

# The Neurolinguistic Approach (NLA) for Learning and Teaching Foreign Languages



# The Neurolinguistic Approach (NLA) for Learning and Teaching Foreign Languages:

*Theory and Practice*

By

Claude Germain

Cambridge  
Scholars  
Publishing



The Neurolinguistic Approach (NLA) for Learning and Teaching  
Foreign Languages: Theory and Practice

By Claude Germain

This book first published 2018

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

Copyright © 2018 by Claude Germain

All rights for this book reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owner.

ISBN (10): 1-5275-1581-8

ISBN (13): 978-1-5275-1581-9

The translation of this book, by MacfarLingua Language Services, is based on the manuscript entitled *L'approche neurolinguistique (ANL) pour l'apprentissage-enseignement des langues étrangères – Théorie et pratique* provided by Claude Germain.

# TABLE OF CONTENTS

Foreword .....	viii
Acknowledgments .....	x
Note .....	xii
Abbreviations .....	xiii

## **Part One: Theoretical Foundations of the NLA**

Chapter One.....	3
Five Lessons from the Neurosciences	
First Lesson: The Absence of a Direct Connection Between Declarative Memory and Procedural Memory .....	3
Second Lesson: The Complexity/Flexibility of the Brain and Two Neuronal Mechanisms: conscious ( <i>vocabulary</i> ) and Unconscious ( <i>lexicon</i> ).....	9
Third Lesson: Focusing on the Meaning or on the Task to Develop Implicit Competence .....	11
Fourth Lesson: The Importance of “Transfer Appropriate Processing” (TAP) and the Limbic System’s Role .....	11
Fifth Lesson: <i>Intake</i> and Individual Cognitive Benefits of Social Interaction .....	13
Chapter Two.....	16
The NLA’s Five Fundamental Principles	
First Principle: Distinguishing between Two Grammars, Internal (Implicit Competence) and External (Explicit Knowledge).....	16
Second Principle: Literacy (Primacy of Orality) and Pedagogy of the Sentence (Importance of the <i>Lexicon</i> ).....	18
Third Principle: Emphasising the Meaning of Messages and Use of Project-Based Pedagogy .....	22
Fourth Principle: TAP and Motivation: Authenticity of (Oral) Communication and the (Written) Document .....	24
Fifth Principle: Social Interaction .....	25

Chapter Three .....	31
The NLA and Other Approaches	
The “Grammatical Paradox” .....	31
Reassessing Language Teaching’s General Reference Models .....	32
The NLA and the CEFR’s Action-Oriented Approach:	
A Comparison .....	35
Comparison with Some Other Teaching Approaches .....	44
Language Textbooks .....	47

## **Part Two: The NLA in Practice: Frequently Asked Questions**

Chapter Four .....	54
The Predominance of Acquiring Oral Skills in the NLA	
Acquiring and Teaching Internal Grammar .....	54
Vocabulary and Lexicon Acquisition .....	64
Teaching Oral Comprehension and Phonetics .....	80
Chapter Five .....	82
Learning and Teaching Reading, Writing and Culture with the NLA	
Learning and Teaching Reading .....	82
Teaching External Grammar .....	90
Learning and Teaching Writing .....	92
The Spoken and the Written .....	107
Teaching and Appropriating Culture .....	117

## **Part Three: Implementation of the NLA**

Chapter Six .....	126
The NLA and Intensive French	
The Canadian Linguistic Context .....	126
First Experience Outside Canada: Implementation	
at the South China Normal University (SCNU) .....	146

## **Part Four: Some Outcomes of the NLA**

Chapter Seven .....	154
NLA Results: Evaluation	
Evaluations at the End of a Teaching Unit .....	154
Quantitative Evaluation of Learning .....	155
Some Testimonials from Learners .....	182
The NLA as a Universal Approach .....	185

Chapter Eight.....	187
Training Teachers in the NLA	
Effects of Teaching on Learning.....	187
Training Second-language Teachers.....	195
Conclusion.....	200
Why Adopt the NLA	
<b>Appendices</b>	
Appendix A .....	208
Origins of Intensive French	
Appendix B.....	210
The First IF Classes in Canada	
Appendix C.....	212
Intensive Learning of French—the Bulgarian Case	
Appendix D .....	214
Sample Project	
Bibliography.....	217

## FOREWORD

Twenty years already! It was the spring of 1997 when my colleague Joan Netten and I began our discussions about the best way to improve the state of French-as-a-second-language learning among Anglophone schoolchildren in Canada. Over time, the *Intensive French* (IF) curriculum we designed, developed, and gradually implemented across Canada's provinces and territories changed shape. When it was implemented at China's South China Normal University (SCNU) for young Chinese university students enrolled in a specialised French-language programme, it became known as the *Neurolinguistic Approach* (NLA).

