly gone unnoticed, is the following. By selecting one particular category (aspect or actionality) as the triggering factor of the acquisition process, one implicitly assumes that the given category is mastered by the learner in a close to mature way from the beginning. This is never overtly stated, except by the defenders of extreme innatistic versions of language acquisition (cf. Bickerton 1981, Weist et al. 1984). Nevertheless, once this usually covert argument is made explicit, its rather embarrassing implications immediately arise, for most scholars would not endorse a view suggesting that a particular linguistic dimension is fully mastered by the toddler (while all the other dimensions have to be build from scratch).

Before elaborating an alternative hypothesis, it is fair to observe that the above picture is somewhat oversimplified. This problem is implicitly present to the mind of the most scrupulous researchers and has received tentative answers. Two positions deserve to be singled out in this connection: Slobin's "Basic child grammar" and Andersen-Li-Shirai's "Prototype account".

Slobin's proposal refers to the cognitive notions 'state' and 'process', rather than to the linguistic categories that make up the domain of actionality. His view might thus be considered immune from the present criticism, for he refers to a universal endowment of human beings, rather than to any specific grammatical component. Although this is undoubtedly the case, a further problem arises: the cognitive notions alluded to by Slobin cannot be directly identified with actional categories in the proper sense. 'State' and 'process' are universal cognitive notions, whereas actional categories may be considered universal only as semantic prototypes; their linguistic implementation is much less uniform than usually assumed. Compare a Slavic language like Bulgarian

with Thai. In Bulgarian, virtually every verb is lexically specified for a/telicity, whereas in Thai all verbs are thoroughly underspecified in this respect (Jenny 2000). While these two languages may be regarded as the extreme poles in the typological range of variation, several intermediate cases could be described, suggesting a highly variegated picture. In fact, most (perhaps all) languages differ among themselves in at least some detail, as far as actional categories implementation is concerned. Consequently, unless one directly refers to the grammatically relevant notions that children have to acquire when learning a specific language, the mere appeal to universal cognitive prototypes is of little help in explaining how ATAM features are acquired.

Andersen-Li-Shirai's model, based upon the notion of "prototype" (as summarized in (1) above), is more elaborated: "Children acquire a linguistic category starting with the prototype of the category, and later expand its application to less prototypical cases" (Shirai & Andersen 1995: 758). The model makes the following predictions. First, children associate to each linguistic form a cluster of prototypical actional properties. For instance, English Past forms are assigned the features [+telic] [-durative] [+result], while English (Present) progressives are assigned the features [-telic] [+durative] [-result]. This stems from probabilistic tendencies: children find this sort of correlations in the input and quite naturally assume at first that they belong to the very nature of language. As a consequence, children tend to use the different tense morphemes (i.e., those available at the initial stages) only with verbs exhibiting the "corresponding" (so to say) actional features. Later on, they gradually learn to generalize the given morphemes to other verbs, more peripheral with respect to the semantic prototype. Andersen-Li-Shirai's model seems thus to elegantly cope with the problem raised above, not only by suggesting that toddlers do not fully master the target morphology, but most of all by showing how they gradually develop their own competence.

On a closer look, however, it turns out that this model does not really answer the crucial question raised above, namely: "Do children have an early consistent understanding of the linguistic categories supposedly acting as triggers?". It rather provides an answer to another question, strictly related and important but nevertheless different, namely: "Why is there such a striking correlation, in the learners initial production, between actional classes and tense morphemes distribution?". We now know that this correlation is there because it basically exists in the input; children build

upon it by, so to say, first pushing it to the extreme. The toddler's behavior is, in other words, strongly biased by the caretakers' example. As for the former question, however, Andersen-Li-Shirai are silent. They appear to imply that toddlers have an embryonic ability to exploit the essential actional information, even when dealing with languages which do not explicitly mark actional contrasts (Japanese), or do so in a far from systematic manner (English, Chinese). This, however, is far from obvious: whenever there is no overt evidence (i.e. there is no one-to-one form-meaning correspondence), one should not take for granted that the learner has a true knowledge of the intended linguistic categories. This is true in general, and even more so in the case of highly elusive features such as the actional ones, which (apart from prototypical examples) often appear to be hard to identify even for expert scholars, as Lenci & Zarcone (in press) have shown.

Summing up, Slobin's proposal and Andersen-Li-Shirai's model do not provide a viable solution to the problem at stake, although for different reasons. Slobin's proposal is cognitively oriented, but linguistically rather vague. In order to make it linguistically interpretable, one should translate it into the usual grammatical (i.e., actional) categories, which is exactly where the problem lies. As for Andersen-Li-Shirai, they do speak of linguistically relevant categories, but assume without prove that they are available as such to the learner.

