Synthesis

Transdisciplinary perspectives on second language acquisition: exploration versus explanation

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SYNTHESIS

Transdisciplinary perspectives on second language acquisition: exploration versus explanation

Jan Hulstijn

Introduction

The central theme in this chapter concerns the potential of a transdisciplinary perspective on second language acquisition (SLA). Is it the case that, by incorporating views from ever more other disciplines (themselves also changing rapidly, influenced by other fields), we might get a better chance of increasing our understanding of second language (L2) acquisition, perhaps even attain (or at least approach) an all–inclusive theory of L2 acquisition? Or is this goal unattainable and the ambition to strive for it simply naïve? This chapter seeks to answer these questions. The answers are colored (critics might say "biased") by the author's stance, rooted in Popper's (1959) critical rationalism. Critical rationalism gives priority to theory construction and theory testing over attempts to define a discipline in terms of its objects of investigation, and over worries of the danger that the discipline might disintegrate.

The chapter is structured in the following way. For a proper treatment of the issues just mentioned it is mandatory to first consider what scientific inquiry is and in what ways psycholinguistics and SLA became multidisciplinary fields. The other chapters of this section of the handbook are then discussed with a view on transdisciplinarity and exploration versus explanation. Holbrook (2013; cited in Douglas Fir Group, 2016) assigns different meanings to the adjectives *transdisciplinary*, *cross-disciplinary*, *interdisciplinary*, and *multidisciplinary* from her philosophical perspective. However, for the topic of the present chapter, Holbrook's fine distinctions are not needed and the terms will be used, where appropriate, without principled differences in meaning. The question of SLA's scope was pushed very strongly by the "Transdisciplinary framework for SLA in a multilingual world," presented by the Douglas Fir Group (DFG, 2016). This framework is presented and discussed with a view on its potential for exploration and explanation. The chapter ends with directions for future research.

Textbox 35.1 Key terms and concepts

A *theory* (also called *local theory*) is an explanation of observations or a solution to a problem.

A *theoretical framework* (also called *metatheory*) offers answers to wider, ultimate questions (e.g., the evolution of language and the human species).

From exploration to explanation (and back)

Scientific inquiry, one might think, is the business of exploration: collecting data, making observations, searching for facts. SLA researchers want to know how control of an L2 develops over time. They want to know in what ways L2 learners differ in their learning and in the proficiency they attain. They want to know which curricular settings or pedagogical practices are best for L2 learning. And they want to know dozens of other things. But scientific inquiry is more than exploration. Observations of developmental patterns, observations of individual differences, and observations of the effects of instructional practices may be puzzling, calling for explanation. Theories are attempts to provide explanations for non-trivial, puzzling observations. Empirical testing of a hypothesis derived from a theory may produce new observations, throwing new light on the puzzling observations which the theory sought to explain. This may necessitate the rejection or adaptation of the theory. Ideally, a theory forms the heart (point 3) of a transparent argument of the following type:

1. The goal is to explain the following non-trivial observations: …
2. The explanation (theory) rests on the following assumptions: … Because of their conditional status, assumptions are not proposed as testable claims.
3. The explanation (theory) runs as follows: … Typically, a theory introduces some constructs and specifies the nature of their relationships.
4. From the theory, the following testable (falsifiable) claims (hypotheses) are derived: …
5. From the theory, the following as yet speculative claims are derived: … Future developments or innovations in … will hopefully allow their empirical testing at some point in the future.

According to Muthukrishna and Henrich (2019), it makes good sense to distinguish between *theories* and *metatheories*, also called *theoretical frameworks*. While theories address what the ecologist Tinbergen (1963) called proximate questions (about causation and development), metatheories (theoretical frameworks) address ultimate questions (concerned with evolution and function).[1] Darwin's (1859) views on evolution began as a theory but they have, meanwhile, developed into a metatheory, conceiving nature as a complex adaptive system (Van den Bergh, 2018). In linguistics and psycholinguistics, *the* ultimate puzzle to be solved is how and why (typical) members of the human species are capable of acquiring language(s) while members of other species are incapable of doing so. Generative linguists, along with some cognitive scientists and biologists, have provided their metatheory for this feat (Berwick et al., 2013; Chomsky, 2005). Usage-based linguists, along with other cognitive scientists, have provided a radically different metatheory, viewing language as a complex adaptive system (the Five Graces Group, 2009). Like theories, theoretical frameworks should be falsifiable (Hulstijn, 2020).

