

The Handbook of Second Language Acquisition

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Catherine J. Doughty and Michael H. Long

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1 The Scope of Inquiry and Goals of SLA

CATHERINE J. DOUGHTY AND
MICHAEL H. LONG

1 The Scope of Inquiry

The scope of second language acquisition (SLA) is broad. It encompasses basic and applied work on the acquisition and loss of second (third, etc.) languages and dialects by children and adults, learning naturalistically and/or with the aid of formal instruction, as individuals or in groups, in foreign, second language, and lingua franca settings (see, e.g., R. Ellis, 1994; Gass and Selinker, 2001; Gregg, 1994; Jordens and Lalleman, 1988; W. Klein, 1986; Larsen-Freeman, 1991; Larsen-Freeman and Long, 1991; Ritchie and Bhatia, 1996; Towell and Hawkins, 1994). Research methods employed run the gamut from naturalistic observation in field settings, through descriptive and quasi-experimental studies of language learning in classrooms or via distance education, to experimental laboratory work and computer simulations.

Researchers enter SLA with graduate training in a variety of fields, including linguistics, applied linguistics, psychology, communication, foreign language education, educational psychology, and anthropology, as well as, increasingly, in SLA per se, and bring with them a wide range of theoretical and methodological allegiances. The 1980s and 1990s witnessed a steady increase in sophistication in the choice of data-collection procedures and analyses employed, some of them original to SLA researchers (see, e.g., Birdsong, 1989; Chaudron, this volume; Doughty and Long, 2000; Faerch and Kasper, 1987; Sorace, 1996; Tarone, Gass, and Cohen, 1994), and also in the ways SLA is measured (Bachman and Cohen, 1998; Norris and Ortega, this volume). However, longitudinal studies of children (e.g., Huebner, 1983a, 1983b; F. Klein, 1981; Sato, 1990; Watson-Gegeo, 1992) and adults (e.g., Iwashita, 2001; Liceras, Maxwell, Laguardia, Fernandez, Fernandez, and Diaz, 1997; Schmidt, 1983) are distressingly rare; the vast majority of SLA studies are cross-sectional, with serious resulting limitations on the conclusions that can be drawn on some important issues. Theory proliferation remains a weakness, too, but the experience of

more mature disciplines in overcoming this and related teething problems is gradually being brought to bear (see, e.g., Beretta, 1991; Beretta and Crookes, 1993; Crookes, 1992; Gregg, 1993, 1996, 2000, this volume; Gregg, Long, Jordan, and Beretta, 1997; Jordan, 2002; Long, 1990a, 1993, forthcoming a).¹

As reflected in the contributions to this volume (see also Robinson, 2001), much current SLA research and theorizing shares a strongly cognitive orientation, while varying from nativist, both special (linguistic) and general, to various kinds of functional, emergentist, and connectionist positions. The focus is firmly on identifying the nature and sources of the underlying L2 knowledge system, and on explaining developmental success and failure. Performance data are inevitably the researchers' mainstay, but understanding underlying competence, not the external verbal behavior that depends on that competence, is the ultimate goal. Researchers recognize that SLA takes place in a social context, of course, and accept that it can be influenced by that context, both micro and macro. However, they also recognize that language learning, like any other learning, is ultimately a matter of change in an individual's internal mental state. As such, research on SLA is increasingly viewed as a branch of cognitive science.

2 The Goals: Why Study SLA?

Second language acquisition – naturalistic, instructed, or both – has long been a common activity for a majority of the human species and is becoming ever more vital as second languages themselves increase in importance. In many parts of the world, monolingualism, not bilingualism or multilingualism, is the marked case. The 300–400 million people whose native language is English, for example, are greatly outnumbered by the 1–2 billion people for whom it is an official second language. Countless children grow up in societies where they are exposed to one language in the home, sometimes two, another when they travel to a nearby town to attend primary or secondary school, and a third or fourth if they move to a larger city or another province for tertiary education or for work.