3 An alternative hypothesis

There is an alternative hypothesis worth exploring. One may assume that the learner builds at the outset an inherently syncretic concept, where the main ATAM semantic dimensions appear to be inextricably intertwined. The acquisition task would then consist in disentangling these dimensions, targeting the adults' behavior. In so doing, learners have at their disposal, as an explicit source of information, no more than the lexical and morphological forms provided by the target language, to the extent that they exhibit the relevant contrasts in each domain. When this does not occur, i.e. when the language does not provide explicit support in terms of form-meaning correspondences, the learner's task is very hard and demands more time and effort. To suggest an obvious parallel, consider the case of neutralized phonological or morphological oppositions, or

the case of \emptyset -morphemes. Learning these features is harder and more time-consuming than learning any overt opposition.

Let us see how the alternative hypothesis works. The child is presumably endowed with the ability to develop the basic cognitive notions, that will in turn sustain his learning task. For instance, one can assume that at some point children understand the contrast ‘entity’ / ‘event’, which is presupposed by any theory of predication. Similarly, one could assume that, in the ATAM domain, children are able to soon develop an intuitive understanding of the following contrasts:

- ‘state’ / ‘process’;
- ‘complete’ / ‘incomplete’ event;
- ‘now’ / ‘not-now’
- ‘realis’ / ‘irrealis’.

Although these notions do not exactly mirror the content of actionality, aspect, temporality and mood, they are obviously related to these linguistic categories. Since, however, such categories are not directly accessible to the toddlers, the latter have to develop them on the basis of the available input. A viable assumption consists in admitting that, at first, the child develops syncretic, rather than independent categories. For instance, s/he might develop the syncretisms ‘state.:incomplete-event.:now.:realis’ vs. ‘process.:complete-event.:not-now.:irrealis’. This would entail the conflation of the relevant ATAM dimensions.¹ For that matter, it is likely that, at the very beginning, even the time and space domains are conflated, giving rise to the contrast ‘here.:now’ vs. ‘not-here.:not-now’. As the child’s cognitive and linguistic experience develops, the initially syncretic categories would be further analyzed. This, however, does not occur at once and may go through intermediate steps, attuned to the specific features of the target language. For instance, depending on the language to be acquired, the learner might first disentangle any one of the main categories, while the others would constitute a syncretic residue. Thus, with some languages temporality might be the first category to develop, while actionality, aspect and mood would be

¹ One might refer, here, to Tomasello’s ‘verb-island hypothesis’, with its emphasis on lexically-based learning. At the initial stage, children employ unanalyzed lexical materials, with no morpho-syntactic specification.

joined into a single residual category. In principle, however, any combination is admissible.

Interestingly, this bears resemblance with the way many languages have shaped themselves. In Classical Arabic, for instance, the dimension of temporality is not overtly marked in the verbal system. In this language, the temporal information is usually suggested, via pragmatic entailment, by the overtly marked aspectual oppositions, unless of course other explicit markers are used (such as temporal adverbs). Hence, in Classical Arabic temporality is by and large parasitic on aspect. Russian, by contrast, is a language where aspect is parasitic on actionality. The basic contrast telic/atelic is typically conveyed by morpho-lexically explicit devices, while the original Ancient Slavonic aspectual oppositions (still preserved in Bulgarian) have entirely vanished. Consequently, the aspectual information is mostly obtained by inference through the explicit actional opposition of a/telicity (in traditional terms: ‘perfective’ / ‘imperfective’ predicates).

The above examples oversimplify the matter somehow. The aim of the discussion, however, was not to show that target languages may be like some version of the learners’ language, but rather to suggest that it is no wonder that L1 learners may build syncretic categories, since even their targets often exhibit various sorts of morphological neutralization. Apart from this, however, the two situations diverge significantly. It would be implausible to state that Classical Arabic and Russian present, respectively, the syncretisms ‘aspect.:temporality’ and ‘actionality.:aspect’. In these languages (and indeed in many others) one category is parasitic on the other, rather than belonging to a mixed and poorly analyzed category.² Indeed, mature speakers must be credited with the ability to cope with the basic contrasts implied by the fundamental ATAM dimensions, for otherwise they would be unable to communicate the content of their own experience. The toddlers’ situation is obviously different. On the one hand, their cognitive maturation is not yet attained. On the other hand, they have to build the ATAM categories by gradually construing how the target language deals with this semantic domain; namely, which categories are overtly expressed and which are covertly conveyed. Learning a grammar thus consists in acquiring a set of restrictions on how to

² On top of that, some types of category conflation might extremely rare in real languages, yet present at the initial stages of language acquisition.

shape the linguistic expression of human experience. In other words, the relationship between linguistic expression and extra-linguistic content is mediated by specific sets of grammatical (morpho-syntactic) devices. Whatever does not find overt expression is left to the inferring abilities of the language users (i.e. to their pragmatic competence).

