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**Introduction**

Language acquisition is the process by which speakers come to have knowledge of a language. Although the term encompasses acquisition of both first (i.e., native) and second (i.e., foreign) languages, by mono-, bi- and multi-lingual children and adults, with and without various forms of language impairment, the present section focuses mainly on monolingual first language acquisition amongst typically-developing children (**Bilingualism** is subsequently discussed in its own entry. Written language is not normally considered within the remit of language acquisition research; hence the inclusion of separate entries for **Reading and writing** and **Schooling and literacy**).

The reason for the use of the neutral term *acquisition* (as opposed, for example, to *learning* or *development*) is that one of the two major theoretical approaches (the *generativist* or *nativist* approach) holds that many important aspects of language are not learned at all, but instead are present from birth (i.e., innate). This knowledge takes the form of an innate *Universal Grammar*; a set of categories, rules and principles that apply, potentially, to all of the world's languages. The opposing view (the *constructivist* or *usage-based* approach) holds that children are not equipped with this type of innate knowledge, but instead construct their knowledge on the basis of the language that they hear from their parents and other adults. Readers new to the field should be aware that it is generally very polarized with regard to these two approaches, and that many textbooks, chapters and articles start from the assumption that one or other of the two theoretical frameworks is the correct one, and simply ignore (or dismiss in a sentence or two) theoretical proposals, and even research findings, associated with the rival approach.

In contrast, the aim of the present section is to compare – in as even-handed a manner as possible – generativist and constructivist accounts of some of the major phenomena in child language acquisition research, focusing on the core domains of syntax and morphology (though the dichotomy is also largely applicable in the domains of word learning and speech

perception/production; see the entries for **Cognitive development beyond infancy** and **Speech development** respectively).

Languages use two main devices to convey who did what to whom: **Syntax**, or word order (e.g., *The dog chased the cat* vs *The cat chased the dog*) and **morphology**; changes that words undergo to mark distinctions such as tense (e.g., *plays* vs *played*; present vs past), person (*I play* vs *He plays*; 1<sup>st</sup> person vs 3<sup>rd</sup> person) and number (*He plays* vs *They play*; singular vs plural). We begin by looking at three aspects of syntax acquisition, before moving on to consider morphology.

**Syntax**

*Assigning words to syntactic categories.*

As we saw in the introduction, the main distinction between generativist and constructivist approaches to language acquisition is that the former assume that important some aspects of grammar are innate (i.e., present from birth), while the latter assume that all are learned on the basis of the input. A particularly clear illustration of these two positions is the debate regarding syntactic categories. For most – and perhaps all – languages, the two most fundamental categories are NOUN and VERB. The NOUN category contains words that refer to concrete objects (e.g., *ball*, *chair*), to people, names and places (e.g., *man*, *John*, *London*) and abstract entities or ideas (*situation*, *democracy*, *happiness*). The VERB category contains words that refer to actions (e.g., *bite*, *kick*), to changes of state (e.g., *melt*, *freeze*) and to ongoing activities or states of affairs (*see*, *hear*, *live*, *love*, *justify*). For children learning language, acquiring these categories is a fundamental task, as they constitute the building blocks for the majority of the utterances that a child will hear or produce. For example, as we will see in the next section, as soon as the child has learned (a) the categories NOUN and VERB and (b) the way that her language uses orders of these categories to convey particular meanings, she will be able to produce an infinite number of sentences. For example, English uses [NOUN] [VERB] [NOUN] order, with the first NOUN denoting the subject (e.g., the do-er of an action) and the second, the object (e.g., the entity that has the action done to it). This information allows the child to produce sentences such as *John kicked [the] ball*, *[The] dog saw [the] cat*, and even *[The] situation justified [the] measures*, provided she has not only learned the

necessary words, but assigned each to the relevant syntactic category (e.g., dog=NOUN, justify=VERB).