Soon after, as the NLA spread to neighbouring areas in Asia (Taiwan, Hong Kong, Japan), an increasing number of stakeholders in the area of learning and teaching second or foreign languages (L2/FL) expressed the desire to learn more about the origins of this new approach for adults. Pressure grew for the publication of a work, accessible to all, which would set out the foundations of the NLA as well as its results.

To celebrate the NLA's 20<sup>th</sup> anniversary, that work has now been produced and is in your hands.

Over the years, Joan Netten has had to concentrate primarily on the evolution of IF among young students in Canada, while I have focused increasingly on the implementation of the NLA at the adult level and in an international context. While recognising her role in the NLA's evolution, I am the sole author of this book.

The present work is first and foremost addressed to current L2/FL teachers, as well as to students of language education pedagogy, future language teachers, and future second-language teaching theorists. I hope that it will also interest language-teaching theorists, as a fair number of the issues addressed are liable to call into question many "received ideas", particularly about the *relationships* between language learning and language teaching.

The book is divided into four major parts. Two of these are geared towards researchers, students in language teaching, and experts in second-language teaching interested in the approach's theoretical foundations (Chapters 1, 2, and 3) as well as in the results obtained (Chapters 7 and 8). Two other parts are more directly addressed to language teachers interested in the approach's pedagogical applications (Chapters 4 and 5)

and the NLA's origins and implementation, in Canada, as well as in Asia, and elsewhere in the world (Chapter 6).

Broadly speaking, the two more “theoretical” parts frame the more “practically” oriented parts (the second part [Chapters 4 and 5] and the third part [Chapter 6]). The latter are presented in a *Frequently Asked Questions* format and include graphics and illustrations to facilitate understanding.

It should be noted that in the more practical parts of the work, the questions answered in the *Frequently Asked Questions* are those that I have most often been asked, either by students in language-education programmes or by teachers at conference lectures I have given or training sessions I have facilitated in various countries. As I formulated my answers for this book, I realised that, in the second and third parts, I could no longer use quite the same writing style I was used to. For instance, the constant use of *text boxes* may prove as disconcerting to some readers as it was for me when I began writing this book. These boxes allowed me to occasionally offer useful complementary information about the development of my ideas, as well as anecdotes, testimonials from teachers, tips and tricks, transcriptions from videos, and so forth. I also determined that frequent recourse to illustrations and figures taken from the large number of slides I have used over the years in presentations on the NLA would make certain parts of the book not only more attractive, but also more accessible.

*The Neurolinguistic Approach (NLA) for Learning and Teaching Foreign Languages* is thus both “scholarly” and “non-technical,” and will, I hope, provide food for thought for all.

Claude Germain, Professor Emeritus  
Université du Québec à Montréal (UQÀM), Canada  
Professor Emeritus  
South China Normal University (SCNU)

## ACKNOWLEDGMENTS

I would like to extend my sincerest and warmest thanks to:

- the 13 students of the 2016-17 graduating class of the Master 1 *Didactiques des langues, FLÉ (Français langue étrangère), Technologies Éducatives* (Language Education, French as a Foreign Language, Educational Technologies), of the Université d'Angers, who sent me 53 questions that I hope I have adequately answered: Kani, Marie-Edith, Camille, Salam, Kristell, Élodie, Burcu, Mouna, Lidia, Diana, Maud, Nora, Anne-Sophie, Anne, Mélanie, and their teacher, Delphine Guedat-Bittighoffer;
- David Bel, Director of the French Department of the South China Normal University (SCNU), who enabled the NLA to be launched in China, with the constant support of the faculty's Dean, Wu Jianli (Amy);
- the FFL (French as a Foreign Language) teachers of the French Department of the South China Normal University (SCNU), as well as their many students whom I've had an opportunity to observe in the classroom twice yearly over a six-year period;
- the FFL (French as a Foreign Language) teachers of the French Department of Nanhai Experimental High School in Foshan City, China, as well as their many students, whom I was also occasionally able to observe;
- Ching-Hsin Chang, Director of the Department of European Languages of Da-Yeh University (Taiwan) and NLA teacher, for her collaboration and her permission to let me observe her FFL classes;
- NLA teacher Elham Mohammadi of the To Be Language Institute (Tehran), for allowing me to observe her classes by video;
- the 30 student teachers who participated in the NLA training session organised by Olivier Massé in Tokyo, Japan, in March 2015, for their numerous pertinent questions;
- Gladys Benudiz, Romain Jourdan and Raymond LeBlanc, for agreeing to review my manuscript;