To sum up, the alternative hypothesis makes the following predictions. At the initial stage, learners of all languages start up with a global, syncretic ATAM category, where the fundamental features are mixed up ('actionality .: aspect .: temporality .: mood'). The ensuing developmental stages differ according to the target language structures. This is a major departure from the current theory, which assumes a universally valid acquisition path. In the alternative hypothesis adopted here, there is no fixed strategy, except for the interplay between the typological variability of the languages and the cognitive endowment of human beings, enabling them to extract the relevant information from the input. It is thus likely that, in the acquisition of Slavic languages, the learners develop the relevant features of actionality earlier than any other ATAM category, due to the explicit evidence available in the target language. This seems indeed to provide a viable interpretation for the observation put forth by Weist et al. (1984), to the effect that Polish children have a very early comprehension of the fundamental aspectual contrasts. In order to understand this claim, one should note that what Weist and co-workers call "aspect" should rather be understood as the composite actional-aspectual category (as a matter of fact, an actionality-prominent category) to be found in all northern Slavic languages. Thus, rather than supporting Weist et al.'s (1984) claim, according to which "aspect" is innate in Polish learners, this simply proves that these speakers take advantage of the explicit morpho-lexical opposition exhibited by the target language. *Mutatis mutandis*, something equivalent occurs in any language. For instance, while acquiring a strictly mood-dominant language – i.e., a language where mood is overtly expressed whereas the other main ATAM dimensions are poorly manifested – one should expect that the basic modal features are mastered before any other feature and drive the acquisition process.

Needless to say, in no case would any major ATAM category be completely inert in the acquisition process. The exact developmental path, however, would significantly differ according to the language. By contrast, postulating a single acquisition strategy for all languages appears to be an instance of naive universalism, based on a

fundamental misconception. The universal endowment of human beings, as far as the language faculty is concerned, necessarily consists of much more abstract substance than any major grammatical category, including the ATAM ones. Any such category, in its language-specific shape, needs to be learned through exposure to actual data.

4 The role of morphology: Overt vs. covert features

As noted above, languages present a variable mixture of overt and covert categories. For instance, a language may have no overt actional marking and nonetheless convey actionality-relevant information (indeed, this is the rule in most cases); or it may have no overt temporal distinctions and yet express temporally-relevant information by way of contextual redundancy and/or adverbs. This presents a formidable challenge to the learning child, seemingly harder than that of L2-learners, except that children receive strong support – within the relevant time-frame – by their unique language acquisition capacity. The difference is that L2-learners have at their disposal their mature competence over the basic linguistic categories; even when a given category is completely opaque in the native language, the speakers hold nevertheless the corresponding cognitive maturation (at least with respect to the most fundamental features). L1-learners, by contrast, have to acquire from scratch all morpho-syntactic categories. Let us then see how this applies to Italian, selected here as an example.

Italian presents no overt marking of actional features. These are lexically specified rather than morphologically marked. To the extent that a given verb is univocally interpretable, its interpretation rests entirely upon the speaker's lexical competence (cf. *dormire* 'sleep' activity vs. *addormentarsi* 'get asleep' achievement; *essere fermo* 'be still' stative vs. *fermarsi* 'stop (oneself)' achievement). Most verbs, however, are ambiguous, for they may receive two or more actional readings, depending on the context. Thus, actionality is not a dominant category in Italian and is in part parasitic on aspect. For instance, with verbs that may receive a static or a dynamic reading (such as *collegare* 'to connect', *separare* 'separate'), the most likely interpretation with a perfective tense such as the Simple Past is dynamic (i.e., 'to put in connection' rather than 'to keep connected'), unless the context suggests a different reading. With the Imperfect, on the contrary, the stative reading is more salient. On top of this, there is

endemic ambiguity between activities and accomplishments (*leggere* vs. *leggere un libro* ‘read (a book)’).

Aspect is partially marked in Italian. In the past domain, the Imperfect contrasts with the Simple and Compound Pasts along the imperfective/perfective divide. In addition, the Pluperfect and the Compound Future convey the perfect aspect with respect to a past and, respectively, future reference-time. The Compound Past, by contrast, is ambiguous: it may express the perfect aspect with present reference-time, but is often employed in the aoristic sense (namely, indicating pure past perfectivity, just like the Simple Past). Other tenses are even more ambiguous. The Present and the Simple Future may be used both perfectly and imperfectly, although their aspectual inclinations diverge (statistically, the Present is more often imperfective, while the reverse occurs with the Future). The aspectual value of the Present is in some cases disambiguated by means of the progressive or the habitual periphrasis; however, the frequency of use of these devices is not large. Besides, they carry in most cases a stylistic, rather than semantic value: indeed, they may even be used with the Imperfect, which is unambiguously imperfective in and by itself. There is also a limited set of adverbs that may contribute to aspectual interpretation (such as the “imperfective” adverb *ancora* ‘still’). Their appearance, however, is sporadic; moreover, several adverbs may be used with alternative readings depending on the context; for instance, *da due ore* – whose meaning might be roughly approximated as ‘since two hours’ – receives different readings in perfective and imperfective contexts (Bertinetto & Delfitto 2000).

