

TOWARD AN INTEGRATED MODEL OF FIRST AND SECOND LANGUAGE ACQUISITION*

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It is never sufficient simply to analyze without synthesis, or for that matter to synthesize without analysis. Ironically, that is as true of language acquisition itself as it is of the research that describes it. Yet researchers cannot synthesize until they have analysed sufficient quantities of data, just as children cannot synthesize until they have had sufficient input (begging the question of what constitutes sufficient data or input).

Researchers in second language (L2) acquisition have now, however, reached a stage of theory building that has been possible only as greater quantities of data became available. In the field of L2 acquisition, we have only now begun seriously to consider the possible universals of L2 acquisition from a theoretical perspective, yet Stobin was already discussing universals of first language (L1) acquisition in 1968.¹ Dulay and Burt led the field with their view of L2 acquisition as creative construction, which was first posited in the mid 1970s² but was constantly restated and modified. One of their later definitions of creative construction was the following:

the process by which learners gradually reconstruct rules for speech they hear, guided by innate mechanisms which cause them to formulate certain types of hypotheses about the language system being acquired until the mismatch between what they are exposed to and what they produce is resolved.³

This is remarkably similar to Brown and Hanlon's view of L1 acquisition:

We suspect that the only force toward grammaticality operating on the child

is the occasional mismatch between his theory of the structure of the language and the data he receives.⁴

Overgeneralizations are one piece of evidence for the hypotheses learners formulate and then try to test against the input they receive. Attempts to account for the resolution of the mismatch in L2 acquisition or learning have included the Monitor Model⁵ and the Pidginization Hypothesis.⁶ These have, so far, been unable to provide complete explanations of any one individual's success or failure as a language learner. In spite of Krashen's⁷ caution against adopting theories from other fields to account for L2 acquisition, we do need to look outside the field of L2 acquisition, not only into L1 acquisition but also into related fields within developmental psychology. Theories of human development such as that of Piaget,⁸ thought out over a lifetime of research, should provide us in a relatively new field with a starting point which unfortunately has all too often been ignored. We can even go beyond theories of human development to gain deeper insights into the process of language acquisition.

Let us consider very briefly the parallels of Dulay and Burt's definition of creative construction⁹ with the Piagetian view of how development comes about. Piaget isolated two universal properties of sentient organisms which are functionally invariant: organization and adaptation.¹⁰ The latter property has two components: assimilation and accommodation. Assimilation is the process of changing the world to fit the self, while accommodation is the process of changing the self to fit the world. The one does not happen without the other, although the relationship between the two may vary quite considerably from event to event. Organization may be related to Dulay and Burt's mention of the learners reconstruction of rules.¹¹ Assimilation and accommodation are the processes by which the learner resolves the mismatch between his language input and output, as Karmiloff-Smith¹² and Hakuta¹³ pointed out for L1 and L2 acquisition respectively. Overgeneralization is one of the processes by which assimilation is achieved prior to accommodation.

It is often forgotten that Piaget's theory was an attempt to account for the development of logical operations in the child, how the child becomes the scientist. If Piaget's theory can explain some of the processes of language acquisi-

tion, can we not then view the child not only as a linguist or ethnographer¹⁴ but as a scientist? Dulay and Burt talk of hypothesis formulation.¹⁵ Hypothesis formation and hypothesis testing are the activities that build science. In order to evaluate the view of the child as scientist, we look in some detail at Kuhn's analysis of how science is done,¹⁶ before relating the results of studies of overgeneralization in language acquisition to a view of language acquisition analogous to scientific research. Kuhn's analysis at the societal level parallels quite closely Piaget's analysis at the level of the individual.¹⁷

Paradoxically, as was mentioned at the beginning of this paper, analysis and synthesis (or assimilation and accommodation) are as necessary a part of language acquisition itself as of the research that examines it. Paradoxically, too, Kuhn's analysis applies as well to the state of theory building within the field of L2 acquisition as it does to the process of language acquisition itself.