So, just how do children do this (given that words in the speech stream do not, of course, come with syntactic category labels)? According to generativist accounts, the categories themselves are innate. That is, the knowledge of Universal Grammar with which children are born includes the knowledge that languages contain the categories NOUN and VERB. This simplifies the problem, as children are not faced with the task of building these categories from scratch, but does not solve it entirely: Children must still somehow assign each of the words that they hear to one of these pre-existing categories (not just NOUN and VERB, but also ADJECTIVE [e.g., *happy*, *sad*], DETERMINER [e.g., *the*, *a*], PREPOSITION [e.g., *in*, *on*], WH-WORD [e.g., *what*, *who*], etc.).

Perhaps the two leading generativist proposals for how children do this are those of Pinker (1987) and Christophe, Milotte, Bernal & Lidz (2008). Under Pinker's *semantic bootstrapping* hypothesis, children's innate knowledge of language contains not only syntactic categories (e.g., NOUN, VERB), but also semantic categories (e.g., PERSON/THING, ACTION/CHANGE OF STATE) and linking rules that pair-up the two (e.g., PERSON/THING = NOUN; ACTION/CHANGE OF STATE = VERB). This helps the child because, unlike syntactic categories, semantic categories are observable in the world. Suppose, for example, that the child hears a sentence such as *The dog bit the cat*, while seeing this event takes place. We also need to assume that the child knows what *dog*, *cat* and *bite* mean (i.e., she is aware of the particular aspect of the unfolding event to which each word refers). This real-world knowledge (e.g., that *dog* and *cat* are THINGS and *bite* is an ACTION) allows the child to assign each word to the relevant syntactic category: *dog*=THING=NOUN, *cat*=THING=NOUN, *bite*=ACTION=VERB. Once the child has used these linking rules to break into the system, they are largely abandoned in favour of distributional analysis: Items that occur in the same sentence positions are grouped into the same category. This allows the child to correctly classify NOUNS that do not refer to THINGS and VERBS that do not refer to ACTIONS. For example, *situation* could be assigned to the NOUN category on the basis that, like *dog* and *cat*, it tends to occur immediately after *the*.

One potential problem for Pinker's theory is that it would seem to predict that VERBS that do not denote ACTIONS should be learned later in development. In fact, nonactional verbs such as *have*, *get*, *see* and – of course – *want* tend to number amongst children's earliest verbs (though one could argue that they are using them with a more actional meaning than do adults). A second potential problem is that children will hear NOUNS that refer to ACTIONS (e.g., *spanking*), which could therefore be incorrectly assigned to the VERB category (we will encounter a third in the following section). Pinker's (1987) solution to these problems is to have the linking rules operate only probabilistically, competing with other factors such as distributional analysis. However, this solution is in danger of raising more problems than it solves. For example, if the child is unable to definitively assign *any* words to syntactic categories on the basis of their meaning alone (e.g., *dog*=THING=NOUN), then distributional analysis will reveal that *situation* is in the same category as *dog*, but not what category this is.

Christophe et al (2008) propose that children use function words to identify syntactic categories. For example, their innate knowledge could include the information that, if a phrase contains a DETERMINER (e.g., *the* or *a*) plus one other word, then that word must be a NOUN. This raises the question of how children know that *the* and *a* are DETERMINERS. Christophe et al's (2008) solution is again innate knowledge. One relevant piece of knowledge is that a DETERMINER can combine with a NOUN to form a NOUN PHRASE (e.g., *the dog*; *the cat*). Another is that a sentence (or, more strictly speaking, a clause) can contain two NOUN PHRASES, but only one VERB PHRASE. Armed with this knowledge, if the child hears a sentence such as *The dog bit the cat*, she will be able to infer that *the dog* and *the cat* are NOUN PHRASES, and hence that *the* is a DETERMINER and *dog* and *cat* nouns. A problem for this account is that it is far from clear that there exist suitable 'flags' for every syntactic category (e.g., DETERMINERS are flags for the NOUN category), even in English, let alone for every language of the world. For example Russian does not use DETERMINERS, so a different flag would be needed. (Incidentally, the DETERMINER category has provoked particularly intense debate between the two sides; see the further readings section for one relevant paper).