Temporality is to a considerable extent overtly marked in Italian, which may be considered, in Bhat’s (1999) conception, a temporality-prominent language. In the default case, the Present is present-referring, while the Imperfect, the Simple and Compound Pasts, as well as the Pluperfect are past-referring and the Simple and Compound Futures are future-referring. In practice, however, most tenses may receive contrasting temporal interpretations. The only tenses that receive an invariable interpretation, from this point of view, are the Simple Past and the Pluperfect (unless the latter is used in a purely counterfactual sense). For instance, the epistemic use of the Simple and Compound Futures imply, respectively, present and past time-reference:

(2) A quest’ora, *saranno* le 5.

- It must be 5 o'clock now
 (3) A quel punto, *saranno state* le 5.
 By then, it must have been 5 o'clock

Although some of the non-default uses are not often proposed to children at the initial learning stages, some of the tenses present a wide range of variability. This is partly the case with the Imperfect, which is often employed, in colloquial style, with hypothetical meaning, implying a sort of temporal displacement. The Present (namely, the most frequently used tense) is the most striking example. This tense is often used as past- or future-oriented and, in addition, it may be used in hypothetical or injunctive contexts, i.e. with strong modal coloring and (in the latter case) perfective value.

Thus, although in Italian temporality is by and large the dominant category, the kind of evidence available to the child is far from univocal. If one adds the aspectual and modal meanings, the evidence offered to the learners appears to be rather confusing. As an example, consider the following uses of the Present, all directly available to the child at the early stages of linguistic experience:

- | | |
|--|---|
| (4) Ora la bambola <i>dorme</i>
'Now the doll is sleeping' | [pres.-oriented; imperfective] |
| (5) La mucca <i>fa il latte</i>
'Cows make milk' | [generic; imperfective] |
| (6) Ed allora il babbo <i>dice...</i>
'And then father says...' | [past-referring (given the right context); perfective] |
| (7) Dopo <i>gioco</i> con te
'Later on I play with you' | [fut.-referring; perfective] |
| (8) Ora lo <i>fai</i> , capito?
'Now you do it, right?' | [injunctive; fut.-referring; perfective] |
| (9) Se <i>vieni</i> qui...
'If you come here...' | [hypothetical; fut.-referring; aspectually underdetermined] |

Incidentally, most of these uses are also available to the English Simple Present, showing that the situation described for Italian is far from idiosyncratic.

Adverbs may of course contribute to temporal interpretation and they yield in most cases a straight-forward reading, although one can find temporally ambiguous adverbs. It is therefore interesting to see whether the learning child uses them as a substitute for overt morphology at the earliest stages (see sect. 5.2).

This brief sketch shows that the learner's task is indeed hard, possibly harder than often assumed. The evidence available to the child may be fairly intricate and even

misleading, for the ATAM system to be acquired often presents instances of ambiguity and neutralization. Fortunately, this domain is plastic enough to allow the speakers to cope with it by means of conventionalized pragmatic inferences, compensating for the lack of explicit morphological marking. Context's redundancy, as well as availability of partly compensating lexical tools (especially in the temporality and mood domains), make the task accessible. And since things are easy enough for the mature speaker, there is no doubt that the ATAM domain as such is learnable.

This, however, does not make the learner's task any easier. It is thus no wonder that many scholars have proposed that the acquisition process be driven by a universally fixed triggering factor (the so-called "aspect priority" hypothesis). This sounds reassuring: the learners are supposedly endowed with a sort of cognitive pre-processing of the data which paves their way. Yet, there is no final proof of a unique developmental path; there is instead growing evidence that the received view should be revised. The two alternative models may be respectively called 'universalistic / projectionist' and 'typologically-oriented / constructivist'. According to the former (traditional) approach, morphology plays a secondary role; according to the latter, morphology is the major trigger of linguistic competence, for learners exploit the overt categories (whenever available) in order to acquire the covert ones.

Important evidence in favor of the constructivist approach stems from results obtained within the international project on the acquisition of morphology directed by Wolfgang U. Dressler. The study by Xanthos et al. (to appear) has shown, by measuring the cumulative "mean size of paradigm", that the more morphologically rich a language is, the steeper is the acquisition curve. This confirms and expands previous results by Pizzuto & Caselli (1992; 1993). In a nutshell: there is substantive evidence that by the time the English L1-learner has mastered the third singular Present-tense desinence, the Turkish L1-learner masters a much larger number of affixes. The cited authors generalize this observation on the basis of the dozen of languages under scrutiny: weakly inflecting languages exhibit a slow acquisition speed, whereas strongly inflecting ones (above all, the agglutinating languages) show a much faster speed. Similar results, obtained via computational simulation of the acquisition process, are described by Pirrelli et al. (2007). This suggests an important conclusion: the learning child should be regarded as a sort of genetically programmed "complexity detector",

able to exploit the recurring patterns in the input distribution to find out the key of its organization (namely, the grammar). This capacity is uniquely possessed by children, for L2-learners are, instead, much slower in acquiring the morphology of their target language (Shirai 2009); for them, morphological complexity turns out to be a substantial obstacle, often an insurmountable one. It must therefore be regarded as an innate capacity.³

5 Experimental evidence

In the following sections, three different types of evidence will be briefly reported: (1) The nature and temporal dynamics of the ‘actionality / aspect’ relationship. (2) The respective acquisition time of Past- and Future-tense markers and of time-locating adverbs. (3) The respective timing of the (alleged) lexical and morphological bursts (the latter, once more, with respect to the acquisition of tense markers).