Where literacy training or even education altogether is simply unavailable in a group's native language, or where there are just too many languages to make it economically viable to offer either in all of them, as is the case in Papua New Guinea and elsewhere in the Pacific (Siegel, 1996, 1997, 1999, this volume), some federal and state governments and departments of education mandate use of a regional lingua franca or of an official national language as the medium of instruction. Such situations are sometimes recognized in state constitutions, and occasionally even in an official federal language policy, as in Australia (Lo Bianco, 1987); all mean that SLA is required of students, and often of their teachers, as well.

Elsewhere, a local *variety* of a language may be actively suppressed or stigmatized, sometimes even by people who speak it natively themselves, resulting

in a need for widespread second *dialect* acquisition (SDA) for educational, employment, and other purposes. Examples include Hawai'i Creole English (Reynolds, 1999; Sato, 1985, 1989; Wong, 1999), Aboriginal English in Australia (Eades, 1992; Haig, 2001; Malcolm, 1994), and African-American Vernacular English in the USA (Long, 1999; Morgan, 1999; Rickford, 2000). In such cases, a supposedly "standard" variety may be prescribed in educational settings, despite the difficulty of defining a *spoken* standard objectively, and despite the notorious track record of attempts to legislate language change. The prescribed varieties are second languages or dialects for the students, and as in part of the Solomon Islands (Watson-Gegeo, 1992; Watson-Gegeo and Nielsen, this volume), once again, sometimes for their teachers, too, with a predictably negative effect on educational achievement. In a more positive development, while language death throughout the world continues at an alarming pace, increasing numbers of children in some countries attend various kinds of additive bilingual, additive bidialectal, or immersion programs designed to promote first language maintenance, SLA, or cultural revitalization (see, e.g., Fishman, 2001; Huebner and Davis, 1999; Philipson, 2000; Sato, 1989; Warner, 2001).

SLA and SDA are not just common experiences for the world's children, of course. More and more adults are becoming second language or second dialect learners voluntarily for the purposes of international travel, higher education, and marriage. For increasing numbers of others, the experience is thrust upon them. Involuntary SLA may take the fairly harmless form of satisfying a school or university foreign language requirement, but regrettably often it has more sinister causes. Each year, tens of millions of people are obliged to learn a second language or another variety of their own language because they are members of an oppressed ethnolinguistic minority, because forced to migrate across linguistic borders in a desperate search for work, or worse, due to war, drought, famine, religious persecution, or ethnic cleansing. Whatever they are seeking or fleeing, almost all refugees and migrants need to reach at least a basic threshold proficiency level in a second language simply to survive in their new environment. Most require far more than that, however, if they wish to succeed in their new environment or to become members of the new culture. States and citizens, scholars and laypersons alike recognize that learning a society's language is a key part of both acculturation and socialization. Finally, less visibly, economic globalization and progressively more insidious cultural homogenization affect most people, knowingly or not, and each is transmitted through national languages within countries and through just a few languages, especially English at present, at the international level.

Any experience that touches so many people is worthy of serious study, especially when success or failure can so fundamentally affect life chances. However, the obvious *social* importance of second language acquisition (SLA) is by no means the only reason for researchers' interest, and for many, not the primary reason or not a reason at all. As a widespread, highly complex, uniquely human, cognitive process, language learning of all kinds merits careful study for *what it can reveal about the nature of the human mind and intelligence*. Thus, a

good deal of what might be termed "basic research" goes on in SLA without regard for its potential applications or social utility.