In sum, scientific inquiry is a matter of exploration and explanation (proximate and ultimate), in a cyclical manner. As will become clear in the remainder of this chapter, the distinction between exploration and explanation should be kept in mind when discussing possibilities for multidisciplinary work on L2 acquisition.

Psycholinguistics and SLA in historical perspective

SLA and psycholinguistics, the two disciplines forming the backbones of this handbook, go back a long time. Psycholinguistics has its origins in the eighteenth century (Levelt, 2013) and SLA, the study of people learning additional languages, has its roots in "25 centuries of language teaching" and the book by the same name by Kelly (1969). However, the cognitive revolution in the twentieth century gave an unprecedented boost (qualitatively and quantitatively) to both SLA and psycholinguistics (Table 35.1).

Table 35.1 Timeline and schools (paradigms) in linguistics and psychology.

Timeline	Linguistics	Psychology
1910 –	Structuralism	Behaviorism
Cognitive Revolution[2]		
1960 –	Generative linguistics	Boxes-and-arrows cognitive psychology, deterministic perspectives
1985 –	Usage-based linguistics	Neural-network psychology, probabilistic perspectives

From around 1960 to 2000, psycholinguistics was typically concerned with the study of processes at the lower levels (sounds, phonemes, morphemes, words, syntactic patterns), involved in speech production, speech perception/comprehension and in reading. The table of contents of textbooks and handbooks confirm this characterization (e.g., Traxler & Gernsbacher, 2006). Research tools initially allowed the measurement of overt behavior. Later, with the advance of new technology, covert behavior (through EEG, fMRI, eye-tracking) could be observed as well (De Groot & Hagoort, 2018). Until recently, research was almost exclusively conducted in "the lab"—a physical place that people had to visit in order to participate.

The study of writing processes has hardly been reported in textbooks of psycholinguistics for many years. For example, the seminal article of Flower and Hayes (1981) was not published in a psycholinguistic journal. By its nature, the study of information processing at higher linguistic levels (discourse, paragraph, text) includes the role of metacognitive skills (e.g., metalinguistic knowledge, reading and writing strategies), leading to a further broadening of psycholinguistics. Consequently, psycholinguistics after approximately 2000 must be characterized as a much wider field than psycholinguistics in the 1960–2000 period, currently including the acquisition of sign languages, L2 acquisition, bilingualism, language processing in special populations (children, adults, and aging people with atypical profiles), and the role of person attributes such as working-memory capacity and attentional skills (executive functions; see Poarch, 2023 [this volume]).

Like psycholinguistics, SLA went through a period of enormous growth since the cognitive revolution, both in volume (number of journals and publications) and scope. Most SLA researchers who published their first papers in the 1970s had received their academic training in a language (e.g., English in the U.S. and the U.K.), not in psychology or another discipline. Many of them began their career as an L2 instructor. At the time of their training, in the 1960s, the prevalent ideas about teaching and learning came from structural linguistics and behavioral psychology (Gagné, 1965; Hilgard & Bower, 1975; Skinner, 1957), materialized in the audiolingual method (Rivers, 1964).

After approximately 1970, influences from cognitive psychology were numerous. Influential constructs in the SLA literature such as automatization and skill acquisition (DeKeyser, 1997), intake (Gass, 1988), input processing (VanPatten, 1996), focus on form (Long & Robinson, 1998), attention, awareness, and noticing (Schmidt, 1995), task-based language teaching (Robinson, 2002; Skehan, 1998), and involvement load (Laufer & Hulstijn, 2001) all reflect (albeit in different degrees) information-processing work in cognitive psychology. Levelt's (1989) psycholinguistic model of speaking influenced Pienemann's (1998) processability theory of L2 acquisition and De Bot's (1992) model of L2 speaking. A huge body of research on explicit and implicit L2 learning (Ellis, 1994; Rebuschat, 2015) was (and still is) based on implicit and statistical learning in cognitive psychology (Williams & Rebuschat, this volume) and on procedural and declarative memory in neuropsychology (Morgan-Short & Ullman, this volume). The examples given so far illustrate the influence of cognitive psychology and cognitive neuroscience on SLA. But there is more. Lantolf (2000) based his