Constructivist accounts sidestep this problem by arguing that children do not need flags or ways to bootstrap into innate syntactic categories, because there are no innate syntactic categories. Instead, children build these categories gradually from the input using distributional analysis. Although this proposal shares with that of Pinker (1987) the use of distributional analysis, the difference is that children simply use these distributionally-defined clusters directly, rather than hooking them up to innate categories. For example, a child might learn that, if two nouns have both appeared after *the* (e.g., *the book*, *the ball*) and the first has appeared with *a* (e.g., *a book*), then the second can probably also be used with *a* (e.g., *a ball*). This process is driven by the input, and makes no reference to an innate category of NOUN or DETERMINER.

Another difference from proposals such as that of Pinker (1987) is that the distributional analysis is *functionally based*. Children group together not only words that share similar distributions, but also those that are used in similar ways. For example, the verbs *want*, *buy*, *eat* and *like*, while not particularly similar on the surface, usually involve a human and a smaller inanimate object. A *car* is not like a *movie*, but both can be bought, rented or stolen by humans, and can be good or bad, long or short, cheap or expensive etc.

An advantage of this account is that using fine-grained distributionally-defined clusters avoids some of the problems associated with relatively coarse syntactic categories. For example, a learner who assigned count (e.g., *book*) and mass nouns (e.g., *mud*) to a single innate NOUN category would make non-childlike errors such as *\*a mud*. A learner who formed more fine-grained distributional clusters (e.g., count noun, mass noun), and used these clusters in production would not make such errors (Freudenthal, Pine & Gobet, 2005). A disadvantage of the constructivist account is that it does not offer a satisfactory explanation of how children acquire the abstract rules that allow them to produce novel sentences; a question to which we now turn.

#### Combining words into sentences.

An important assumption of the generativist approach is that children's innate Universal Grammar contains not only syntactic categories (e.g., NOUN, VERB), phrases (e.g., NOUN PHRASE, VERB PHRASE) and syntactic roles (e.g., SUBJECT, OBJECT), but also rules for combining them into sentences. For example, children are born with rules that

form a sentence by combining a SUBJECT NOUN PHRASE, and a VERB PHRASE (which may contain, in addition to the VERB, an OBJECT NOUN PHRASE):

[NP<sub>SUBJECT</sub>] [VP[V] [NP<sub>OBJECT</sub>]]  
 The dog bit the cat

These rules are often represented using a syntactic tree. Figure 1 illustrates these rules, as well as one that we met in the previous section: that a NOUN PHRASE may contain a determiner (e.g., *the*, *a*) as well as the NOUN.

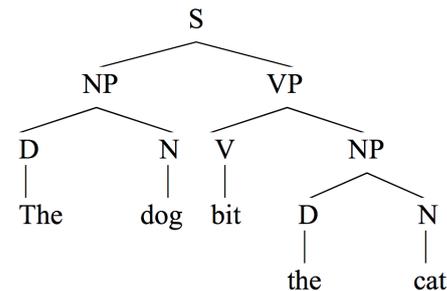


Figure 1. Innate rules for combining syntactic categories and phrases into sentences.

As we saw above, because these rules are innate rather than learned, as soon as children have assigned words to the relevant syntactic categories, they are almost ready to begin using them to produce sentences. The reason they are not quite ready is that the innate rules (e.g., VP = V+NP) do not specify the order of the constituents. Indeed, they cannot do, because this varies between languages. For example, in English, a VERB PHRASE consists of a VERB, followed by a NOUN PHRASE (e.g., [*kicked*] [*the ball*]). In Turkish, a VERB PHRASE consists of a VERB preceded by a NOUN PHRASE (e.g., [*the ball*] [*kicked*]). Because the VERB is the “head” of the VERB PHRASE (just as all phrases are named after their head category), we say that English is *head-first*, while Turkish is *head-final*. Thus, a key assumption of the generativist approach is that, before children can use their innate rules to produce sentences, they must first set the *head-direction parameter*: a kind of inbuilt mental switch with two settings (*head first/head final*).