5.1 Actionality and aspect

The first point should best be scrutinized with scheme (1) in mind. As often observed, at the early stages of child speech (henceforth CS) telic verbs tend to be used in perfective contexts, while atelic predicates exhibit a strong preference for imperfective ones. Later on, children depart from this pattern and converge towards the adults’ usage, where this sort of correlation, although present, is less pervasive. To properly examine this issue, one needs to label each occurrence of the aspectually ambiguous tenses with respect to the individual contexts, refraining from predefined assignments. This is especially important for the Present, which is in most languages both highly ambiguous (also in terms of temporal interpretation) and very frequently used in CS.

This labeling procedure was adopted by Bertinetto et al. (in press *a, b*) for the productions of three Italian children (Camillo, Raffaello, Rosa; the last two belonging to the Italian CHILDES corpus) and by Freiberger (2008) for the speech of an Austrian child (Lena). The children’s age was comprised between 1;6 and 3;0. To check for contextual interpretation, the video-recordings were inspected whenever available,

³ By contrast, no single grammatical category (including actionality and aspect) is innate, as suggested in sect. 1.

namely for Raffaello and Rosa. For all children, any context not univocally interpretable – either actionally or aspectually – was discarded from further analysis; the percentage of discarded utterances was, however, reassuringly small.

The productions of each child were divided into three developmental phases, based on the appearance of: the first tense contrasts with different verbs (phase 2); the first 3-member tense mini-paradigms within one and the same verb as produced in a single recording (phase 3). The latter phase coincides by and large with the proto-morphological phase, according to the model proposed in Dressler (1997) and Dressler & Karpf (1995; cf. also Kilani-Schoch et al. 2002, Bittner et al. 2003).

The data in Bertinetto et al. (in press *a*) and Freiberger (2008) show that, with respect to the actionality / aspect interaction, stative and telic verbs behaved as predicted by the traditional view. Activity predicates, however, present a different and intriguing case. Due to their atelic character, they should converge with stative verbs, but in fact the children's behavior is surprisingly variegated. Camillo conforms to the received view, for only at phase 3 – where perfectivity eventually prevails – the correlation with the caretakers' behavior finally appears. Rosa and Lena, by contrast, are always correlated with their caretakers, but contrary to expectations perfectivity wins even at the earliest stages. Finally, Raffaello correlates with his mother starting with phase 2, but unexpectedly perfective and imperfective uses are balanced through-out, except for the mother's third phase, where – unexpectedly again – imperfectivity prevails. Thus, two out of the three Italian children, plus the Austrian child, do not show with activity verbs the alleged pervasiveness of the 'actionality / aspect' interaction as predicted by the standard view. In particular: (i) Perfective uses may be remarkably large from the beginning (indeed, with Rosa and Lena they prevail); (ii) The input effect is evident throughout, instead of the predicted gradual convergence of CS towards the adults' model.

With specific respect to the input effect, the child directed speech (CDS) of the three Italian children was compared – phase by phase – to the adult directed speech (ADS) produced by the very same speakers. To obtain a sizeable ADS set, the productions of all caretakers were cumulated into a single bench-mark sub-corpus. For the sake of this comparison, all types of predicate (thus, not only activities) were considered with respect to the 'actionality / aspect' dimension. The analysis yielded an overall high

correlation between CDS (at all phases and for each child) and the single ADS corpus. The partial exception is Camillo's CDS, whose phases 2 and 3 were only weakly correlated to ADS (.05 level). Interestingly, however, Camillo is the only child showing the expected behavior, as far as activity predicates are concerned; hence, ironically, the only slightly deviant adults' set is precisely the one that fulfills, together with the corresponding child, the ideal picture predicted by the standard view.

The following conclusions suggest themselves: (i) The variable CDS behavior (with respect to the actionality / aspect relationship) remains altogether within the normal range, as shown by the CDS / ADS correlation. (ii) By some sort of transitivity, the variable CS behavior must reflect the children's sensitivity to the available input, as shown by the CS / CDS correlation. Hence, there is no evidence of any sort of universal acquisition footprint.

5.2 Tense markers and temporal adverbs

The second issue can be summarized as follows: What is the relative timing of cognitive maturation and morphology acquisition? There are three conceivable answers: (A) Cognitive maturation comes first; (B) Morphological maturation accompanies cognitive maturation; (C) Depending on the specific domain, either (A) or (B).⁴ As far as the domain of temporality is concerned, one has to inspect the relative timing of appearance of all sorts of time-referring devices: namely, tense affixes and time-referring adverbs. In order to prove hypothesis (A), one should find an initial stage of CS where – in order to localize the events in time – children exploit temporal adverbs, as well as the past- and future-oriented uses of the Present, as a substitute for the lack of tense affixes.