First, we have to discuss Kuhn's use of the word **paradigm**. Kuhn does not give just one definition of the word, but many. One can only gain an understanding of his meaning by extracting from the many uses of the term. As a body of socially accepted scientific theory, a paradigm provides the basis for normal science (that is, the daily research of scientists). It is the tool for the socialization of scientists-to-be. A paradigm defines the problems which are to be examined and the rules and methodology for solving those problems, and also excludes the problems which are to be ignored. "Paradigms guide research by direct modeling as well as through abstracted rules".¹⁸ But, while nature does not fit exactly any paradigm, "measurements taken without a paradigm ... seldom lead to any conclusions at all".¹⁹

As we mentioned, a paradigm provides the basis for normal science. Normal science only begins when a paradigm has been universally accepted. Prior to this, the science is preparadigmatic, with many competing paradigms.

Kuhn's main concern was to describe how science progresses, how new paradigms emerge. Normal science is concerned not with changing paradigms but with investigating the facts that the paradigms show to be particularly revealing of the nature of things²⁰, comparing

facts with predictions based on the paradigm theory, and gathering facts in order to articulate the theory. However, paradigms never define all the problems and all the solutions. Inevitably anomalies appear, indicating a crack in the theory. These anomalies are not at first treated as counterinstances. In order to recognize and accept the novel, in order to realize that something has gone wrong, one has to know what was expected. Furthermore, anomalies are not recognized until an alternative candidate as paradigm is available which accounts for the anomalies in addition to everything that was accounted for by the original paradigm:

The decision to reject one paradigm is always simultaneously the decision to accept another, and the judgement leading to that decision involves the comparison of both paradigms with nature and with each other.²¹

Not all anomalies give rise to new theories and subsequently new paradigms, only those "whose characteristic feature is their stubborn refusal to be assimilated to existing paradigms."²² Serious anomalies lead to a "proliferation of versions of a theory"²³ which is symptomatic of crisis. Finally, one version becomes accepted, and the crisis is resolved, after a scientific revolution.

The transition from crisis to new paradigm is not merely additive, it involves radical change:

Assimilating a new sort of fact demands more than an additive adjustment of theory, and until that adjustment is completed — until the scientist has learned to see nature in a different way — the new fact is not quite fact at all.²⁴

Kuhn quotes Butterfield as describing the reorientation required after a paradigm shift as:

picking up the other end of the stick, "a process that involves handling the same bundle of data as before, but placing them in a new system of relations with one another by giving them a different framework."²⁵

Once the revolution has occurred, there is a return to the activities of normal science, and the process starts again.

To summarize, Kuhn views the progress of science as involving essentially three stages: (1) pre-paradigmatic science, when there are a number of competing paradigms — none is universally accepted by the scientific community; this stage ends with the acquisition of a paradigm; (2) normal science, when the accepted paradigm is articulated, the significant facts are defined, the facts are matched with the theory, and the theory becomes increasingly precise through puzzle-solving activity which leads to the discovery of anomalies; and (3) scientific revolution, when the old paradigm is rejected as a result of the anomalies and a new one is sought.

Where lies the parallel with language acquisition? First, we consider the broad implications, and then the narrower ones. A language can be viewed as a paradigm in that, in terms of the speech community in which it is spoken, ²⁶ it is a body of socially accepted "theory", and it sets the limits of the problem to be solved. Language, like scientific knowledge, is intrinsically the common property of a group or nothing else at all.²⁷ If a paradigm is a means for socializing future members of the community, then language acquisition viewed as socialization²⁸ is the acquisition of a paradigm.

