

Lecture 9 THEORIES REGARDING ORDER OF ACQUISITION

The plan:

Psychological approaches to SLA

Developmental sequences

Language instruction

Psychological approaches to SLA have made significant contributions to understanding why certain elements are acquired in a fixed sequence. One of the best known of these approaches is the Multidimensional Model, developed by researchers who initially studied the German L2 learning of adult L1 speakers of Italian, Spanish, and Portuguese in the ZISA project (see Clahsen, Meisel, and Pienemann 1983).

This model includes the following claims:

- Learners acquire certain grammatical structures in a developmental sequence.
- Developmental sequences reflect how learners overcome processing limitations.
- Language instruction which targets developmental features will be successful only if learners have already mastered the processing operations which are associated with the previous stage of acquisition.

The processing strategies which account for developmental sequences in perception and production are explained by Clahsen (1984) in relation to the IP constraint of limited capacity: “linguistic structures which require a high degree of processing capacity will be acquired late” (p. 221). Which syntactic structures require more processing capacity (i.e. are more complex) is determined by the extent to which their underlying relations are preserved in output, and by the perceptual salience of any reordering that does occur. Clahsen (1984:23) infers the following hierarchy: (1) Canonical Order Strategy:

There is no reordering from “basic” word order. Structures which can be processed with this strategy will be acquired first. (2) Initialization/Finalization Strategy: Reordering which moves underlying elements into the first or last position in a grammatical string are perceptually more salient, and thus easier to process than permutations to internal positions. (3) Subordinate Clause Strategy: Reordering in subordinate clauses is not allowed. This accounts for why “learners initially use certain reorderings only in main clauses and [. . .] thus the order of the elements in subordinate clauses is less varied.” A reorientation of the Multidimensional Model is known as Processability Theory (Pienemann 1998; Pienemann and Kessler 2011); it also has the aim of determining and explaining the sequences in which processing skills develop in relation to language learning. The following acquisitional hierarchy of processing skills is proposed (from Pienemann and Håkansson 1999): (1)

Lemma/word access: Words (or lemmas) are processed, but they do not yet carry any grammatical information, nor are they yet associated with any ordering rules.

(2) Category procedure: Lexical items are categorized, and grammatical information may be added (e.g. number and gender to nouns, tense to verbs). 82
INTRODUCING SECOND LANGUAGE ACQUISITION

(3) Phrasal procedure: Operations within the phrase level occur, such as agreement for number or gender between adjective and noun within the noun phrase.

(4) S-procedure: Grammatical information may be exchanged across phrase boundaries, such as number agreement between subject and verb.

(5) Clause boundary: Main and subordinate clause structures may be handled differently. This is an implicational hierarchy in the sense that processing skill at level 1 is a prerequisite for processing skill at level 2, level 2 is prerequisite for level 3, and so forth. The sequence of strategies describes the developing learner grammar in terms of processing prerequisites needed to acquire grammatical (syntactic and morphological) rules at successive stages. The universality of this sequence in SLA is being tested by researchers, with generally supportive results. In addition to Pienemann's analysis of German L2 (1998) and reanalysis of data from prior research on Swedish L2 (Pienemann and Håkansson 1999), the most extensive studies thus far have been on Danish, Norwegian, and Swedish (Glahn et al. 2001). Claims that language instruction will be effective only if it targets the next stage in an L2 learner's developmental sequence (rather than more advanced levels) have been tested on many languages since the 1970s (reviewed in Spada and Lightbown 1999). Results are mixed concerning the interaction of developmental order and instructional level, with indication that at least for some structures, and for some learners, instruction at a more advanced level can be more efficient.

Complexities include the type of instruction (e.g. whether explicit contrastive L1–L2 information on the structure is presented), and the degree to which L1 knowledge may be applicable. However, these complexities do not appear to invalidate claims about order of acquisition; even when learners profit from more advanced levels of instruction, they progress through the same developmental sequence. Competition Model Another psychological approach that has addressed the general question of how languages are learned is the Competition Model (Bates and MacWhinney 1981; MacWhinney 2001). This is a functional approach which assumes that all linguistic performance involves “mapping” between external form and internal function. The form of a lexical item is represented by its auditory properties, and its function by its semantic properties; the forms of strings of lexical items are word-order patterns and morphological inflections, and their functions are grammatical. For example, for the word horse the form is represented by the sounds [hors]; the function is the meaning of a four-legged, hay-eating animal. In the sentence Horses eat hay, the word orders of

horses before and hay after the verb are forms; the functions are to convey that horses is the subject and hay is the object. The inflection -s on horses is also a form; its function is to convey that more than one horse is being referred to.