An advantage of parameter-setting approaches (e.g., Sakas & Fodor, 2001), is that, because children can set the head-direction parameter on the basis of, in principle, a single utterance, they explain the fact that children seem to learn language relatively quickly, and rarely, if ever, make word order errors with these type of basic sentences (e.g., *\*The dog the cat bit*). A

problem for parameter setting approaches is that it is unclear how children are able to recognize the heads in the language that they hear. For example, an English speaking child could use an input sentence such as *The man kicked the ball* to set the head-direction parameter, only if she were somehow able to recognize *kicked* as the head of the VP *kicked the ball*; but, of course, speech does not come with these labels. A second problem is that, because children must set multiple parameters simultaneously, many sentences will not provide unambiguous evidence of the correct settings. One possible solution to these problems is that children use phonological information to set the parameter (e.g., Christophe et al, 2008). For example, head-first language tend to place stress on the end of the phrase (e.g., *kicked **the ball***), and head-final language at the start (***the ball** kicked*). However, it is far from clear that this correlation is sufficiently robust for the strategy to be reliable crosslinguistically.

An alternative generativist approach is Pinker's (1987) syntactic bootstrapping hypothesis. In addition to the innate linking rules discussed above (one linking ACTION to VERB), Pinker proposes rules linking AGENT (the do-er of an action) to SUBJECT and PATIENT (the entity that has the action done to it) to OBJECT. This would allow the child to use a sentence such as *The dog bit the cat* (AGENT ACTION PATIENT) to discover that English uses SUBJECT VERB OBJECT word order. Together with other innate linking rules, this knowledge would allow children to infer the syntactic structure of the target language (e.g., Figure 1, for English). However, in addition to the problems discussed above (including the existence of nonactional verbs, and actional nouns), Pinker's account (1987) suffers from the problem that some languages (e.g., Dyirbal) link semantic and syntactic categories in a different way to English. Furthermore, languages differ as to which entity they conceptualize as the PATIENT of a given event. For example, the Chechen-Ingush equivalent of *Johnny hit Tommy with a stick* has *a stick* rather than *Tommy* as the PATIENT (a rough paraphrase would be *Jonny hit a stick onto Tommy*).

According to the constructivist approach, children do not have innate categories or rules, but instead learn basic word order from the input. Children start out with rote-learned holophrases (e.g., *I+hold+it; I+eat+it; I+get+it*), across which they abstract to acquire low level *lexically-specific construction schemas* or *slot-and-frame patterns* (e.g., *I [ACTION] it*). Later, children

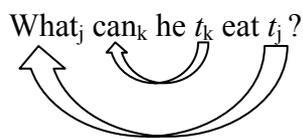
analogize across these partially-abstract schemas (e.g., *I [ACTION] it; He's [ACTION]ing it; She's eating [THING]*) to arrive at a wholly abstract [SUBJECT] [VERB] [OBJECT] construction.

An advantage of the constructivist approach is that it offers an explanation of the fact that children's linguistic development appears to be not only uneven (which we would not expect if children have generativist-style abstract knowledge), but uneven in a way that reflects the input; i.e., forms that are frequent in the input are acquired earlier, and show lower error rates, than more frequent forms (e.g., Tomasello, 2003; Ambridge & Lieven, 2015; Ambridge, Kidd, Rowland & Theakston, 2015). For example (1) in naturalistic data studies, a high proportion of children's utterance appear to reflect the use of a small number of slot-and-frame patterns whose source forms are frequent in the input; (2) in elicitation studies, young children rarely produce full SUBJECT VERB OBJECT sentences with novel verbs; but when they do, they almost always use pronoun forms that suggest the use of a slot-and-frame pattern (e.g., *He's [ACTION]ing it*); (3) in weird-word-order studies, young children imitate unconventional word orders for low-frequency and novel verbs, but not high-frequency, familiar verbs.