The behavior of the already mentioned four children was analyzed in this respect. Table 1 recapitulates the situation of Raffaello, offered here as an example. The data of the three Italian children are analytically described in Bertinetto et al. (in press *b*), those of Lena in Freiberger (2008). Table 1 indicates the time of first consistent appearance of the relevant types of marker/function, coinciding with the first white cell in each column. In one case, there is a light-grey area suggesting that, according to a more

⁴ The fourth possibility, such that morphological maturation predates cognitive maturation, is definitely implausible.

generous criterion, the time of appearance could be anticipated. Indeed, the first future-referring adverb emerges at 2;1: since, however, Raffaello does not use any other such adverb until 2;7, one wonders whether the first absolute occurrence should be taken at face value. Two of the columns refer, respectively, to the perfective- and imperfective-Past tenses. It should be noted that Raffaello is astonishingly precocious with respect to the appearance of the Imperfect. As for perfective-Past, the only tense used by the three Italian children during the whole observation period is the Compound Past (see also fn. 5). Relevant for the present discussion is the fact that, contrary to hypothesis (a), Raffaello does not employ time-referring adverbs at an early stage. Past-referring adverbs do not even show up within the recording period; future-referring ones do appear but, regardless of the criterion used, they follow rather than precede the appearance of the first instances of future-oriented Present.

Raffaello's situation is substantially similar to that observed with the other children. The following summary will concern the behavior of the four of them. For clarity's sake, it is best to examine the relevant ATAM features individually.

As for temporality, past-referring adverbs lack completely in Raffaello and Lena, and appear relatively late in Camillo and (even more) Rosa. The past-oriented use of the Present precedes the appearance of the perfective-Past only with Rosa (by 3 months) and Lena (by 6 months); with Raffaello and Camillo the two devices emerge at the same time. Explicit morphological contrasts in the temporal domain (i.e., the emergence of the first Present / Past tense opposition) appears early in the Italian children, a bit later in Lena's productions. As far as the past sub-domain is concerned, then, there is little or no evidence that cognitive maturation precedes the development of morphological competence. Indeed, past-referring adverbs definitely follow the emergence of the first Past tense, while the past-oriented use of the Present antedates the first past tense occurrences in only two children (and by a very short time-span). Besides, the latter use belongs to the caretakers' behavior as well, and therefore cannot be regarded as an exclusive feature of the child's emerging grammar. Reference to future, by contrast, antedates the appearance of the Future tenses, which are never used by the four children within the recording period. The future-oriented use of the Present emerges very early with Raffaello and Rosa, and slightly less so with Camillo and Lena. Future-referring adverbs appear after the future-oriented Present: one month later with Lena, three with

Camillo, four with Rosa, nine with Raffaello. The divergence of the future, as opposed to the past, sub-domain poses an interesting problem. To understand this difference, one should best consider the distribution of Past and Future tenses in the CDS of the Italian children, as shown in table 2. As it happens, the input offered to the children contains a very small number of Futures in comparison to Past tenses. It is no wonder, then, that the children are so slow in learning the former type of morpho-syntactic device. Note however that, rather than suggesting a universal cognitive constraint, this merely depends on the two languages considered. In Hebrew, L1-learners are very fast in acquiring the Future, as shown by Spharim & Nunio (2008); but, significantly, in this language the Future is obligatorily used in negative imperative sentences, which form a large portion of CDS.

As for aspect, the following observations are in order. On the one hand, it is difficult to locate the appearance of the imperfective vis-à-vis perfective use of the Present, for they are not overtly distinguishable. The appearance of the Present Progressive would be much stronger evidence; but since this morphological device is not widely used in Italian, one should not attach too much emphasis to this detail. At any rate, Raffaello is the only child to produce some examples of this construction, starting at 2;6. On the other hand, the first occurrences of the perfective-Past emerge simultaneously with (Rosa) or one month later (Raffaello and Camillo) than the future-oriented – and thus implicitly perfective – use of the Present, suggesting that the notion of aspect might be latently possessed (Lena does not count here, for German has virtually no aspectual oppositions). The appearance of the Imperfect is the final evidence that aspect is mastered at the morphological level. This occurs very early with Raffaello (2;0), lending further support to the early emergence of aspectual competence in this particular child. With Rosa and Camillo, however, the Imperfect appears quite later (2;6 and 2;8, respectively). Hence, contrary to the “aspect priority” view, there is ground to conclude that, in a substantially temporality-prominent language like Italian, temporality tends to be overtly mastered at an earlier stage than aspect.

This conclusion confirms the results of the previous section, substantially reducing the appeal of the standard view summarized in scheme (1). As for the issue discussed in the present section, hypothesis (A), claiming that cognitive maturation precedes the emergence of morphological competence, should be definitely rejected. Since the

available data do not allow the choice between hypotheses (B) and (C), the latter one will be provisionally retained due to its cautious formulation.