In linguistics and psychology, for example, data on SLA are potentially useful for testing theories as different from one another as grammatical nativism (see, e.g., Eubank, 1991; Gregg, 1989; Liceras, 1986; Pankhurst, Sharwood-Smith, and Van Buren, 1988; Schwartz, 1992; White, 1989; and chapters by Gregg, Sorace, and White, this volume), general nativism (see, e.g., Eckman, 1996a; O'Grady, 2001a, 2001b, this volume; Wolfe-Quintero, 1996), various types of functionalism (see, e.g., Andersen, 1984; Eckman, 1996b; Mitchell and Miles, 1998, pp. 100–20; Rutherford, 1984; Sato, 1988, 1990; Tomlin, 1990), and emergentism and connectionism (see, e.g., Ellis, this volume; Gasser, 1990; MacWhinney, 2001). Research on basic processes in SLA draws upon and contributes to work on such core topics in cognitive psychology and linguistics as implicit and explicit learning (e.g., DeKeyser, this volume; N. Ellis, 1993, 1994; Robinson, 1997), incidental and intentional learning (e.g., Hulstijn, 2001, this volume; Robinson, 1996), automaticity (e.g., DeKeyser, 2001; Segalowitz, this volume), attention and memory (e.g., N. Ellis, 2001; Robinson, this volume; Schmidt, 1995; Tomlin and Villa, 1994), individual differences (e.g., Segalowitz, 1997; Dörnyei and Skehan, this volume), variation (e.g., Bayley and Preston, 1996; R. Ellis, 1999; Johnston, 1999; Preston, 1989, 1996; Romaine, this volume; Tarone, 1988; Williams, 1988; Young, 1990; Zobl, 1984), language processing (e.g., Clahsen, 1987; Doughty, this volume; Harrington, 2001; Pienemann, 1998, this volume), and the linguistic environment for language learning (e.g., Doughty, 2000; Gass, this volume; Hatch, 1978; Long, 1996; Pica, 1992), as well as at least two putative psychological processes claimed to distinguish first from second language acquisition, that is, cross-linguistic influence (see, e.g., Andersen, 1983a; Gass, 1996; Gass and Selinker, 1983; Jordens, 1994; Kasper, 1992; Kellerman, 1984; Kellerman and Sharwood-Smith, 1986; Odlin, 1989, this volume; Ringbom, 1987; Selinker, 1969) and fossilization (see, e.g., Kellerman, 1989; Long, this volume; Selinker, 1972; Selinker and Lakshmanan, 1992). SLA data are also potentially useful for explicating relationships between language and thought; for example, through exploring claims concerning semantic and cultural universals (see, e.g., Dietrich, Klein, and Noyau, 1995), or relationships between language development and cognitive development (Curtiss, 1982) – confounded in children, but not in SLA by adults. There is also a rich tradition of comparisons among SLA, pidginization, and creolization (see, e.g., Adamson, 1988; Andersen, 1983b; Andersen and Shirai, 1996; Bickerton, 1984; Meisel, 1983; Schumann, 1978; Valdman and Phillips, 1975).

In neuroscience, SLA data can help show where and how the brain stores and retrieves linguistic knowledge (see, e.g., Green, 2002; Opler and Hannigan, 1996; Ullman, 2002); which areas are implicated in acquisition (see, e.g., Schumann, 1998); how the brain adapts to additional burdens, such as bilingualism (see, e.g., Albert and Opler, 1978; Jacobs, 1988; Kroll, Michael, and Sankaranarayanan, 1998; Kroll and Sunderman, this volume), or trauma resulting in bilingual or multilingual aphasia (see, e.g., Galloway, 1981; Paradis,

1990); and whether the brain is progressively more limited in handling any of those tasks. In what has become one of the most active areas of work in recent years, SLA researchers seek to determine whether observed differences in the success of children and adults with second languages is because the brain is subject to maturational constraints in the form of sensitive periods for language learning (see, e.g., Birdsong, 1999; Bongaerts, Mennen, and van der Slik, 2000; DeKeyser, 2000; Flege, Yeni-Komshian, and Liu, 1999; Hyltenstam and Abrahamsson, this volume; Ioup, Boustagui, El Tigi, and Moselle, 1994; Long, 1990b, forthcoming b; Schachter, 1996).