This approach considers that learning the system of Form–function mapping is basic for L1 acquisition. SLA involves adjusting the internalized The psychology of Second Language Acquisition 83 system of mapping that exists in the learner’s L1 to one that is appropriate for the target language. This is accomplished by detecting cues in language input which are associated with a particular function, and by recognizing what weight to assign each possible cue (the cue strength). The cue in English that horses is the subject in the sentence Horses eat hay is word order – horses comes in front of the verb. If the sentence were in Japanese, the cue would be a case marker, the inflection -ga that is attached to the end of a word which means it is the subject (i.e. that it has nominative case). Brian MacWhinney (b. New York), 1945–present Psychology MacWhinney’s studies of language processing across languages led to the co-development of the Competition Model with Elizabeth Bates (MacWhinney and Bates 1989). In this research, many areas of processing were studied: normal adult sentence processing, the development of child sentence processing, and language processing of people with aphasia. MacWhinney has also developed a set of computer programs and a database called CHILDES (Child Language Data Exchange System), which is used by more than 800 researchers in forty-six different countries.

Multiple cues are available simultaneously in input; language processing essentially involves “competition” among the various cues. For example, for the grammatical function of subject, possible cues are word order, agreement, case marking, and animacy (i.e. capacity for volitional action). All of these possible cues are illustrated in the following sentences (some are not grammatical or grammatically felicitous): a. The cow kicks the horse. b. The cow kick the horses. c. Him kicks the horse. d. The fence kicks the horse. The relative strength of word order as a cue in English over the other possibilities can be tested by presenting native speakers with sentences such as these and asking them to identify the subject or agent in each (i.e. who/ what does the “kicking”). In spite of the ungrammaticality of (b–c), or in the case of (d) its anomalous character, native English speakers are most likely to identify the first noun phrase in each of these sentences as subject, even though in (b) the verb agrees with the second noun phrase rather than the first, in (c) him is case-marked as object (the receiver of the action) rather than subject, and in (d) fence is inanimate and cannot be interpreted literally as a “doer” of the verb kick.

If these sentences were translated into other languages, different identifications of subject would likely be made depending on 84 INTRODUCING SECOND LANGUAGE ACQUISITION whether agreement, case marking, or animacy carried more weight. In Japanese, for instance, the case marker -ga attached to a noun phrase

(if no other -ga occurred) would generally carry more weight in identifying that NP as the subject, no matter where in the word order it occurred. An English L1 speaker learning Japanese as L2 might inappropriately transfer the strong word-order cue to initial form–function mapping (and identify the wrong noun phrase as subject if it occurred first), whereas native speakers of Japanese might transfer their L1 cue weights to English L2 and also provide nonnative interpretations. Acquisition of appropriate form–function mappings is driven primarily by the probability that a particular functional interpretation should be chosen in the presence of a particular cue. If the probability is high, the cue is reliable. The following determinants of cue strength are also discussed by MacWhinney

- Task frequency: how often the form–function mapping occurs. The vast majority of English sentences have a subject before the verb, so the mapping of word-order form to subject function is very frequent.

- Contrastive availability: when the cue is present, whether or not it has any contrastive effect. In example (a) above, for instance (The cow kicks the horse), the third person singular -s on the verb agrees with both noun phrases and so the agreement cue tells nothing about which is the subject. An available cue must occur contrastively if it is to be useful.

- Conflict reliability: how often the cue leads to a correct interpretation when it is used in comparison to other potential cues. Transfer of L1 cue strengths to L2 is the most likely outcome in early stages of SLA when the systems differ, but research has shown that some learners ultimately abandon L1 cue strengths in favor of L2, while some compromise and merge the two systems, and some differentiate between the languages in this aspect of processing. Connectionist approaches Connectionist approaches to learning have much in common with IP perspectives, but they focus on the increasing strength of associations between stimuli and responses rather than on the inferred abstraction of “rules” or on restructuring. Indeed, from a connectionist perspective learning essentially is change in the strength of these connections. Some version of this idea has been present in psychology at least since the 1940s and 1950s (see McClelland, Rumelhart, and Hinton 1986 for an overview of historical developments), but Connectionism has received widespread attention as a model for first and second language acquisition only since the 1980s.

The best-known connectionist approach within SLA is Parallel Distributed Processing, or PDP. According to this viewpoint, processing takes place in a network of nodes (or “units”) in the brain that are connected by pathways. As learners are exposed to repeated patterns of units in input, they extract regularities in the patterns; probabilistic associations The psychology of Second Language Acquisition 85 are formed and strengthened. These associations between nodes are called connection strengths or patterns of activation. The strength of the associations changes with the

frequency of input and nature of feedback. The claim that such learning is not dependent on either a store of innate knowledge (such as Universal Grammar) or rule-formation is supported by computer simulations. For example, Rumelhart and McClelland (1986) demonstrated that a computer that is programmed with a “pattern associator network” can learn to associate English verb bases with their appropriate past tense forms without any a-priori “rules,” and that it does so with much the same learning curve as that exhibited by children learning English L1.

The model provides an account for both regular and irregular tense inflections, including transfer to unfamiliar verbs, and for the “U-shaped” developmental curve (discussed in the previous section on order of acquisition) which is often cited in linguistic models and in other cognitive approaches as evidence for rule-based learning. Assumptions about processing from a connectionist/PDP viewpoint differ from traditional IP accounts in other important ways. For example (McClelland, Rumelhart, and Hinton 1986; Robinson 1995): (1) Attention is not viewed as a central mechanism that directs information between separate memory stores, which IP claims are available for controlled processing versus automatic processing.