- Clément Beaudoin, President of Myosotis Presse, for rising to the challenge of publishing, in French, the first book on this topic: *L'approche neurolinguistique (ANL) : Foire aux questions* (Myosotis Presse, 2017);
- my partner Louise, for her endless patience and unfailing understanding.

Apologies and my thanks also to all those whom I may have forgotten to mention.

## NOTE

While the Neurolinguistic Approach (NLA) for the teaching of second and foreign languages may be applied to all language-learning classroom situations, the numerous examples of student work provided in the discussion that follows come mostly from French-as-a-second/foreign-language classrooms. The NLA's principle of authenticity makes it primordial that such examples genuinely illustrate the issues that can arise in the classroom, and as the NLA was originally developed for and applied to learning French at the school level, FSL/FFL classrooms naturally presented the widest pool of examples to choose from.

These examples of original student work are accompanied in the text by English translations which attempt to provide equivalent errors to those found in the original French.

Unless otherwise indicated, translations of quotations from sources published in languages other than English have been provided by the translators. Any errors or omissions in the translations are the responsibility of the translators.

## ABBREVIATIONS

The following abbreviations are used throughout this book:

L1	First or dominant language
L2	Second language
FL	Foreign language
DELFF	<i>Diplôme élémentaire de langue française</i> : a certificate provided after successfully passing a French language exam. The DELF assesses language proficiency based on a scale developed by the CEFR.
CEFR	Common European Framework of Reference for languages
NLA	Neurolinguistic Approach
IF	Intensive French: refers to a French-as-a-second-language program delivered in a number of schools in Canada. The program offers up to 300 hours of second-language instruction during a five-month period of the school year



## PART ONE

### THEORETICAL FOUNDATIONS OF THE NLA

Firstly, it is important to mention that in second-language pedagogy, all research begins with an issue from the field. In the late 1990s, the issue from the field with which we were faced was that of the low levels of *communicative skills* shown by the majority of Anglophone Canadian schoolchildren learning French (with the exception of those in French Immersion classes). We consequently needed to examine both theoretical and foundational scholarship to discover potential solutions. In other words, we needed to delve into the *relevant* data from the various disciplines involved in language pedagogy.

After a while, it became clear that the greatest difficulty needing to be addressed was the lack of an adequate relationship between acquiring/learning a language and the ways in which it was taught. To a large extent, it seemed to us that this difficulty could be ascribed to the fact that the multiple disciplines involved in language learning/teaching existed in highly compartmentalised silos. We therefore focused our attention on the various disciplines providing *links* between what is known about how L2/FLs are acquired/learned and how they can be taught. It was at this point that the then-new area of neuroscience research struck us as potentially being able to shed new light on how we might conceptualise *relationships* between L2/FL acquisition/learning and teaching strategies used in the classroom.

As we examined research in the various disciplines that contribute to second-language pedagogy, the neurosciences yielded up Paradis's neurolinguistic theory of bilingualism (1994, 2004, 2009). Over time, the neurosciences provided us with five major lessons or conceptual data models which all struck us as *pertinent* to our goal of improving results in acquiring/learning languages.

The first chapter deals with the five lessons or teachings that provided us with the foundations for the development of the neurolinguistic approach (NLA). Building on these theoretical foundations, we devised the five fundamental principles of the NLA; these are discussed in the second chapter. In order to highlight the originality of the NLA, in the

third chapter I compare the approach to some others, in particular the action-oriented approach advocated in the *Common European Framework of Reference for Languages* (CEFR, 2001). It is worth noting that we designed the NLA in 1997 and began to test it in the classroom in September 1998, some years *before* the CEFR was published.

