Synonyms:
First language acquisition, L1 learning process, Language development, Language acquisition

Definition

Language acquisition is a process which starts three months before birth (Elman et al 1996; Karmiloff & Karmiloff-Smith 2001) and gradually leads to the child's mastery of his/her native language/s, at around adolescence. Language *learning*, language *acquisition* and language *development* can be understood as synonymous. However, this lexical differentiation carries interesting theoretical nuances.

Theoretical background

Why would a child *acquire* and not *learn* or *develop* a language?

The term *acquisition* reflects the influence of Noam Chomsky, and of nativist (generativist) models inspired by his work, since the late 1950s. The term is rooted in linguistics, and emphasizes the notion that grammar is only triggered by the environment rather than learned. It also implies that language development is rather independent of other kinds of development, whether linguistic or otherwise. The process depends on inherited grammatical knowledge. Its modelling is formalist with the role of experience reduced to the bare minimum.

The term *learning* ties up with *behaviourism*, and is rooted in psychology. In the late 1950s, Skinner put forward the first scientific explanation of how a language is *learned*. It focused on experience, and on an associative language learning process, with reinforcement by adults gradually shaping the child's language performance.

Currently, the constructivist-emergentist models describe language development as a process of ontogenetic, gradual, complex, and adaptive change. Change is driven by a complex interaction of experience and the learning brain, plus some *general* innate constraints. Emergentist models claim to reveal how the grammar of a language is learned. Their evidence would imply that it is not enough to "land" in a linguistic setting -*á la Skinner*-, but instead, it is necessary to add rich internal cognitive dynamics to the learning process. Their evidence would also imply that knowledge which is already linguistic and is innate –*á la Chomsky*- is not needed in a scientific account of the language development process.

Much of the current research on child language is based on emergentism (Bavin 2009). Emergentist models are related to the theory of complexity. It is argued that the language acquisition process itself is a recursive process by which interactions among primitive linguistic elements give rise to higher-level

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emergent linguistic entities with emergent properties, such that interactions amongst these new emergent linguistic entities give rise to yet higher-level emergent entities with their own emergent properties, and so on.

Current language acquisition research has gained reliability, depth, and detail using new methodology. Neuro-imaging techniques are frequently used, identifying neurological correlates of early language processing (Elman et al 1996). A form of computer modelling (connectionism, neural nets) is a rich source of hypotheses of possible brain-like processes of analysis and representation (Elman et al 1996). Nowadays research in the field is often multicultural and multidisciplinary. Research questions are better focused and new experimental methods like eye-tracking, or preferential looking have been devised to investigate early comprehension processes. As questions have become more precise, fine-grained analyses based on massive detailed information have been devised. Nevertheless, longitudinal corpora still form the backbone for a number of questions in the field, especially in studying new phenomena or new languages.

The use of child language corpora itself has been enhanced by the availability of computer software and hardware, which has enormously facilitated research. Nowadays the language which is directed *to* the child is also a research field, seeking to further elucidate the observed growth in the child's linguistic competence. Since 1991 collaboration has resulted in the database of the Child Language Data Exchange System (CHILDES) (http://childes.psy.cmu.edu), which includes longitudinal acquisition data from normal monolingual and bilingual children of many languages, plus the same sort of data for atypical language development. Parent report measures for documenting the linguistic and communicative development of infants and toddlers have also been created. A screening instrument for differentiating atypical from normal development from very early on (8 months) exists for many different languages (www.sci.sdsu.edu/cdi/cdiwelcome.htm).

Important scientific research and open questions
Most present day scientific questions have to do with how babies, toddlers and children 'crack the code' to become competent language users. Language has a formal structure which is never explicitly taught to the small child. In spite of that, by about 27 months of age children successfully start finding the grammar of their language/s.

Nativist models propose all humans are endowed with genetic grammatical knowledge, termed UG (Universal Grammar). UG is a set of very general grammatical "rules" which will somehow mature and then guide the child in its search for the grammar of the environmental language/s it is born to (Chomsky 1972; Hauser et al 2002). Because language acquisition is assumed to depend on the genetic UG endowment, and/or its "maturation", research from this perspective focuses on possible descriptions of the genetic UG. The model does not focus on the roles played by the environment, by the experience, by the brain, and by the cognitive processing of the learner.

Emergentist models are not strictly empiricist. Rather, several innate but *general* brain processing constraints are described which bias the human learning process and experience (Bavin 2009; Elman et al 1996; Karmiloff & Karmiloff-Smith 2001; Tomasello 2003). As opposed to nativism, along development, the child´s brain develops language-specific processing mechanisms, which are a *consequence* of its successful language learning history.

As for open research questions, within emergentist models the notion of *local learning* constitutes a lively research field today. According to this children learn linguistic categories through statistical learning procedures applied to specific examples. Analyses of these categories lead to rule-like structures themselves then subject to analysis. This language learning process would, at first, advance practically item-by-item. This is why researchers observe that, at first, a certain language structure (an inflection, an agreement, a syntactic structure) is only produced correctly with one or a few words, and not with others, in specific local contexts, and not in others (Bavin 2009; Tomasello 2003).

Another set of open research questions stems from the fact that although the language development process is apparent in the growth of the child´s production, it also occurs both in the *input* and in the learning *system* itself. Both the input and the learning system change along the process becoming, themselves ever more complex. The learning system is said to *filter* the quantity and quality of input it receives as a function of its own developmental state (Elman et al, 1996). In turn, it modifies itself, creating various types of transitional states on the way. It is these transitional states which are the focus of much current research.