Rather, attention is a mechanism that is distributed throughout the processing system in local patterns. (2) Information processing is not serial in nature: i.e. it is not a “pipeline . . . in which information is conveyed in a fixed serial order from one storage structure to the next” (Robinson 1995 :288). Instead, processing is parallel: many connections are activated at the same time. (3) Knowledge is not stored in memory or retrieved as patterns, but as “connection strengths” between units which account for the patterns being recreated. It is obvious that parallel processing is being applied when tasks simultaneously tap entirely different resources such as talking on a cell phone while riding a bicycle, but it also less obviously occurs within integrated tasks such as simply talking or reading, when encoding/decoding of phonology, syntactic structure, meaning, and pragmatic intent occur simultaneously. Many connections in the brain must be activated all at once to account for successful production and interpretation of language, and not processed in sequence (i.e. one after the other).

Little research based on this approach has been conducted in SLA, but the assumption is that transfer from L1 to L2 occurs because strong associations already established in L1 interfere with establishment of the L2 network. Because frequency is the primary determinant of connection strength, it might be predicted that the most common patterns in L1 would be the most likely to cause interference in L2, but research on transfer from linguistic perspectives does not support this conclusion in any strong sense; L1–L2 relationships are not that simple. Proponents of connectionist approaches to language acquisition note that while frequency 86 INTRODUCING SECOND LANGUAGE ACQUISITION is “an all-pervasive causal factor” (Ellis 2002 :179), it interacts with other determinants, including how noticeable the language

patterns are in the input learners receive, and whether the patterns are regular or occur with many variations and exceptions. Many linguists and psychologists would argue against a strong deterministic role for frequency of input in language learning. One counterargument is that some of the most frequent words in English (including the most frequent, the) are relatively late to appear, and among the last (if ever) to be mastered. Still, whatever one's theoretical perspective, the effects of frequency on SLA clearly merit more attention than they have typically received since repetition drills went out of fashion in language teaching. Researchers from several approaches to SLA which focus on learning processes are taking a renewed look at how frequency influences learning.

Complexity Theory What I choose to call Complexity Theory (CT) , following Larsen-Freeman (2011), is closely related to what others in SLA call Dynamic Systems Theory (e.g. van Geert 2008), Complex Systems Theory, and Chaos Theory. The approach traces its roots to theoretical developments in the natural sciences, where its general goal has been to describe and explain change in complex systems (including language). Its first application to second language acquisition is usually credited to Larsen-Freeman (1997). The key question in SLA which CT and related theories address has been viewed from a linguistic perspective for more than fifty years, as discussed in Chapter 3 : What accounts for the nature and order of language development? As we have already seen, this has also been a key question as viewed from a psychological perspective. CT differs fundamentally from most linguistic approaches in denying that any innate mental faculty for language is required in an account of either first or second language acquisition. In this important respect it agrees with common views in psychology that learning is essentially the same process in any domain (not just language). CT also differs from many psychological perspectives, however, in integrating considerations of social and contextual factors along with cognitive ones in attempting to describe and explain the processes of SLA.

A basic concept in Complexity Theory as it applies to SLA is that all languages, and varieties of language, are complex systems with interconnected components and stages of learner language. Saying that a complex system has interconnected components means that levels of language like phonology, vocabulary, and discourse are interdependent in their development. In the process of development, the different components become more orderly, more structured or organized, over time. "Only by adopting an integrative dynamic framework will we understand how they come about" (Ellis 2008 :233). The dynamic process thus accounts for the formation of patterns in the development of both first and second language acquisition, as well as all other complex systems in nature. This is an important departure from the claims of UG and even many functional views of grammar that basic rules The psychology of Second Language Acquisition 87 and constraints of grammar are uniquely hard-wired in the

brain. According to Complexity Theory, “these regularities are not rule-driven; there are no mechanisms for such top-down governance. Instead, they emerge from the dynamics of language usage” (ibid.).

In a further departure from most linguistic as well as prior psychological perspectives, descriptions and explanations of the dynamic processes of language change and development need to take into account the variable effects of communicative functions and opportunities, the structural relationships of L1 and L2, the intentions and acts of learners and others, and a host of other internal and external factors. (For a comprehensive and in-depth overview of dynamic aspects of SLA, see de Bot, Lowie, and Verspoor 2005 .) While this holistic view of SLA is appealing to many of us, it presents some problems for researchers who need to control variables in order to predict outcomes in different learning circumstances. The results of research from this perspective so far are yielding some interesting insights into language development processes and experiences, however, and have considerable promise for enlightening some of our teaching practices.

Questions for discussion

1. How do psychological theories, such as behaviorism and cognitive psychology, explain the process of second language acquisition?
2. What role does memory, attention, and motivation play in learners’ progress through developmental sequences in SLA?
3. How can teachers identify and support learners at different stages of language development?
4. In what ways does effective language instruction influence or accelerate natural developmental sequences in SLA?
5. How do individual psychological factors—such as anxiety, self-confidence, and learning styles—affect the success of second language learning?