# CHAPTER ONE

## FIVE LESSONS FROM THE NEUROSCIENCES

This chapter deals with the five lessons that we drew from the neurosciences in order to improve L2/FL learning/teaching in school settings. These lessons constitute the theoretical basis for the NLA. Our approach builds on data produced by recent research in cognitive psychology, particularly the neurosciences, as well as the design of an approach in the development of literacy<sup>1</sup> skills specific to L2/FL, all from a neuroeducational<sup>2</sup> perspective (as we will see in detail further on).

The neurolinguistic approach (NLA) is a new paradigm, that is, a new way of conceiving the relationships between appropriating (acquiring and/or learning) and teaching a second or foreign language (L2/FL), which aims at creating optimal conditions, in a classroom setting, for spontaneous communication and successful social interaction.

The NLA was developed by two Canadian scholars: Claude Germain, a Francophone Québécois, Emeritus Professor at the Université du Québec à Montréal (UQÀM) and Emeritus Professor at the South China Normal University (SCNU), and his Anglophone colleague Joan Netten, Member of the Order of Canada and Honorary Research Professor at Memorial University of Newfoundland (MUN).

### **First Lesson: The Absence of a Direct Connection between Declarative Memory and Procedural Memory**

Our principal neuroscience reference source is Paradis's neurolinguistic theory of bilingualism (2004). We should note, however, that ten years earlier, he had already introduced the major elements of his theory in an

---

<sup>1</sup> *Literacy* is here defined as the ability “to use the listening, viewing, speaking, reading and writing strands of language(s), and other ways of representing [...] to think, learn, and communicate effectively” (Government of Newfoundland and Labrador, 2002). For a more elaborate definition, see next chapter.

<sup>2</sup> By *neuroeducation*, we refer to the study of cerebral mechanisms as applied to education.

important chapter entitled “Neurolinguistic Aspects of Implicit and Explicit Memory: Implications for Bilingualism” (Paradis 1994), which he contributed to Nick Ellis’s collective work *Implicit and Explicit Learning of Second Languages*.

Paradis introduces his neurolinguistic theory with a fact long known to psychologists, namely the distinction between two types of memory: declarative memory and procedural memory.

Declarative memory deals with facts or conscious knowledge: for instance, recalling what we ate for breakfast, the name of Canada’s capital, a grammatical rule, etc. Procedural memory, on the other hand, is the memory involved with skills, such as the ability to swim, to drive a car, to speak, to communicate or interact with language, etc. (see also Contreras Asturias 2016).

Any explicit or conscious knowledge is sustained by declarative memory; any implicit competence or unconscious skill is sustained by procedural memory.

However, the main fact revealed by the empirical data provided by scans of the human brain is *the absence of any direct connection between the two types of memory*. According to Paradis, in language, as in any other cognitive activity, there is no direct connection between declarative memory and procedural memory.

This, at least, is what is revealed by the research Paradis discusses, which looked at bilingual individuals suffering from Alzheimer’s disease and bilingual individuals suffering from aphasia (difficulty in forming sentences). In the first case, it is declarative memory that is affected, while morphosyntax (which relates to procedural memory) is unaffected. In the case of those suffering from aphasia, the reverse was essentially true: morphosyntax was affected, while ability to use skills linked to declarative memory was retained.

Brain scans of both the Alzheimer’s patients and the aphasia patients reveal that completely different neuronal mechanisms are affected by their respective conditions.

To illustrate how an aphasic person’s language troubles can manifest themselves, here is the transcription of a video extract of a conversation between an adult aphasic patient (A) and his therapist (T):<sup>3</sup>

T: *Tell me what was this thing with your leg, last week or the week before.*

---

<sup>3</sup> Source: [https://www.youtube.com/watch?v=f2liMEbMnPM&list=PLtUz1usdFEOuU\\_PwD1WNsE0uO6NJIvOug](https://www.youtube.com/watch?v=f2liMEbMnPM&list=PLtUz1usdFEOuU_PwD1WNsE0uO6NJIvOug)

A: *eh... no good... eh... ache... and... eh... eh... eh... eh... [long pauses]... knees... and ankles... eh...*

T: *What did you do about it?*

A: *eh... home... doctor... and... legs... eh... eh... walking... no good...*

As can be seen, this aphasic person can only use vocabulary words (verbs, nouns, adjectives), without any hope of forming statements that are syntactically acceptable: *no good, ache, knees, and... ankles, home, doctor, and... legs, walking, no good...* Brain scans of this aphasic patient would show that it was the neuronal systems associated with his procedural memory that were affected. His declarative memory, however, remains intact.