Now, where lies the parallel with patterns of overgeneralization in language acquisition? The target language paradigm is only acquired over a long period of time, during which the language learner forms his own personal paradigms.²⁹ Overgeneralizations reveal the acquisition of a personal paradigm. To demonstrate this, we review briefly the broad stages in the linguistic marking of a semantic notion in studies of overgeneralization.³⁰ First we find a few instances of correct usage, but reduced utterances or unanalysed prefabricated patterns rather than fully understood linguistically complex utterances. Errors coded during the first stage are either random or only temporary, but not precursors of future errors. In the second stage, there is evidence of the generation of a hypothesis independent of the prefabricated patterns. This hypothesis often results in correct utterances in a limited number of cases at first. But then overgeneralization begins as the one hypothesis

is applied to all instances of use of the particular syntactic form. Toward the end of this stage of overgeneralization, there is the beginning of an awareness of error, as evidenced by random or temporary errors which are precursors of what is to come. Then comes the crisis point, when a great number of errors reflect the realization that the hypothesis does not fit the data at all and that alternatives have to be tried. Finally the crisis is resolved, at least for one problem, but the cycle has to be repeated for each new paradigm.³¹

There is a remarkable parallelism between these stages in the acquisition of language and the stages in the development of new paradigms in science. The first stage, in which there are random or temporary errors only alongside the use of prefabricated patterns, reflects the absence of a paradigm. Then the first hypothesis is formulated and tried out, correctly at first, alongside the prefabricated patterns. This stage is pre-paradigmatic, ending in the acquisition of a paradigm. Prior to this point, overgeneralization is impossible, because overgeneralization reflects the presence of rules embodied in a theory. A paradigm is a **prerequisite** to the discovery of laws.³² Then overgeneralization becomes widespread as the facts are gathered and investigated, to be compared with predictions based on the hypothesis. The paradigm guides the research by direct modeling and abstracted rules.³³ However, anomalies begin to appear, reflected in more random errors which evidence an attempt to find the correct solution. At this point, there is no alternative paradigm. Only when an alternative paradigm, a new hypothesis, has been found can the crisis be resolved. But the new paradigm only solves part of the problem so the whole cycle is started again, with ever greater refinements as one paradigm replaces another. The order in which the problems are resolved and the structures are acquired may be related to the importance of the perceived anomalies: only those "whose characteristic feature is their stubborn refusal to be assimilated to existing paradigms" give rise to new theories.³⁴ Furthermore, since "assimilating a new sort of fact demands more than an additive adjustment of theory",³⁵ we still find the random error which is a hangover from the old paradigm, and the self-corrections representing shifts from the old to the new paradigm within one utterance.

While this parallelism may be appealing, it is important to see where other theories might fit in. We first examine Schumann's Acculturation model.³⁶ Schumann emphasizes

the importance of viewing L2 acquisition as socialization into the L2 community (cf Vygotsky on L1 acquisition),³⁷ just as Kuhn emphasizes the importance of scientists being socialized into the scientific community. Schumann developed his model in an attempt to account for the fact that some learners, who evidenced limited syntactic development, never seemed to reach the presumed goal of target usage of the L2, in other words never acquired the L2 paradigm. His explanation was in terms of the social and psychological distance of the learners from the L2 community. He saw parallels between L2 acquisition and the development of pidgins along a pidginization-creolization continuum, in terms of both linguistic and social features. Pidgins may be seen as pre-paradigmatic in Kuhn's terms, while creoles may be "normal science." Andersen expanded on Schumann's evolving model, relating the L2 acquisition continuum not only to the pidginization-creolization continuum but also to the creolization-decreolization continuum.³⁸ In the move toward decreolization, we see a paradigm shift. We can relate Andersen's revision of Schumann's model to the schematic representation in Figure 1, expanded to show parallels with Kuhn, Piaget, and the stages in the acquisition of negation found in Chimombo's studies of overgeneralization.³⁹