sociocultural theory of L2 acquisition on the work of the Russian psychologist Vygotsky. Almost all textbooks of SLA contain sections devoted to constructs from other fields in the social sciences, such as learning styles, personality, motivation, anxiety, willingness to communicate, language-learning aptitude, attitudes (towards an L2, towards speakers of the L2, towards learning the L2), and acculturation. Only a handful of SLA researchers have tried to explain phenomena of L2 acquisition with notions from outside the social sciences. Schumann (1997) sought to explain affectual aspects of L2 acquisition from a neurobiological perspective, arguing that emotion and cognition are tightly connected in the brain through a long evolutionary process. A perspective from physics on L2 acquisition is offered by Han et al. (2017), who argue that the law of energy conservation in physics can be used to account for ultimate attainment of an L2. The authors offer mathematical formulae for the dynamic interplay of motivation, aptitude, L1-L2 distance, and L2 input. Finally, with respect to methods of empirical inquiry, SLA has been affected by experimental psychology, neuroscience (neuroimaging), psychometrics, and (frequentist and Bayesian) statistics (Norouzian et al., 2018).

Despite many influences from other disciplines, much current SLA work still is conducted by researchers trained in linguistics. Both generative and usage-based linguistics have put their stamp on large amounts of theoretical and empirical work in SLA. The poverty-of-the stimulus argument (Chomsky, 1980, p. 3) and universal grammar, consisting of "principles" and "parameters" (Chomsky, 1981, p. 3–4) had (and still have) a huge impact on SLA research. Usage-based linguistics (insights of scholars like Langacker, Croft, Bybee, Hopper, Goldberg, and others), originating some 25 years later than generative linguistics, began to impact SLA researchers in the 1990s, notably through the work of Nick Ellis.

In sum, psycholinguistics and SLA, until approximately the year 2000, can be characterized as largely separate disciplines, as observed (more generally, for linguistics and psychology) already twenty years ago by Segalowitz (2001). However, the second wave of the cognitive revolution, characterized by thinking of the mind as a neural network, along with technological innovation, and probabilistic usage-based linguistics made the two disciplines partly overlap in scope. Fortunately, there is no place in academia for an authority dictating boundaries of, and between, disciplines. The current partial overlap of psycholinguistics and SLA is the result of natural progress in scientific inquiry, driven by researchers' curiosity and desire to deepen their insights by taking account of ever more factors, as the contributions to this handbook illustrate.

The chapters in this section

The authors of the five individual chapters in this section of the handbook review the study of L2 learning and use in various learning contexts, from various disciplines (such as education and developmental psychology) "neighboring" SLA, but also partially overlapping with it. Although exploration and explanation must stand in a cyclical relationship to one another (as explained previously), exploration arguably tends to dominate explanation in much (but not all) educational research, given the need to find solutions to practical, educational problems. Thus, in their chapter, Sachs, Baralt, and Gurzynski-Weiss (2023 [this volume]) address possible educationally favorable interactions between learner attributes (in the cognitive realm) and pedagogical arrangements (in particular, pedagogical tasks of different cognitive complexity). This work belongs to the tradition of aptitude-treatment interaction research, which is motivated by the idea that it is, potentially, educationally more fruitful to investigate pedagogical tasks and learner attributes in combination with one another than separately. Providing a related educational perspective, Leow (2023 [this volume]) addresses the question of how local contexts (e.g., different programs within a curriculum) or global contexts (e.g., L2 learning in school or elsewhere) might affect the way in which the L2 is processed (i.e., psycholinguistically) when people are learning an L2. Leow notices a tremendous paucity of research on this question, proposing that it "provides a worthy direction for future studies" (p. 382). Thus,