Basic research sometimes yields unexpected practical applications, and that may turn out to be true of basic SLA research, too. Much work in SLA, however, has clear applications or potential applications from the start. The most obvious of these is second (including foreign) language teaching (see, e.g., Doughty, 1991, this volume; Doughty and Williams, 1998; N. Ellis and Laporte, 1997; R. Ellis, 1989; de Graaff, 1997; Lightbown and Spada, 1999; Long, 1988; Norris and Ortega, 2000; Pica, 1983; Pienemann, 1989; Sharwood-Smith, 1993), since SLA researchers study the process language teaching is designed to facilitate.² For bilingual, immersion, and second dialect education, second language literacy programs, and whole educational systems delivered through the medium of a second language, SLA research findings offer guidance on numerous issues. Examples include the optimal timing of L1 maintenance and L2 development programs, the linguistic modification of teaching materials, the role of implicit and explicit negative feedback on language error, and language and content achievement testing.

SLA research findings are also potentially very relevant for populations with special language-learning needs. These include certain abnormal populations, such as Alzheimer's patients (see, e.g., Hyltenstam and Stroud, 1993) and Down syndrome children, where research questions concerning so-called (first) "language intervention" programs are often quite similar to those of interest for (second) "language teaching" (see, e.g., Mahoney, 1975; Rosenberg, 1982). Other examples are groups, such as immigrant children, for whom it is crucial that educators not confuse second language problems with learning disabilities (see, e.g., Cummins, 1984); bilinguals undergoing primary language loss (Seliger, 1996; Seliger and Vago, 1991; Weltens, De Bot, and van Els, 1986); and deaf and hearing individuals learning a sign language, such as American Sign Language (ASL), as a first or second language, respectively (see, e.g., Berent, 1996; Mayberry, 1993; Strong, 1988). In all these cases, as Bley-Vroman (1990) pointed out, researchers are interested in explaining not only how success is achieved, but why – in stark contrast with almost uniformly successful child first language acquisition – at least partial failure is so common in SLA.

NOTES

- 1 A seminar on theory change in SLA, with readings from the history, philosophy, and sociology of science and the sociology of knowledge, is now regularly offered as an elective for M.A. and Ph.D. students in the University of Hawai'i's Department of Second Language Studies. The importance of such a "big picture" methodology course in basic training for SLA researchers – arguably at least as great as that of the potentially endless series of "grassroots" courses in quantitative and qualitative research methods and statistics that are now routine – will likely become more widely recognized over time.
- 2 The utility of some work in SLA for this purpose does not mean that SLA is the only important source of information, and certainly not that a theory of SLA should be passed off as a theory of language teaching. Nor, conversely, does it mean, as has occasionally been suggested, that SLA theories should be evaluated by their relevance to the classroom.

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24 SLA and Cognitive Science

MICHAEL H. LONG AND
CATHERINE J. DOUGHTY

Little more than three decades of research since modern SLA emerged as a serious field of inquiry in the late 1960s have brought significant advances in our knowledge of the acquisition process and of typical patterns in final achievement. A neo-behaviorist conception of second language learning as the substitution of one set of language patterns and habits for another through such opaque processes as "overlearning" has been replaced by an awareness that, to the extent that habit formation plays a role at all, it is in the development of skill and fluency, not to be confused with the new underlying L2 knowledge system that makes "skill" and "fluency" possible – and knowledge is a matter of mind, not behavior. A discernible trend, therefore, especially in the 1980s and 1990s, has been for increasing numbers of researchers and theorists, rationalists all, to focus their attention on SLA as an internal, individual, in part innately specified, cognitive process – one that takes place in a social setting, to be sure, and can be influenced by variation in that setting and by other interlocutors, as demonstrated by several chapters in this volume, but a psycholinguistic process, nonetheless, which ultimately resides in the mind-brain, where also lie its secrets.