It appears that in the initial stage of language acquisition, only random and temporary errors occur due to the absence of a norm: the language learner cannot have a norm until he has some data. In L2 acquisition, one reason for the finding that overgeneralization does not begin until Stage III, while in L1 acquisition it begins in Stage II,⁴⁰ may be that the learner has first to prepare himself to shift from the L1 to the L2 norm, prior to establishing the L2 norm in Stage II. Such an interpretation is validated by studies like Taylor's⁴¹ in which it has been found that L2 learners initially evidence a greater amount of L1 interference (or interlingual overgeneralization as we prefer to call it) but then increasingly produce more intra-lingual overgeneralization errors, as the L2 norm becomes established. Acquisition toward an internal norm is only evident when intra-lingual overgeneralization errors begin. Once disconfirming evidence for the original hypothesis leading to these overgeneralization errors is found, then begins acquisition toward an external norm. Interesting confirmation of the process of lessening overgeneralizations and increasing

differentiation of syntactic markers as being acquisition toward an **external** norm comes from Chimombo's data on the relationship of overgeneralized utterances to preceding utterances in the discourse context.⁴² At the height of overgeneralization, when **another's** utterance provides a model, this model is modified to fit the current hypothesis. Only when overgeneralization is coming to an end is complete and accurate imitation of **another's** utterance possible.

This brings us to the question of where Krashen's Monitor Model fits in.⁴³ The Monitor Model is related to Krashen's distinction between informal language acquisition and formal language learning.⁴⁴ Krashen claims that learning is used only as a conscious Monitor, while acquisition may or may not serve as a conscious Monitor but does not preclude unconscious monitoring. Acquisition is central. Learning is limited in three ways: (1) with respect to individuals — not everyone uses the Monitor in performance; (2) with respect to rules — learning may be applicable only to a small subset of the grammar; and (3) with respect to the situation — the Monitor is not used everywhere. Krashen gives examples of Monitor under-users who appear to have no conscious rules at all, and monitor over-users, whose rules are so conscious that rather than make errors they remain silent, as well as optimal Monitor users, who make the best use of conscious rules to produce correct target language output.⁴⁵

When we examine the results of Chimombo's studies,⁴⁶ we find clear examples of the Monitor being used in acquisition, when the child code-switches or corrects himself. However, it is not until a paradigm has been acquired and is being tested, in the stage of overgeneralization, that awareness of error becomes evident.⁴⁷ This suggests that the Monitor, the conscious application of rules, cannot come into operation prior to the acquisition of a personal paradigm.

While maintaining the Monitor, we therefore suggest that it is not so much the distinction between acquisition and learning *per se* that is the key to use of the Monitor, but rather differences in two other factors: perception and socialization into the speech community. We have already mentioned the importance of socialization in language acquisition, so let us look now at the related question of perception. The Monitor can only come into operation when an error has been perceived. But as Forsdale says:

Each of us uses three selective processes in communication: selective attention or exposure, selective perception, and selective memory or retention. We attend to communication that interests us or meets our needs, tuning out communication that doesn't; we perceive communication in ways congruent with our assumptions and needs; we remember communication that serves our assumptions and needs.⁴⁸

Socialization to some extent dictates the operation of these selective processes. We saw how Kuhn emphasized the need for a paradigm, a tool for socialization into the scientific community in order to discover new laws. But a paradigm can be both a help, in memorizing the known, and a hindrance, in perceiving the anomalies. Kuhn gives many examples of the effects of selective attention and selective perception and how discoveries in science have been made as a result of shifts in perception. One example is the discovery of oxygen: Priestley had prepared the way for Lavoisier to perceive an anomaly in the phlogiston theory. But Lavoisier's work on oxygen gave him a structure to his perception:

It told him a thing he was already prepared to discover. ... That advance awareness of difficulties must be a significant part of what enabled Lavoisier to see in experiments like Priestley's a gas that Priestley had been unable to see there himself. Conversely, the fact that a major paradigm revision was needed to see what Lavoisier saw must be the principal reason why Priestley was, to the end of his long life, unable to see it.⁴⁹

As that example shows, there is often great resistance to novelty, an inability to perceive it in spite of recognition of anomalies. In fact, Kuhn adds later, "Almost always the men who achieve these fundamental inventions of a new paradigm have been either very young or very new to the field whose paradigm they change"⁵⁰ because once we perceive something complex in one way, on the basis of one paradigm, we have great difficulty in shifting our perceptions to perceive it differently, on the basis of a new

paradigm. Clark observed such a resistance to novelty in the study of language development and concluded that "far from being an essential tool, a theory may be a handicap."⁵¹ However, we must remember Kuhn's warning that unless we operate within a theoretical framework, we will not come to any conclusions.