A potential problem for the constructivist approach is that, when tested with comprehension paradigms, children show evidence of generativist-style abstract knowledge of word order from a much younger age. For example, even young two-year-olds are able to point to a matching video in response to a sentence such as *The duck is glorping the bunny* or *The bunny is glorping the duck*. However, one could argue that the predictions of the constructivist account relate not to age, but unevenness (Ambridge & Lieven, 2005). A more serious problem for this approach is that it offers only a very general sketch of how children move from lexically-specific to abstract constructions (e.g., Tomasello, 2003: 163-169) and that this aspect of the account has not, to our knowledge, been tested empirically. In contrast, the generativist approach – by essentially placing adult levels of abstract knowledge in the head of the child – sidesteps this problem; though at the expense of failing to satisfactorily explain the apparent unevenness of children's early syntactic knowledge.

### Movement constructions

The debate plays out in a very similar way for “movement constructions”: passives (e.g., *The cat was bitten by the dog*), relative-clause sentences (e.g., *The cat who the dog bit chased the mouse*) and – our example construction for the present section – questions. Generativist approaches assume that children’s innate knowledge of Universal Grammar contains two *movement rules*. One (*subject-auxiliary inversion*) moves the auxiliary (e.g., *can*) from after to before the subject (e.g., *he*). The other (*wh-movement*), which applies to *wh-* but not *yes/no* questions, moves the *wh*-word from its underlying position at the end of the sentence to the beginning of the sentence (see Figure 2):



**Figure 2:** *Wh*-movement and subject-auxiliary inversion in questions

This movement is illustrated by the subscript notation, with  $t_j$  and  $t_k$  indicating the positions from which *What<sub>j</sub>* and *can<sub>k</sub>* have moved. That is, the sentence starts out as *He can eat what?*, then is successively transformed into *What he can eat?* and *What can he eat?* by subject-auxiliary inversion and *wh*-movement respectively.

Just as for basic word order, the advantage of generativist accounts of question acquisition (e.g., Santelmann, Berk, Austin, Somashekar & Lust, 2002) is that they explain why children appear to acquire questions relatively quickly and easily, despite their unusual word order. Furthermore, although, for certain question types, children make word-order errors at relatively high rates (i.e., 50% and above), these errors are not random, but appear to reflect misapplication of the movement rules. For example, one error type that is particularly frequent, especially for negative questions, is auxiliary doubling (e.g., *\*What does he doesn't like?*), which can be analysed in terms of “copying plus deletion failure”. *Wh*-movement is applied correctly, but the subject-auxiliary inversion rule goes awry. The child correctly copies the auxiliary from its original position (after *he*) to its new position (before *he*), but then forgets to delete the original. Another common error type, subject auxiliary uninversion (e.g., *\*What he can eat?*) can be explained in terms of failure to apply the subject-auxiliary inversion rule altogether. The generativist approach even has

a ready explanation of why error rates vary for different question types. For example, uninversion errors are more common for *do* (e.g., *\*What he does like?*) than for modal auxiliaries such as *can* (e.g., *\*What he can eat?*). Generativist accounts argue that children have difficulty applying their innate movement rule to *do*, as (unlike, for example, *can*) it is not present in the original form of the utterance, and has to be inserted as an additional stage of the movement process

He likes what? → What he likes? → What he does likes? → What does he like?  
 He can eat what? → What he can eat? → What can he eat?

A problem for generativist accounts is that error rates vary not just according to the identity of the auxiliary (e.g., *do* vs *can*) but to the particular *wh*-word+auxiliary combination. Furthermore, these error rates do not vary at random, but are correlated with the frequency of the relevant *wh*-word+auxiliary combination in the input (Ambridge & Rowland, 2009). For example, *what+can*, *what+does* and *why+can't* questions are relatively frequent in the input, and show relatively low error rates in an elicited production study (approximately 15%). *What+doesn't* and *what+can't* are less frequent, and show much higher error rates (approximately 30%). Constructivist researchers take findings of this type as evidence for their claim that, just as for simple declarative sentences, children start out with low-level lexically-specific slot-and-frame patterns (e.g., *Why can't [THING] [PROCESS]*), and only gradually analogize across these patterns to acquire fully abstract adultlike knowledge (e.g., *[WH-WORD] [AUXILIARY] [SUBJECT] [VERB]?*).