A discernible trend does not imply consensus or unanimity, however, and there remain identifiable groupings of scholars – socioculturalists, conversation analysts, and action theorists, for example – who persist in seeing external learner behavior, even group behavior, not mental states, as the proper domain of inquiry. More generally (and more vaguely) there are "critical theorists" and an often overlapping group of self-professed epistemological relativists, who express general angst with SLA's cognitive orientation and/or its growing accountability to one or more theories and to empirical findings while offering no alternative but the abyss.

In this light, it is not surprising that indications abound of increasing tensions and fragmentation within the field. More conferences are held which

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offer platforms primarily or exclusively for papers with one or other theoretical allegiance, journals are born which attempt to do the same, research funding is sought from different government agencies and private foundations depending on the kind of work involved, philosophical assumptions range from rationalist to relativist, an array of qualitative and quantitative research methods is imported from the various disciplines in which SLA scholars were originally trained, and (healthily increasing numbers of) jobs for SLA specialists are offered in a variety of university departments, including linguistics, modern languages, psychology, English, and education. (To our knowledge, there are as yet no departments of first or second language acquisition.) Given such variability and growing diversification, it is becoming less and less clear whether "SLA" is viable as a discipline at all, or where its future lies if it has one. SLA has traditionally hovered on the borders between the humanities and social sciences, yet many scholars (including most authors in this volume) identify themselves increasingly as cognitive, not social, scientists.

Cognitive science is a field whose unifying focus is its principal object of inquiry: the mind. Cognitive scientists accept that study of cognitive phenomena involves use of the notions of representation and computation, and further that successful research will require interdisciplinary collaboration. Cognitive scientists conduct research on such matters as the evolution and nature of human intelligence; intelligence and reasoning in humans, other animals, and machines; novice and expert approaches to problem solving; individual and group (e.g., cultural) differences in cognition; the localization of mental functions in the brain; biological constraints on language development; the neural bases of perception, learning, and memory; the ways language is processed, acquired, stored, accessed, and used; and relationships between innate and learned knowledge. Applications include robotics, information processing, data retrieval, medical diagnoses and treatments, manufacturing, telecommunications, human-computer interaction, treatment of communication disorders, and the design of instruction.

While knowledge, intelligence, reasoning, consciousness, and thought processes in general have occupied philosophers from Aristotle and Plato to the present day, modern cognitive science is generally accepted as dating from three major developments in the late 1950s and early 1960s. The first of these, based on pioneering work by the British mathematician Alan Turing in the 1940s and 1950s, and the building of the first digital computers soon thereafter, was the initiation by Minsky, Newell, Simon, and others in the 1960s of research programs in artificial intelligence, producing such early successes as Newell, Simon, and Shaw's computer program, *Logic Theorist*. The second development was the dismantling of the behaviorist hegemony in psychology, begun by Miller's work on short-term memory and Chomsky's famous review of Skinner's *Verbal Behavior* in 1959, and its replacement by a pre-eminently cognitive, information-processing approach that holds sway to this day. The third, heralded by the publication of Chomsky's *Syntactic Structures* in 1957, was related work on language and language learnability by

Chomsky, Fodor, and others that replaced the patterns and habits of American structuralism with the rules and modules of the generative tradition, and had a lasting impact on linguistics and on research in first and second language acquisition.

A survey of publications in the journal *Cognitive Science* and presentations at the annual meeting of the Cognitive Science Society from 1977 to 1995 (Schunn, Crowley, and Okada, 1998) found that two disciplines, cognitive psychology and computer science, had dominated both journal and conference during that period, between them accounting for over half the articles and papers. This dominance may soon change, however. The dramatic increase in the accessibility and use of computers in numerous areas of public and private life has given further impetus to the field, simultaneously providing both seemingly endless new applications and the technological means to achieve them. Not unrelated, in neurophysiology, new brain scanning and imaging techniques, notably computer-assisted tomography, positron emission topography, and magnetic resonance imaging, have led to greater understanding of the functions of different cerebral areas, for example, the location of various linguistic abilities and memory, and relationships between cognitive impairments and anatomical damage in different locations, and have made cognitive neuroscience an increasingly central and successful research area.