Perhaps one reason why children are often more successful L2 learners than adults is that their L1 paradigm is less entrenched so they are less resistant to the novelty of the L2 paradigm. But Kuhn also points out that at times of crisis, or approaching paradigm shift or scientific revolution, there is a proliferation of different versions of a theory accompanying intense concentration on the problems, just as Chimombo found in the patterns of overgeneralization immediately prior to acquisition of the target negative form.⁵² An important aid to the perception of anomaly and to consequent perception of novelty is this intense concentration, intense activity, intense input. This suggests that the most necessary ingredient in successful L2 acquisition, in which the Monitor can be used appropriately to aid acquisition toward an external norm, is intense input, most especially in the earliest stages when the learner has to shift from a L1 to a L2 norm, or in Kuhn's terms to experience a paradigm shift. Without this intense input learners will be unable to see patterns, to generate hypotheses, and thus acquisition toward an internal norm is impossible. But in later stages they will also be unable to test their hypotheses without sufficient input. To get this input, they need to be active members of the appropriate language community. It seems that socialization is a prerequisite to perception, in language acquisition as in science.

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NOTES

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3. H. Dulay and M. Burt, 'Some Remarks on Creativity in Language Acquisition,' in **Second Language Acquisition Research**, edited by W.C. Ritchie (New York: Academic Press, 1978), p. 67.
4. R. Brown and C. Hanlon, 'Derivational Complexity and the Order of Acquisition in Child Speech,' in **Psycholinguistics**, edited by R. Brown (New York: The Free Press, 1970), p. 204.
5. S. Krashen, 'Some Issues Relating to the Monitor Model' in **On TESOL '77**, edited by H.D. Brown, C.A. Yorio, and R.H. Crymes (Washington, D.C.: TESOL, 1977), pp. 144-158; and 'The Monitor Model for Second Language Acquisition,' in **Second Language Acquisition and Foreign Language Teaching**, edited by R.C. Gingras (Arlington, Va.: Center for Applied Linguistics, 1978), pp. 1-26.
6. J.H.Schumann, **The Pidginization Process: A Model for Second Language Acquisition** (Rowley, Mass.: Newbury House, 1978).
7. Krashen, 'The Monitor Model for Second Language Acquisition', *op. cit.*, p. 1f.
8. J.H. Flavell, **The Developmental Psychology of Jean Piaget** (Princeton, N.J.: Van Nostrand, 1963).
9. Dulay and Burt, 'Some Remarks on Creativity in Language Acquisition,' *op. cit.*, p. 67.
10. Flavell, **The Developmental Psychology of Jean Piaget**, *op. cit.*
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14. A.E. Fantini, 'Language Acquisition of a Bilingual Child: A Sociolinguistic Perspective (to Age Five),' Ph.D. dissertation, University of Texas, Austin, 1974.
15. Dulay and Burt, 'Some Remarks on Creativity in Language Acquisition,' **op. cit.**, p. 67.
16. T.S. Kuhn, **The Structure of Scientific Revolutions**, 2nd edition (Chicago: University of Chicago Press, 1970).
17. However, Piaget does not consider the child's development in terms of socialization, while Kuhn considers the socialization of scientists to be important for the development of science; cf. L.S. Vygotsky, **Thought and Language**, edited and translated by E. Hanfmann and G. Vakar (Cambridge, Mass.: The M.I.T. Press, 1962) on socialization in language acquisition.
18. Kuhn, **The Structure of Scientific Revolutions**, **op. cit.**, p. 47.
19. **Ibid.**, p. 113.
20. **Ibid.**, p. 25.
21. **Ibid.**, p. 77.
22. **Ibid.**, p. 97.
23. **Ibid.**, p. 71.
24. **Ibid.**, p. 53.
25. **Ibid.**, p. 85.
26. D. Hymes, **Foundations of Sociolinguistics: An Ethnographic Approach** (Philadelphia, Pa.: University of Pennsylvania Press, 1974).