the work reviewed in this chapter is based on the premise that, albeit in ways poorly understood so far, naturalistic and instructional environments (global contexts) and pedagogical procedures, such as learner feedback (local contexts) may indeed affect L2 input processing in educationally meaningful ways. Exploration characterizes the work reviewed in the chapters of Sachs et al. and Leow more than explanation and hypothesis testing. The few hypotheses that do form the starting point of empirical work reviewed in these chapters (associated with names such as Skehan, Robinson, and Krashen) are local theories (in the sense defined above, as an explanation of observations). This observation is *not* a criticism. The distance between global or local contexts of L2 learning and the way in which L2 information is being processed by L2 learners (from millisecond to millisecond) is indisputably huge and it would thus be unfair to criticize brave attempts to explore possible effects of learning contexts on what goes on in the mind/brain (see "Open questions").

Manchón (2023 [this volume]) addresses the question of how various cognitive processes involved in writing (conceptualized as a kind of conscious, intentional information processing) may lead to L2 learning. As in Leow's contribution, Manchón's contribution adopts an educational, instrumental perspective, guided by the question of which task-mediated processes causally lead to L2 learning. The "theoretical perspectives" on L2 writing as a site for L2 learning (section "Theoretical perspectives and approaches") are derived from local theories, which originated in the deterministic school of cognitive psychology rather than in the probabilistic, neural-network school (see Table 35.1). Regarding the primary processes of writing (planning and formulation), these theoretical perspectives pertain to the distinction between implicit (direct) learning, including automatization, and explicit (indirect) learning. Regarding the processes involved in revision, including feedback processing, the theoretical perspectives pertain to task-mediated depth of processing, monitoring, activation of prior knowledge, and hypothesis testing, based on Gass's (1997) model of input processing.

Schoonen (2023 [this volume]) shows how the understanding of language proficiency, the central construct in language testing, has changed substantially since the days of Lado (1961) as a result of work in psycholinguistics. Lado distinguished between elements of language use and integrated skills, reflecting insights from structural linguistics and behaviorist psychology (Table 35.1). In contrast, current work on language assessment (as reviewed by Schoonen) takes psycholinguistic processing models into account. This change reflects the paradigm shift, caused by the cognitive revolution, calling for investigating and explaining covert cognitive processing in relation to overt behavior. Schoonen points out that researchers of language assessment have to weigh the relevance (or lack thereof) of psycholinguistic research on language processing at different levels of granularity for different types of language assessment with different purposes (diagnostic testing as well as testing of level of proficiency). Referring to Borsboom et al. (2004), Schoonen addresses the need of a causal theory of construct validity, which turns out to be a tall order. The need of such a theory of response behavior and the weighing of findings and insights from various disciplines makes language assessment a fascinating field of inquiry, as illustrated by "Open questions and issues" in Schoonen's chapter.

Poarch (2023 [this volume]) addresses a psycholinguistic question, not connected to practical matters of language education and testing. The question is a typical and fascinating example of the succession of exploration and explanation in a cyclical manner. It starts with observations (obtained in some studies) of a possible association between control of various types of executive functions and (degree of) bilingualism. Poarch shows that researchers have tried to investigate the generalizability of such an association (i.e., between cognitive control and bilingualism) and, at the same time, have tried to explain the existence (or lack) of patterns of association between cognitive control and bilingualism (modulated by other factors, in different populations, involving different tasks). Work in this field nicely illustrates how the role of explanans (cause) and explanandum

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(effect) might change place. Although the jury may still be out with respect to the existence and explanation of an association between cognitive control and bilingualism, both exploration and explanation in this field—conducted along the conventions of critical rationalism—have deepened (according to some), or not (according to others) our understanding of the control of more than one language. As Berthele (2021, p. 110) remarks, "Multilingualism is large and old enough to teach us modesty."