### **An Anti-Chomskyan Position**

This means that Paradis's position (2004) is resolutely anti-Chomskyan. According to Chomsky (1965), the brain includes a *Language Acquisition Device* (LAD), that is, a specific mechanism for language acquisition, pre-programmed by universal grammar and distinct from all other types of cognitive activity.

Many neuroscientists, by contrast, Paradis among them, hold that language works like any other human cognitive activity. It follows that there is no LAD, no genetic mechanism containing a universal grammar.

### **Declarative Memory is not transformed into Procedural Memory**

However, though procedural memory and declarative memory call on discrete neuronal systems, it does not follow that declarative knowledge can *transform itself* into "procedural knowledge." This is in fact the subject of debate among cognitive psychologists. On one side, some (such as Griggs, Carol and Bange 2002) believe that even if these two types of memory call on discrete neuronal systems, there might nevertheless be a *transformative* process allowing declarative knowledge to become procedural knowledge. Those who hold this position do not hesitate to speak of "knowledge proceduralisation" or know-how.

Paradis, on the other hand, contends that declarative knowledge *cannot transform itself* into procedural knowledge and, on this basis, refuses to speak of procedural knowledge or knowledge proceduralisation, which, according to him, would be a contradiction in terms, or even an impossibility. Rather, what happens is that metalinguistic knowledge is acquired in parallel, by dint of hearing and using a language structure to

which one has paid attention (Paradis 2009). Paradis's position is therefore completely different from the preceding one.

For instance, in the case of a patient suffering from aphasia, one can state that explicit knowledge is not transformed into an implicit competence, that is to say a skill underlying spontaneous communication. Otherwise, one might suppose that, if there existed a *direct connection* between these two discrete neuronal systems and a *transformation* of the knowledge associated with one into that associated with the other, this would mean that what can be learnt can affect what is acquired, and vice versa. It would be as if knowing the explicit rules of grammar would, ipso facto, allow one to use them unconsciously. We know, however, that they can only be used explicitly and in a controlled manner.

### **Indirect Influence of the Declarative on the Procedural**

It should be noted that in the normal course of language use, the declarative may indirectly influence the procedural. One has only to think of what happens when, in an everyday conversation, we suddenly use the wrong word. For instance, let us suppose I want to say, "Yesterday evening, we went to the theatre," but instead I say, "Yesterday evening, we went to the cine—" interrupting myself in the middle of the word "cinema." In such a case, I might say, "Oops! I mean, to the theatre." This "Oops" can only come from what Krashen (1981) called a sort of *monitor* (or *piloting*) in our brains that supervises, so to speak, everything we say.<sup>4</sup> And given the extreme speed of one's verbal flow, this sort of mistake is quite understandable.

But in such a case, it must be agreed that conscious knowledge has an indirect influence on the unconscious ability to communicate. This underscores that when using language, recourse to conscious knowledge presupposes the pre-existence of a skill.<sup>5</sup> There is therefore no question of a *connection* between an unconscious skill and conscious knowledge.

From this point of view, the dual originality of Paradis's theory resides in its demonstration that, firstly, there is no transformation of conscious knowledge into unconscious skills and, secondly, that human language

---

<sup>4</sup> This does not mean that the NLA is simply an application of Krashen's theory. To learn about the important distinction between the two approaches, see the next chapter.

<sup>5</sup> Moreover, as Paradis (2004) remarks, it is always possible for the implicit to be made explicit (as in linguistic studies, for instance), but this never involves the *transformation* of the implicit into the explicit.

functions in the same way as any other non-linguistic human activity, such as, for example, swimming.

### **Learning Cannot be Transformed into Acquisition**

That which is *conscious*, Paradis specifies, cannot become something *unconscious*, just as *knowledge* cannot become a *skill*, and that which is *explicit* cannot become an *implicit competence*. These involve completely discrete neuronal mechanisms, one of which cannot transform itself into the other: (conscious) *learning* cannot transform itself into (unconscious) *acquisition*, nor become an acquisition. The salient parts of Paradis's argument, which was first introduced in his *A Neurolinguistic Theory of Bilingualism* (2004), were developed in more detail in his *Declarative and Procedural Determinants of Second Languages* (2009).