A third set of issues concerns the development of intentional communication. The general cognitive skills of small children will help them identify the distributional patterns of their language(s) but will also help them identify the intentions of the model speakers (Tomasello 2003). Closely tied to this is the issue of imitation. Imitation plays an essential role in the take-off of any particular language acquisition process. Children begin to learn linguistic structures by imitating linguistic exemplars which implement them, even though, in the end, what they learn is the *language*, the formal conventional system. Imitation is not a single learning mechanism, but a conflation of many of them. In order for an immediate imitation of a linguistic structure to take place:
a-the learning system must have oriented its attention to that structure,
b-the intention of the imitated speaker must have been hypothesised,
c-the detected structure must have been segmented out of the continuous speech stream,
d-the system must have built a motor equivalent of the perceived structure,
e-the articulatory system must produce it.
Currently, each one of those processes constitutes a research field of its own. A linguistic structure which can be "imitated", can also be internally "represented" and stored. This inner availability, in turn, would allow the system to search for statistical regularities in the stored materials.

There is now much research activity on what could be part of a neurological support of imitation, the Mirror Neuron System, first described in adult macaque monkeys. This is a series of neurons that fire not only when the subject performs an action but also when it observes another performing that action (Tomasello 2003).

Another group of current research questions focus on the acquisition of discourse, in later language development. During the *early* language acquisition process, the child succeeds in learning a basic linguistic code (phonology, lexicon, morphology, syntax, semantics, pragmatics) of his-her language/s. Five year-olds are still not fully developed speakers, but they have the foundations of their language/s. From then onwards, until adolescence, the process is termed *late* language acquisition (Bavin, 2009).

Narrative and dialogue are special cases of discourse. Dialogue itself is an "easy" case of narrative, by which human beings can build oral texts through cooperation. Narrative involves guiding a listener through a beginning, a middle, and an end while linking successive sentences together by using linguistic instruments such as tense marking, connectives, and pronouns. Such linguistic instruments (cohesion devices) allow the speaker to refer back to things said earlier, to leave things unsaid, to link events coherently, to progress through the narrative smoothly, to avoid going back through every detail (Karmiloff & Karmiloff-Smith 2001). Research today is examining how conceptual coherence and linguistic cohesion relate to one another dynamically at every stage of children´s discourse development.The development of subtle linguistic features such as humour, sarcasm and metaphor each constitute a research field today. Language development is a very long developmental process, perhaps the slowest development of all human cognitive abilities.

But linguistic development in literate societies also includes the learning of a meta-language. In many societies, by the time children are starting to acquire some basic oral discourse skills, they also start to be explicitly trained in reading and writing. This new linguistic level requires the learning of letter and written word recognition, the refinement of phonological awareness, the development of completely new spelling skills, the learning of letter-to-sound correspondences and the learning of new narrative skills as applied to the written form. This meta-level of linguistic development, in turn, creates its own difficulties in development and its own observable effects on brain connectivity. All of them are subject of specialised research today.

There are many different types of language learner for each of which there is dedicated research (Bavin, 2009). For example, for the child born into a bi/tri-lingual environment the normal process of language learning takes place in the various languages simultaneously. With the exception of some trivial confusions the bi/tri-lingual baby, toddler, or small child, gets to match the linguistic level of monolingual children in his-her languages at around age 4-5. The same overall normality is found in deaf children born to deaf parents who are users of a sign language. Most deaf babies, though, have hearing parents who do not know a sign language, and these babies have more difficulties. Atypical language developments, like Specific Language Impairment (SLI),

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Autism Spectrum Disorder (ASD), Williams Syndrome and Down Syndrome each constitute highly developed specialized fields, with interest not just on their own, but also for issues of brain plasticity, and of brain activity patterns as dependent on linguistic development and linguistic experience.

Even within "normal" language development processes there are variations. There are differences in the language acquisition process which depend on differences in culture, or in language, or in socioeconomic status (SES) but in addition deep individual differences have been found. in "equivalent" children, i.e. the same culture, the same language, and the same SES. These variations, difficult to reconcile with nativist (UG) models are linked with subtle differences in linguistic experience and processing as would be predicted in the emergentist model.

People might suppose all adults belonging to the same linguistic community will be equivalent in their mastery of their common language. But that intuition rests on the typical descriptive paradigm for mainstream linguistics. The intuition of the homogeneous speech community is a fiction. Instead, one of the more striking ways in which individuals differ is in their learning and use of language (Bavin 2009; Elman et al 1996). Interestingly, some individual variations in language development suggest that the learning system follows alternate *paths* or routes in the acquisition of particular sounds, or words, or grammar, or of narrative (Karmiloff & Karmiloff-Smith 2001). This plasticity of the process constitutes another interesting research issue today.

Cross References
Bilingualism; Connectionist theories of learning; Constructivist learning; Developmental cognitive neuroscience and learning; Imitation: definitions, evidence, and mechanisms; Language development and behavioural methods; Self-organized learning; Speech perception and learning

Reference list
Bavin, E.L. (2009) (Ed.) *The Cambridge handbook of child language.* New York: Cambridge University Press

Chomsky, N. (1972). *Language and mind.* New York: Harcourt

Elman, J.L, Bates, E., Johnson, M.H., Karmiloff-Smith, A., Parisi, D., & Plunkett, K. (1996). *Rethinking innateness: A connectionist perspective on development.* Cambridge, Mass: MIT Press.

Hauser, M.D., Chomsky, N., & Fitch, W.T. (2002). The faculty of language: what is it, who has it, and how did it evolve? *Science,* 298, 1569-1579.

Karmiloff, K. & Karmiloff-Smith, A. (2001). *Pathways to language: From fetus to adolescent.* Cambridge, Mass: Harvard University Press.

Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition.* Cambridge, Mass: Harvard University Press.