A transdisciplinary framework for SLA (the Douglas Fir group, 2016)

In this section, we return to the topic of this chapter: transdisciplinarity in SLA. In 2016, a seminal paper on the topic of transdisciplinarity was published in the *Modern Language Journal* that deserves to be discussed here because it argues for transdisciplinarity from a wider perspective than discussed in the previous sections. The paper, entitled "A transdisciplinary framework for SLA in a multilingual world," was authored by a collective of 15 scholars, united under the name of the *Douglas Fir Group* (DFG, 2016). These scholars have "different theoretical roots, including in no particular order: sociocultural theory (Johnson, Lantolf, Negueruela, Swain), language socialization theory (Duff), social identity theory (Norton), complexity and dynamic systems theory (Larsen-Freeman), usage-based approaches (Ellis, Ortega), the biocultural perspective (Schumann), ecological and sociocognitive approaches (Atkinson), variationist sociolinguistics (Tarone), systemic functional linguistics (Byrnes, Doran), and conversation analysis (Hall)" (DFG, 2016, p. 20). The paper addresses historical, philosophical, educational, and ethical issues of SLA as well as the demarcation lines with other disciplines. The DFG framework "assumes the embedding, at all levels, of social, sociocultural, sociocognitive, sociomaterial, ecosocial, ideological, and emotional dimensions" (p. 24). It pursues "an integrative consideration of learners' mental and neurobiological processing, remember-language, and moment-to-moment language use" (p. 24).

The framework renders L2 learning as a process beginning "at the micro level of social activity." The context of these activities is situated and shaped at a meso level by "sociocultural institutions and communities (e.g., neighborhood, work, leisure-time activities), characterized by pervasive social conditions (e.g., economic, cultural, religious, political)," affecting the creation of people's social identity. At the macro level there are "society-wide ideological structures" and belief systems with particular orientations toward the use and learning of (additional) languages (p. 24). Each of the three levels "exists only through constant interaction with the others" (p. 25).

After the presentation of the framework, the DFG authors devote ten sections to "fundamental themes" (p. 26), formulated as propositional statements.

1. Language competences are complex, dynamic, and holistic (p. 26).
2. Language learning is semiotic learning (p. 27).
3. Language learning is situated and attentionally and socially gated (p. 27).
4. Language learning is multimodal, embodied, and mediated (p. 29).
5. Variability and change are at the heart of language learning (p. 29).
6. Literacy and instruction mediate language learning (p. 30).
7. Language learning is identity work (p. 31).
8. Agency and transformative power are means and goals for language learning (p. 33).
9. Ideologies permeate at all levels (p. 33).
10. Emotion and affect matter at all levels (p. 36).

Three years later, the *Modern Language Journal* (volume *103* (S1), 2019) published another supplementary issue, in which several individual members of the DFG were given room to set their individual stamps on the framework.

Appraisal of the DFG framework

Google Scholar (accessed 22 March 2021) lists 176 citations of the 2016 DFG paper. Interestingly, almost all papers citing the DFG paper are concerned with applied linguistics in the wide sense, including language teaching and language and ideology. Only two of the citations provide an appraisal by researchers of SLA in the narrow sense (linguists): Han (2016) and Slabakova (2019). Of these, Han's rejoinder gives the most critical appraisal of the DFG article. Han (2016) noted that the ten themes, "with apparent lack of epistemological coherence," do not make up a theory, although Han acknowledged that the DFG authors did not claim the framework to be a theory (p. 738). As a "way forward" for SLA, Han proposed to distinguish three subfields: (i) basic or fundamental SLA, (ii) instructed SLA (ISLA), and (iii) applied SLA (ASLA). While basic/fundamental SLA and ISLA have established themselves already (see Leow, 2023 [this volume]) the DFG framework brought ASLA to the fore "as a potential area" (Han, 2016, p. 739). In her invited peer commentary, Slabakova (2019) argued that the approach of generative SLA (GenSLA) in its more recent appearance (Rothman & Slabakova, 2018) is partially commensurable with usage-based approaches to SLA and the DFG's framework. Leow (2023, pp. 373–374) notes that it is "challenging to address the influence of this transdisciplinary context on the psycholinguistics of L2 learning, when viewed from a process-oriented perspective. . ., especially given the many variables postulated to play a role in L2 learning."