5.3 Lexical and morphological spurt

The last issue to be briefly discussed concerns the relative timing of the lexical and morphological spurt. Actually, not all authors endorse the existence of the former event. Without going into the details, one can note that things vary from child to child with respect to both the presence and the extent of the lexical burst. To the extent that this is observed in a given child, the claim often put forth – and supported by connectionist simulations – is that the grammatical capacities undergo rapid acceleration as soon as the dimension of the lexicon reaches a given threshold (the so-called “critical mass”). Marchman and Bates (1994), for instance, detected a clear correlation, for a group of English children, between the respective points of non-linear expansion of the verbal lexicon and of Past tense morphology. Similar observations were put forth by Bassano et al. (2004) analyzing the behavior of French and Austrian German children.

Following this line of research, the issue will be considered here in relation to the acquisition of the Past tenses by the four children of the reference corpus. The measure adopted is the “Verb expansion rate” (V-Rate), expressed by the formula in (2), where V_{t_i} and N_{t_i} are, respectively, the number of verb- and noun-types cumulatively produced by the child in the recordings from t_1 to t_i , while $V_{t_{i+1}}-V_{t_i}$ and $N_{t_{i+1}}-N_{t_i}$ indicate the number of new verb- and noun-types produced by the child in recording t_{i+1} :

$$(2) \quad \frac{V_{t_{i+1}} - V_{t_i}}{N_{t_{i+1}} - N_{t_i}}$$

This method, which compares the incremental rate of verbs with respect to nouns throughout the various recordings, has the advantage of neutralizing the recordings’ size, avoiding undesirable distortions. By plotting the V-rate over time, as in figure 1 referring to Raffaello (see Bertinetto et al. in press *b* and Freiberger 2008 for the figures relating to the other children), one can inspect the verb-expansion curve. Besides identifying possible phases of non-linear acceleration (spurt- or burst-phases), the slope of the curve provides a direct insight on the V-rate dynamics: a rising slope indicates a

faster expansion of verbs as opposed to nouns, while a falling slope indicates the inverse situation.

The four children present individual differences in V-rate evolution, but also a common tendency. The latter consists in the presence of a phase of V-spurt, in most cases followed by a more stationary phase. The individual differences concern the exact time location of the spurt phase, which varies from child to child, as well as the abruptness of the verb-growth acceleration, which appears to be rather weak in Rosa and much sharper in the other children. The present discussion, in any case, does not intend to claim that the V-spurt phenomenon has universal validity; the purpose is simply to highlight the temporal correlation between the observed V-spurt and the emergence of grammatical competence. The latter is specifically illustrated by the use of Past tenses, witnessing the acquisition of an overt morphological contrast within the temporality domain (Past as opposed to Present). The crucial observation is that in all children the V-spurt is followed, at a very short delay, by a noticeable increase in Past tense usage, showing that the attainment of a critical mass of lexical density is a precondition to grammatical maturation. In the Italian children, this is best observed (as in figure 1) in the Past-perfective curve (Compound Past and bare Participle)⁵, because the number of Imperfects is relatively small, even in the case of a remarkably precocious learner such as Raffaello.

One objection could be raised against this conclusion. Since the verb-spurt leads to a sharp increase in Past tense usage, one might surmise that each new verb entering the lexicon in the spurt-phase is assigned the Past tense, thus suggesting rote-learning rather than morphological competence maturation. To shed light on the issue, one can inspect the emergence of tense mini-paradigms (in the very restricted sense of different tense-

⁵ The bare Participle, often used by Italian children at the early stages of language acquisition, is usually interpreted as an elliptic form; i.e. as the Compound Past with auxiliary deletion, to reduce the complexity of the form. One might object that it is not a fully grammatical form, but in any case its appearance does not normally antedate the first occurrences of the Compound Past. The two forms should thus be considered alternative realizations of the same tense, whose choice possibly depends on independent constraints, such as the number of words in the utterance. Additional evidence to this interpretation stems from the variable realization, at the early stages, of the (stress-less) auxiliary also in nominal and adjectival predicates, ranging between: \emptyset , indistinct schwa, fully-fledged item.

forms)⁶ based on one and the same verb within a single recording. As table 1 shows, with Raffaello there is tight coincidence of the first appearance of Past-perfective forms and of 2-member mini-paradigms. With Lena and Rosa the emergence of mini-paradigms is delayed by only one month. The only child showing a substantial delay (four months) is Camillo. Thus, in general one may confidently assert that the Past-tense-spurt is fairly good sign of the emergence of morphological competence. This conclusion is further strengthened if one conceives of mini-paradigms in a larger sense, namely as composed not only of different tenses, but of different forms in general (as distinguished by person and number, in addition to tense). Producing different person/number forms is enough to counteract the tendency towards mere rote-learning. The behavior of the three Italian children is revealing: with Rosa, the first person/number mini-paradigms emerge simultaneously with the first instances of Past-perfective forms; with Raffaello and (most importantly) Camillo they even emerge one month earlier. With this in mind, one can safely assume that the above suggested conclusion, with respect to morphological maturation, is supported.