In order to further distinguish the nature of these two memories, it is important to note that neuroscience research strongly suggests there is as great a difference between procedural memory and declarative memory as there is between a *process* and a *product*.

If one is wondering what sort of process is involved in procedural memory, it is, in a sense, a set of *patterns* or traces left in the brain by dint of frequent use. Looked at this way, procedural memory consists of *regularities* rather than *rules*. These regularities are like *patterns* or "pathways," rather like a path in a field created by passing numerous times in more or less the same spot (as is so well shown in the great Impressionist artist Monet's painting reproduced below).

According to Paradis (2004), frequent use of verbal language is required to develop implicit competence. "What serves as input for implicit competency is the frequency with which particular linguistic constructions are encountered, irrespective of their surface form" (Paradis 2009, 80). Nick Ellis (2011) also supports this point of view.<sup>6</sup>

---

<sup>6</sup> Nick C. Ellis is a specialist in language acquisition and a professor of psychology and linguistics at the University of Michigan, Ann Arbor, United States. He has served as publisher for the prestigious American journal *Language Learning*. (He must not be confused with Rod Ellis, an internationally renowned British specialist who is also recognised in the area of language acquisition.)

## The Development of Implicit Competences: A Process and Regularities

### Procedural memory



Claude Monet, *Wheat Fields* (1881)

<https://www.flickr.com/photos/7208148@N02/4177752801/>

*Fig. 1-1*

Furthermore, when it comes to language, declarative memory seems to be more of a product allowing the storage of vocabulary and verb conjugations, as well as *formal rules* such as grammar rules.

**In summary**, the following can be learnt from Paradis's neurolinguistic theory of bilingualism:

- Implicit competences, underpinned by procedural memory, and explicit knowledge, underpinned by declarative memory, are two discrete aspects of neuronal functioning;
- There is no direct connection between the two;
- Explicit knowledge cannot *transform* itself into an implicit competence;
- Declarative memory is like a *product* made up of facts (vocabulary and verb conjugations) or *rules* (like grammar rules);
- Procedural memory is like a *process* made up of *regularities* due to the frequent use of language structures leaving traces or *patterns* in the brain.

## Second Lesson: The Complexity/Flexibility of the Brain and Two Neuronal Mechanisms: conscious (*vocabulary*) and Unconscious (*lexicon*)

The brain is a very complex instrument. For instance, contrary to what was once thought, there is not a language “centre.” The brain’s complexity can be illustrated by examining certain brain scans. These reveal, as one would expect, that visual information does not follow the same pathways as aural information when reaching the brain. Clearly this implies discrete neuronal connections, which means that when a word (for instance, *hammer*) is heard, it does not activate the same neuronal circuits in the brain as it does when read, spoken, or even thought—as brain scans reveal (see Fig. 1-2). This explains why we cannot necessarily recognise a word (such as *table*) in its written form, even if we are able to use it orally. Likewise, even if we can read a word (like *table*), we cannot necessarily spell it.

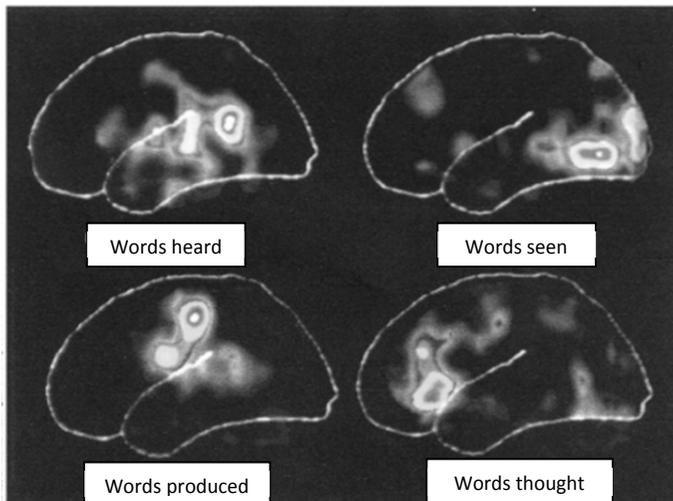


Fig. 1-2—Source: Damasio and Damasio 1997, 13

It should be mentioned that the brain is not merely complex, but also highly flexible; it is neither frozen in time nor entirely genetically determined. Current research indicates that the brain’s structure is continually evolving as people learn and interact with their environment. This is “one of the most fundamental discoveries of modern neuroscience,”