A problem for constructivist accounts is that they do not offer a satisfactory explanation of why children produce the particular error types that they do. There is some evidence that both uninversion and auxiliary-doubling errors reflect children’s attempt to combine frames, as in the following examples:

What + He can [PROCESS] = \*What he can [PROCESS]?  
 What does [THING] [PROCESS] + He doesn't [THING PROCESS] = \*What does he doesn't [PROCESS]?

Indeed, Ambridge and Rowland (2009) found that only children who produced a well-formed positive question with a particular *wh*-word+auxiliary combination (e.g., *What does...*) produced an auxiliary-doubling error for the corresponding negative question type

(\**What does he doesn't like?*); a finding that the authors took as evidence for schema combination (e.g., *What does + he doesn't like = \*What does he doesn't like?*). However, this proposal is rather *ad hoc*, as it does not explain why children do not make similar errors for other sentence types (e.g., declaratives).

A more fundamental problem for the constructivist approach is that, just as we saw for basic word order sentences in the previous section, it does not offer a satisfactory account of how children move from lexically-specific slot-and-frame patterns (e.g., *Why can't [THING] [PROCESS]?*) to abstract adultlike knowledge (e.g., *[WH-WORD] [AUXILIARY] [SUBJECT] [VERB]?*). Again, the generativist approach circumvents this problem by attributing this knowledge to children from birth; but at the expense of explaining the apparent unevenness of their early performance.

### Morphology

Again, the generativist-constructivist debate plays out in a similar way with regard to the acquisition of inflectional morphology; the system that languages use to mark distinctions such as tense (e.g., *plays* vs *played*; present vs past), person (*I play* vs *He plays*; 1<sup>st</sup> person vs 3<sup>rd</sup> person) and number (*He plays* vs *They play*; singular vs plural). Generativist approaches again assume an innate rule, which ensures that – although some lexical learning is of course required – children can apply any inflection that they know to any verb that they know. Constructivist approaches again assume that children start out with rote-learned forms (e.g., *plays*, *walks*, *runs*), and only later abstract and analogize across these forms to acquire, first, slots-and-frame patterns or morphological constructions (e.g., *[ACTION]+s*) and, later, a fully abstract adultlike construction (e.g., *[VERB]+[INFLECTION]*).

Generativist researchers take as evidence for their approach the finding that rates of agreement (i.e., person and/or number marking) error (e.g., using a 3sg verb form with a 1sg subject) are extremely rare (i.e., generally <5%, regardless of the language studied):

Children simply don't say *I likes ice cream* [A 3sg form in a 1sg context]... The correct agreement features on verbal inflectional morphemes are known (Wexler, 1998: 42)

Young German-speaking children... do not make agreement mistakes (Wexler, 1998: 19)

Again, the main advantage of the generativist approach is that it offers an explanation of how children seem to quickly master linguistic systems that are often extremely complex (e.g., Spanish has 40 different person+number inflections in the present tense alone). Again, however, a problem for the approach is that children's development appears to be uneven, in way that reflects the statistics of the input. For example, a corpus study of two children learning Spanish (Aguado-Orea & Pine, 2015) found that an overall error rate of <5% disguised considerable variation across different person/number inflections. To take an extreme case, 3sg forms (e.g., [E] juega, 'he plays'), which are the most frequent in the input, showed an error rate of just 0.7%. On the other hand, 3pl forms (e.g., [Ellos] juegan, 'they play'), which are rare in the input, showed error rates of 34% and 46% (for Juan and Lucia respectively).

As for similar findings in the domain of syntax, constructivist researchers take this unevenness in development as evidence for their gradual-learning, input-based approach. Again, the main problem for this approach is that it does not offer a satisfactory account of how children reach the adult state. Again, the generativist approach, under which the child state is effectively the same as the adult state, does not suffer from this problem, but lacks a ready explanation of apparent input effects.