While the new science is still young, indications of its institutional recognition have grown rapidly over the past 25 years. The journal *Cognitive Science* was founded in 1977, and the Cognitive Science Society in 1979. Cognitive science programs at the undergraduate and graduate levels are offered by over 60 universities in North America, Europe, and Australasia, with new ones announced every year. Conferences devoted to the whole field or to domains within it are ever more numerous.

As is inevitable in the emergence of any new discipline, the first generations of cognitive scientists hail from diverse academic backgrounds and training programs: artificial intelligence, linguistics, anthropology, biology, neuroscience, philosophy, physiology, mathematics, education, speech and hearing, library information science, computer science, electrical engineering, and more. Most hold formal academic qualifications in those fields, not in cognitive science per se, and collectively they employ a large variety of research methods in their work. The formal academic training now available in the new discipline tends to consist not of a lengthy series of courses in "cognitive science" per se, either, but of one or two introductory survey courses, followed by extensive work in one or more of the feeder disciplines, such as psychology or computer science, emphasizing domains inside them that speak to the broader issues and applications of interest outside, in cognitive science.

The huge diversity of the new discipline means that the work of some practitioners is unintelligible or of only marginal interest to others, and that some research which appears in cognitive science books and journals could just as easily appear in publications within the source discipline, and vice versa. It is not surprising, therefore, that questions have been asked both within the field

and by outsiders as to whether a discipline of cognitive science distinct from the disciplines on which it draws really exists, or whether "cognitive science" is just an umbrella term for (sometimes very) loosely related work in each of them. Moreover, is it the case that to qualify as cognitive science, particular research programs should be multidisciplinary (this is sometimes referred to as the *localist* conception of multidisciplinaryity; Schunn et al., 1998), or, more inclusively, is it enough that multiple disciplines contribute to the field's overall research program (the so-called *holist* conception; Von Eckardt, 2001)?

To the extent that *Cognitive Science* and the Cognitive Science Society reflect tendencies in the field as a whole both inside and outside the USA (and they may not), the evidence suggests that cognitive science is more than just the sum of its parts, that it increasingly has an identity of its own, independent of, albeit closely related to, its source disciplines. Thus, as indicated by departmental affiliations of first authors, collaboration make-up of authors, research methodology used (computer simulation and/or empirical study, or neither), and disciplinary sources of previous theories and results cited, Schunn et al. (1998) noted that despite the steady dominance of psychology and computer science overall (linguistics and philosophy being very minor players thus far), multidisciplinary studies were on the increase, accounting for 30–50 percent of work in the journal in recent years. The same was true of "cognitive science" departments or institutes as authors' primary work affiliation, recently amounting to nearly 20 percent of the papers.

Cognitive science and SLA, it transpires, exhibit many of the same characteristics: youth, interdisciplinarity, theoretical and methodological diversity, and lack of a single clear institutional home. Cognitive science has the immense advantage, however, of the substantive coherence accruing from its common focus of inquiry, the mind and cognition. As reflected in the chapters in this volume, many SLA scholars share that focus: grammatical nativists, general nativists, connectionists, processing researchers, those studying individual differences in such attributes as age, aptitude, intelligence, memory, or cognitive style, and those investigating such processes as implicit, explicit, incidental and intentional learning, and automatization, among others. Underlying all their work is a shared conception of SLA as a cognitive process involving representations and computations on those representations. There is a big difference between that conception and the view prevalent among some applied linguists that would equate "SLA" with almost any research having to do with non-natives when they *use* a second language. Much of the work that would be included under the broader definition is rigorous and valuable, but little of it has anything to do with how people *learn* a second language – or, at least, a connection has yet to be demonstrated.

But a common focus is not enough. For SLA to achieve the stability, stimulation, and research funding to survive as a viable field of inquiry, it needs an intellectual and institutional home that is to some degree autonomous and separate from the disciplines and departments that currently offer shelter. Cognitive science is the logical choice.

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