By bringing in notions from the meso and macro levels, the DFG as a collective as well as individual members of it are clear in their call for broadening the object of SLA, thereby redefining SLA. With their proposal, the DFG authors "call to SLA researchers to expand their analytic gaze to different dimensions of social activity and . . . to think integratively" (p. 38). Many researchers (including myself) will think positively about parts or all of the contents of sections headed by the ten statements listed earlier. But what kind of wisdom do these propositions reflect? Are they generalizations supported by robust evidence? Are they assumptions, hypotheses, or speculative views? What the DFG authors failed to do is point out that there is no certainty in scientific knowledge, that generalizations, assumptions, claims, and speculative views have to be translated into scientific inquiry of the exploratory and explanatory kind, in a cyclical process. In the absence of such a warning, SLA researchers, in particular novice researchers, may be led to "accept" the content of the propositions as rendering the truth.

Whether the ideas proposed by the DFG will turn out to have a major (transdisciplinary) impact on SLA as a discipline remains to be seen. At the time of writing this chapter (2020–2021) it is probably too early to tell. One can sympathize with, support, or advocate the ethical and political ideology of the proponents of a social and ecosocial turn in SLA as a desired goal for SLA. Novel and "weird" ideas are needed, scientific inquiry is essentially anarchistic,[3] but the *real* future of a scientific discipline is eventually determined by its capability of solving fundamental puzzles through exploration and explanation in a cyclical manner.

For SLA researchers sympathizing with the DFG framework and the social turn, the challenge, therefore, is (i) to translate the framework's main ideas into fundamental issues (puzzling phenomena and problems in need of explanation and solution), (ii) find explanations and solutions, and (iii) empirically test hypotheses derived from these explanations and solutions. A discipline may have as its main goal to improve the world (create better ecosystems, prevent natural disasters, address migration challenges, battle poverty, improve health care, improve education, improve L2 instruction) but the bottom line is that, if it loses its brief of being critical of virtually every statement, examining its empirical evidence and finding explanations for crucial observations, it runs the risk of becoming marginalized. More importantly, it may lose its capacity to produce cumulative, robust, evidence-based knowledge, albeit even evidence-based knowledge will not give us absolute certainty. As Popper said, there is no place for certainty in scientific inquiry but there are rational

and critical ways to reduce uncertainty maximally through theory construction and testing. Or, in the succinct statement of Gass et al. (2021, p. 245), "Scientific rigor is the sine qua non in all areas of scientific inquiry."

Directions for future research

This chapter of the handbook addressed the degree of transdisciplinarity in current SLA, appraising the preceding five individual chapters of this section and the DFG's "Transdisciplinary framework for SLA," from a perspective on scientific inquiry as a cyclical process of exploration and explanation. SLA's history shows that the first phase of predominantly linguistic studies of "interlanguage" soon evolved into a thriving phase, characterized by numerous influences from various other disciplines in the social sciences.

Transdisciplinary research and interdisciplinary collaboration are likely to be fruitful when the researchers involved (with roots in different disciplines) share (i) a theoretical perspective (preferably even an overarching theoretical framework [metatheory], addressing so-called ultimate questions of evolution and function), and (ii) views on what should be accepted as robust knowledge. Because of its nature, a theoretical framework provides *converging* perspectives from different disciplines (linguistics, psychology, sociology, economy, brain sciences, physics, biology). Because these perspectives converge, the framework forms the basis of potentially fruitful multidisciplinary work. Language as a complex adaptive system (CAS) is such a theoretical framework (De Bot et al., 2007; Ellis, 2019; Han, 2019; Larsen-Freeman, 2018, 2019; and others). Language as CAS is multidisciplinary as of necessity, with a potential for SLA, *provided* that its claims are falsifiable (Hulstijn, 2020).

If researchers of different schools, embracing different epistemological stances, attempt to collaborate, no fruitful work can be expected. To my knowledge, no important work has been conducted by structuralists collaborating with generativists, by generativists collaborating with usage-based linguists, or, in psychology, by cognitive psychologists with behaviorists. Equally important, collaboration is not likely to be fruitful when researchers do not agree on the weights given to qualitative and quantitative research methods.