27. Kuhn, **The Structure of Scientific Revolutions, op. cit.**, p. 210.
28. Vygotsky, **Thought and Language, op. cit.**; Schumann, **The Pidginization Process, op. cit.**
29. The term 'personal paradigm' is borrowed from Richard Wozniak (personal communication, June 1981). Personal paradigms might be called approximative systems or inter-languages by others: cf. W. Nemsler, 'Approximative Systems of Foreign Language Learners', in **Error Analysis**, edited by J.C. Richards (London: Longman, 1974), pp. 55-63, and L. Selinker, 'Interlanguage' in **New Frontiers in Second Language Learning**, edited by J.H. Schumann and N. Stenson (Rowley, Mass.: Newbury House, 1974), pp. 114-136.
30. Slobin, 'Cognitive Prerequisites for the Development of Grammar', **op. cit.**; Karmiloff-Smith, **A Functional Approach to Child Language, op. cit.**; M. Chimombo, 'Overgeneralization in Negation: A Comparison of First and Second Language Acquisition', Ed.D. dissertation, Teachers College, Columbia University, New York, 1981.
31. Slobin, 'Cognitive Prerequisites for the Development of Grammar', **op. cit.** p. 205.
32. Kuhn, **The Structure of Scientific Revolutions, op. cit.** p. 28.
33. **Ibid.**, p. 47.
34. **Ibid.**, p. 97.
35. **Ibid.**, p. 53.
36. Schumann, **The Pidginization Process, op. cit.**
37. Vygotsky, **Thought and Language, op. cit.**
38. R. Andersen, 'The Role of Creolization in Schumann's Pidginization Hypothesis for Second Language Acquisition', in **Research in Second Language Acquisition**, edited by R.C. Scarcella and S.D. Krashen (Rowley, Mass.: Newbury House, 1980), pp. 66-73.

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40. Chimombo, 'Overgeneralization in Negation', **op. cit.**, pp. 186 and 222, for L1 and L2 acquisition respectively.
41. B.P. Taylor, 'The Use of Overgeneralization and Transfer Learning Strategies by Elementary and Intermediate Students of ESL', **Language Learning**, 25 (1975), 73-107.
42. Chimombo, 'Overgeneralization in Negation', **op. cit.**, pp. 302-310 and 339-345 for L1 and L2 acquisition respectively.
43. Krashen, 'Some Issues Relating to the Monitor Model', **op. cit.**; 'The Monitor Model for Second Language Acquisition', **op. cit.**; and 'Aptitude and Attitude in Relation to Second Language Acquisition and Learning', in **Individual Differences and Universals in Language Learning Aptitude**, edited by K.C. Diller (Rowley, Mass.: Newbury House, 1981), pp. 155-175.
44. Krashen, 'Some Issues Relating to the Monitor Model', **op. cit.**
45. Krashen, 'The Monitor Model for Second Language Acquisition', **op. cit.**
46. Chimombo, 'Overgeneralization in Negation', **op. cit.**; and 'Conscious or Unconscious.'
47. Chimombo, 'Conscious or Unconscious', **op. cit.**, pp. 50-52.
48. L. Forsdale, **Perspectives on Communication** (Reading, Mass.: Addison - Wesley, 1981), p. 132.
49. Kuhn, **The Structure of Scientific Revolution**, **op. cit.**, p. 56.

50. **Ibid.**, p. 90.
51. R. Clark, 'Theory and Method in Child-Language Research: Are we Assuming Too Much?' in **Language Development, Volume 1: Syntax and Semantics**, edited by S.A. Kuczaj II (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1982), pp. 1-36.
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Figure 1

SCHEMATIC REPRESENTATION OF THE L1 AND L2 ACQUISITION CONTINUA