A similar situation holds for perhaps the most-studied phenomenon in the domain of inflectional morphology: *root-infinitive* (or *optional-infinitive*) errors. Children learning many languages make errors in which they fail to mark tense and/or person+number agreement in contexts in which adults would do so:

Root infinitive error	Adult form
*John play football	John plays/is playing football
*John Fussball spielen	John spielt Fussball

Generativist accounts (e.g., Wexler, 1998) view these errors in terms of either a mis-set parameter (e.g., children incorrectly assume that they a learning a language that does not mark tense/agreement on verbs, such as Mandarin Chinese) or a "genetically-specified (and withering away in time)" (Wexler, 1998: 27) innate constraint that prevents children from inflecting verbs for both tense and agreement at once. Constructivist accounts assume that children produce these forms because memory limitations force them to omit words from the start of adult utterance. For example, both *\*John play football* and *\*John Fussball spielen* could be truncated forms of

adult utterances with modal can/kann (\**John can play football* and \**John kann Fussball spielen*). Although this account may sound rather simplistic, when implemented as a computational model, it can explain variation in rates of root-infinitive errors both across different languages, and across different verbs within a given language (Freudenthal, Pine & Gobet, 2010). Again, the drawback of the constructivist approach here is that it does not offer a complete account of how children reach the adult state.

### Atypical development

Although this entry has focused mainly on typically developing children, the generativist and constructivist approaches also offer contrasting explanations of atypical language development.

Specific Language Impairment (SLI) is a disorder thought to affect around 5% of children. In order to qualify for a diagnosis of SLI, a child must show impaired language, despite having nonverbal cognitive skills within the normal range, and no hearing or social impairments. Generativist approaches tend to emphasize the *specificity* of the language impairment in SLI. If, as assumed under generativist accounts, children have an innate “language module” with some genetic basis, then it stands to reason that this module can be impaired as the result of a heritable disorder (SLI does seem to have a large hereditary component). Indeed, many generativist approaches (e.g., Van der Lely, 1997) posit that the underlying deficit in SLI is specific not just to language, but to some particular subcomponent of the system, such as movement rules or inflection, as discussed above. Consistent with this view, children with SLI seem to be particularly impaired in these domains, above and beyond their more general language impairment. Constructivist approaches view the underlying cause of SLI as some more general deficit in memory and/or processing; perhaps, in particular, the processing of rapidly-changing stimuli. Consistent with this view, the general cognitive abilities of children with SLI, while – by definition – within the normal range, tend to be below average. Indeed, Hayiou-Thomas, Bishop and Plunkett (2004) found that if typically-developing children are placed under high cognitive load, they display a pattern of linguistic impairments that is very similar to that seen in SLI.

Also relevant to this debate is the trajectory of language acquisition shown by children with other developmental disorders,

including autism, Down syndrome, fragile X and Williams syndrome (see, Rice, Warren & Betz, 2005, for a particularly comprehensive review). However, determining the pattern of impaired and spared linguistic abilities in each of these disorders has proved extremely difficult. Part of the problem is that deficits that are, in principle, independent of syntactic and morphological development (e.g., the social communication deficit that is diagnostic of Autism Spectrum Disorder) may, in practice, impact negatively upon both language acquisition (i.e., by effectively reducing the amount of linguistic exposure or uptake) and the tools used to assess it (i.e., upon children’s ability to complete production tasks and other diagnostic assessments).

### Summary

The field remains divided with regard to the question of how language is acquired. Generativist approaches posit a considerable degree of innate, specifically linguistic knowledge (e.g., syntactic categories, and rules for (a) combining categories into phrases and sentences, (b) movement and (c) inflection). In contrast, constructivist approaches assume that children learn syntactic categories, sentence constructions (including questions) and morphological constructions by generalizing across the input.