Summing up, the data from the four children considered confirm the possibility (if not the necessity) of a strict time convergence of the lexical and morphological spurts. Apparently, the learning child needs to accumulate a sufficiently large amount of lexemes for the morphological component to gain momentum. In turn, this lends support to the findings by Laaha & Gillis (2007), according to which morphological complexity supports the linguistic maturation, rather than hindering it. Indeed, the morphological spurt seems to occur fairly early, showing that children are able to soon detect, and take advantage of, the most salient morphological contrasts available in the input. The observed convergence of the lexical and morphological spurts might then be viewed as yet another instance of the interplay between cognitive and grammatical maturation, under the assumption that lexical expansion is an important aspect of the former. As noted in the previous section, the two dimensions seem to go hand in hand.

⁶ Needless to say, tense mini-paradigms do not only consist of the contrast Present / Past. In Italian, for instance, the early productions contain, besides the Present, the Imperative (to the extent that it differs from the Present) and the Infinitive. See also fn. 5.

6 Conclusion

This paper presented a new model of ATAM acquisition. Instead of a projectionist and universally-valid acquisition path, based on the alleged “aspect priority”, it defended a constructivist and typologically-oriented view, whereby the trigger role may be played by any of the major ATAM domains, depending of the structure of the individual language. The basic assumption is that children develop their ATAM competence out of an initially syncretic proto-category. Which particular domain (or domains) takes the lead in the acquisition process depends on the morphological setting of the target language. For instance, actionality-prominent languages – typically providing overt marking of the telic / atelic contrast – offer the learners first and foremost actionality as concrete support for their category-disentangling task. When the acquisition process is completed, however, all major categories are active in the speaker’s competence, despite their varying degrees of explicitness. Some categories might be fully developed, up to the most subtle nuances, due to the morphological explicitness of the language. Some might, by contrast, remain latent and parasitic on other categories, inasmuch as they are not overtly expressed. The latent categories will thus only have a marginal presence in the speaker’s competence, just as they are the last ones to be learned. Yet, even in this case all the fundamental ATAM features will be at work. Although possibly neutralized in a given language – i.e. conveyed by ambiguous *signifiants* – they will be accessible to the speaker whenever the context provides sufficient cues, for they correspond to primary cognitive needs (Bertinetto 2008). The subtle interplay between our basic cognitive capacities and the actual grammars of native languages is an essential part of the human (pragma-)linguistic competence.

Needless to say, the hypothesis proposed above should be checked against a wide range of languages with the most diverse characteristics: temporality-dominant, aspect-dominant etc. (including various combinations of these ideal types). Hopefully, converging results will stem from the work of other scholars, as well as from further studies planned by the research team coordinated by the present author.

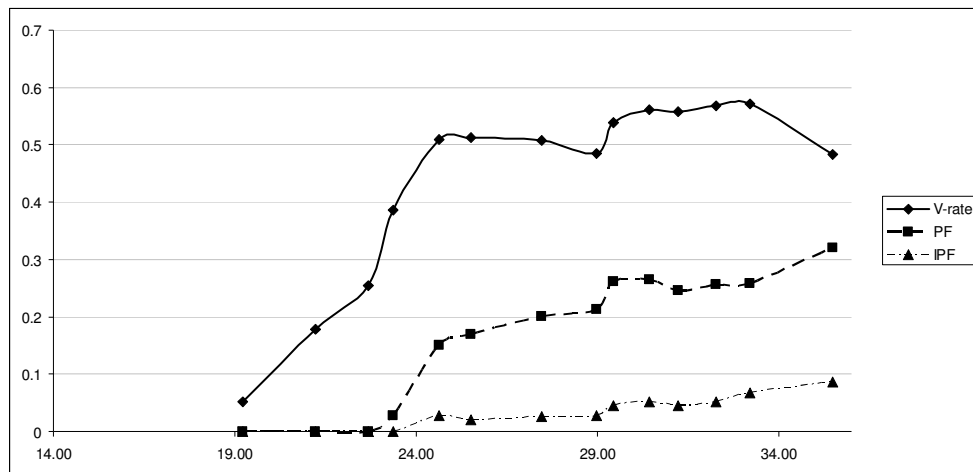
Table 1. Temporal evolution of lexical and morphological devices for past- and future-time-reference with one Italian child (Raffaello)

Age	Past-referring Adverbs	Fut.-referring Adverbs	Past-oriented Present	Fut.-oriented Present	Compound Past (past-perfective)	Imperfect (past-imperfective)	2-member tense mini-paradigms
1;7							
1;9							
1;10				+			
1;11			+		+		+
2;0						+	
2;1		(+)					
2;2							
2;3							
2;4							
2;5							
2;6							
2;7		+					

Table 2. Past- and Future-tenses in the CDS of three Italian children.

Tense	Camillo	Raffaello	Rosa
Compound Past	562	468	861
Imperfect	239	514	183
Simple Future	50	45	8
Compound Future	2	4	1
% of Future vis-à-vis Past	6,5%	5%	0.1%

Figure 1. V-rate and Past tenses expansion in Raffaello (PF= perfective-Past, namely Compound Past plus bare Participle; IPF= Imperfect).



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