The DFG framework should be taken seriously because it forces SLA researchers to reflect on what their goals are and how they might achieve them. In concrete terms, the first positive potential of the DFG framework is that it encourages SLA researchers to *replicate* existing empirical work with more varied samples of participants. Hitherto, most empirical work in SLA has been conducted with rather homogeneous samples of L2 learners (often university students) in restricted arenas of L2 acquisition. Replication studies should include participants (i) with other backgrounds, (ii) exposed to the L2 in other situations, as suggested by Andringa and Godfroid (2020; see also Bolibaugh et al., 2021). A point not raised in the DFG article, which I propose to add, is that (iii) more typologically different second languages should be included, acquired by people living in more parts of the world than has been done in SLA hitherto. Empirical work along these three lines will surely produce surprising findings which in turn will shed new light on some fundamental issues, supporting some theoretical claims but challenging others. The bottom line is that transdisciplinarity is not a goal in itself.

In conclusion, SLA is still in a healthy state of Darwinian variability: It is developing naturally and exploring potentially promising new avenues. An equally natural process of Darwinian selection will surely take place, with some theories surviving and others not. There is thus much work to do for (new generations of) researchers, to make this selection process happen, through rigorous cycles of exploration, explanation, and hypothesis testing.

Textbox 35.2 Open questions and issues

Is it desirable (and is it indeed possible) to somehow unite (i) a theory of L2 acquisition as a mental, cognitive phenomenon (the processing and representation of linguistic information in the mind/ brain) with (ii) a theory of learning and use of additional languages in different socio-economic or ideological contexts?

What might the phenomena at the meso and macro levels of the DFG's framework be that need a theoretical explanation?

Which theoretical framework (metatheory) would provide the best umbrella for the explanation of phenomena of L2 acquisition and use at *all* three levels (micro, meso, macro)?

Is it necessary that every "local" question or claim be in line with an overarching theoretical framework? For instance, does research on instructed L2 acquisition really need a theoretical framework (metatheory) for it to produce robust, evidence-based knowledge, fruitful for L2 instruction?

Acknowledgments

Notes

1 Konrad Lorentz and Niko Tinbergen were awarded the Nobel Prize in Physiology/Medicine in 1973 "for their discoveries concerning organization and elicitation of individual and social behavior patterns in animals." (https://en.wikipedia.org/wiki/Nikolaas_Tinbergen, archived 18 May 2020)
2 According to Miller (2003, p. 142), one can assign a real date to the cognitive revolution. The date is September 11, 1956. when Noam Chomsky, Paul Newman, Herb Simon, George Miller, and others met at a symposium at M.I.T. For linguistics, Chomsky's seminal books appeared in 1957 and 1965. In psychology, the seminal publication was Miller et al. (1960).
3 "Scientific teamwork is essentially anarchistic: the best ideas should govern the process, not scientific authority," says Willem (Pim) Levelt, one of the founders of the Max Planck Institute for Psycholinguistics in Nijmegen, in an interview in 2020 on the occasion of the institute's fortieth anniversary (www.mpi.nl/40th-anniversary, accessed 20 March 2021).

Further reading

The question of whether SLA has been, can, or should (not) be split up in various subfields, such as instructed second language acquisition (Leow, 2023 [this volume]) and applied SLA (Han, 2016) has been discussed by, among others, Ellis (2021), Long (2007), DeKeyser (2010), Hulstijn (2013), and Gass, Loewen, and Plonsky (2021).

The question of whether SLA researchers, working in different cognitive and non-cognitive branches of SLA, might be able to bridge their differences has ramifications in ideology (the goals of scientific inquiry), philosophy of science (epistemology and ontology in critical rationalism and relativism), sociology (the role of communities of researchers in a scientific discipline), and research methodology (emic and etic perspectives; quantitative vs. qualitative methods). These matters have been addressed by (in alphabetical order) Martha Bigelow, Nick Ellis, Robert DeKeyser, Jan Hulstijn, James Lantolf, Alison Mackey, Lourdes Ortega, Steven Talmy, and Richard Young in an article published in *Studies in Second Language Acquisition* (Hulstijn et al., 2014). See also Ortega (2019).

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