Consequently, the two approaches have complementary strengths and weaknesses. By positing innate abstract knowledge, the generativist approach avoids the problem of explaining how this knowledge is acquired, but fails to offer a satisfactory explanation of the fact that children’s linguistic development is uneven, in a way that seems to reflect the input. Conversely, by positing that children’s early knowledge consists of low-level lexical schemas (slot-and-frame patterns), the constructivist approach naturally explains uneven development, but fails to offer a satisfactory explanation of how children reach the adult endpoint. It is only by attempting to address these weaknesses that research and theory development conducted within one or other of these frameworks can bring us closer to a complete account of child language acquisition.

### References

- Aguado-Orea, J., & Pine, J. M. (2015). Comparing Different Models of the Development of Verb Inflection in Early Child Spanish. *PloS one*, *10*(3), e0119613.

- Ambridge, B., & Lieven, E.V.M. (2015). A Constructivist Account. In B. MacWhinney and W. O'Grady (Eds). *Handbook of Language Emergence*. Hoboken, NJ: Wiley Blackwell (pp. 478-510).
- Ambridge, B., & Rowland, C. F. (2009). Predicting children's errors with negative questions: Testing a schema-combination account. *Cognitive Linguistics*, 20(2), 225-266.
- Ambridge, B., Kidd, E., Rowland, C. F., & Theakston, A. L. (2015). The ubiquity of frequency effects in first language acquisition. *Journal of Child Language*, 42(2), 239-273.
- Christophe, A., Millotte, S., Bernal, S., & Lidz, J. (2008). Bootstrapping lexical and syntactic acquisition. *Language and Speech*, 51, 61-75.
- Freudenthal, D., Pine, J. M., & Gobet, F. (2005). On the resolution of ambiguities in the extraction of syntactic categories through chunking. *Cognitive Systems Research*, 6(1), 17-25.
- Freudenthal, D., Pine, J., & Gobet, F. (2010). Explaining quantitative variation in the rate of Optional Infinitive errors across languages: a comparison of MOSAIC and the Variational Learning Model. *Journal of Child Language*, 37(03), 643-669.
- Hayiou-Thomas, M. E., Bishop, D. V. M., & Plunkett, K. (2004). Simulating SLI: General cognitive processing stressors can produce a specific linguistic profile. *Journal of Speech Language and Hearing Research*, 47(6), 1347-1362.
- Pinker, S. (1987). The bootstrapping problem in language acquisition. In B. MacWhinney (Ed.), *Mechanisms of language acquisition* (pp. 339-441). Hillsdale, NJ: Lawrence Erlbaum.
- Rice, M. L., Warren, S. F., & Betz, S. K. (2005). Language symptoms of developmental language disorders: An overview of autism, Down syndrome, fragile X, specific language impairment, and Williams syndrome. *Applied Psycholinguistics*, 26(01), 7-27.
- Sakas, W. G., & Fodor, J. D. (2001). The structural triggers learner. In S. Bertolo (Ed.), *Language Acquisition and Learnability*. Cambridge: Cambridge University Press.
- Santelmann, L., Berk, S., Austin, J., Somashekar, S., & Lust, B. (2002). Continuity and development in the acquisition of inversion in yes/no questions: Dissociating movement and inflection. *Journal of Child Language*, 29, 813-842.
- Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.
- Van der Lely, H. K. J. (1997). Language and cognitive development in a grammatical SLI boy: Modularity and innateness. *Journal of Neurolinguistics*, 10(2-3), 75-107.
- Wexler, K. (1998). Very early parameter setting and the unique checking constraint: A new explanation of the optional infinitive stage. *Lingua*, 106(1-4), 23-79.

### Further readings

- Ambridge, B., & Lieven, E. V. (2011). *Child language acquisition: Contrasting theoretical approaches*. Cambridge: Cambridge University Press.
- Guasti, M. T. (2004). *Language acquisition: The growth of grammar*. Cambridge, MA: MIT Press.
- Lust, B. C. (2006). *Child language: Acquisition and growth*. Cambridge: Cambridge University Press.
- Pine, J. M., Freudenthal, D., Krajewski, G., & Gobet, F. (2013). Do young children have adult-like syntactic categories? Zipf's law and the case of the determiner. *Cognition*, 127(3), 345-360.
- Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.