according to Masson (2015a).<sup>7</sup> For instance, thanks to magnetic resonance imaging (MRI) techniques, empirical research has demonstrated that as learners learn to read, their cerebral activity gradually shifts from the front of the brain, the seat of attention, concentration and short-term memory (in the prefrontal cortex<sup>8</sup>), to the top and then the back of the brain (reaching areas that specialise in such learning), due to the automatisms being created: “This has the effect of freeing up the prefrontal cortex, and thus diminishing cognitive overload,” Masson explains (2015a).

### **Conscious Mechanism (*Vocabulary*) and Unconscious Mechanism (*Lexicon*)**

Another aspect of Paradis’s distinction between cerebral mechanisms is that drawn between *vocabulary* and *lexicon*. For Paradis, *vocabulary* is made up of all the explicit correspondences between *meaning* and *sound* (or written word), as found in the dictionary (2004, 247). A speaker’s conscious knowledge of a word’s *meaning-sound* association can be demonstrated by their ability to point to a house when asked to show a house. This therefore represents a piece of *conscious* knowledge, sustained by declarative memory. The object pointed to is the word’s *referent*.

By *lexicon*, Paradis means all of the correspondences between *meaning* and *implicit grammatical properties*, as much on the phonological level as the morphological or the syntactic. For instance, in some languages, gender—whether masculine, feminine, or neuter—is one of a noun’s grammatical properties. Used in a sentence, a word constitutes a lexical element endowed with its own implicit grammatical properties. This distinction is equally valid for verbs: whether a verb is transitive or intransitive is part of its implicit grammatical properties.

Note that Paradis’s distinction is fully in line with a recent trend in cognitive linguistics dedicated to *construction grammar*, which now insists on the syntax-lexicon continuum rather than their separation; this is why one sometimes sees discussions of *word syntax*.<sup>9</sup>

---

<sup>7</sup> Steve Masson, founder of the Association pour la recherche en neuroéducation/ Association for Research in Neuroeducation (ARN), which publishes the online scientific journal *Neuroeducation*, is a professor in the Département de didactique/ Education Department of the Université du Québec à Montréal (UQAM).

<sup>8</sup> See Fig. 1-3 below.

<sup>9</sup> To learn more about this trend in cognitive linguistics, see Hoffman and Trousdale (2013). For a synthesis in French of this current, see Mathieu (2003); more recent sources include Legallois and François (2006) and François (2008).

**In summary**, the neurosciences teach us that:

- the brain is highly complex: neuronal connections are discrete, according to the various sensory organs involved (sight, speech, etc.);
- the brain is highly flexible; it is not static;
- according to Paradis, it is important to distinguish a conscious mechanism (*vocabulary*) from an unconscious one (*lexicon*).

### **Third Lesson: Focusing on the Meaning or on the Task to Develop Implicit Competence**

To ensure that implicit competence is developed, Paradis explains, it is necessary to turn one's attention away from the language form by concentrating either on the meaning of the messages formulated when accomplishing a task or concentrating on the task to be accomplished. What is conscious does not transform itself into something unconscious. Concentrating on language forms (something conscious) means the unconscious has little chance of being developed. Hence the importance of concentrating either on the meaning of the formulated messages or on the task to be accomplished: "attention can then not focus on all relevant parameters (phonology, morphosyntax, the lexicon) at the same time. If attention is selectively concentrated on one of these aspects, the others must necessarily wait" (Paradis 1994, 400).

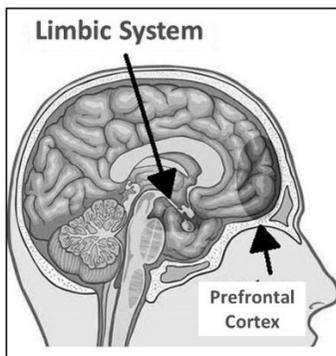
**In summary**, a third lesson to be drawn from Paradis's linguistic theory is that

- to develop implicit competence, one must concentrate on *something other* than the language form, thus either on the meaning of a message formulated while accomplishing a task or on the task itself.

### **Fourth Lesson: The Importance of "Transfer Appropriate Processing" (TAP) and the Limbic System's Role**

A further neuroscientific dimension, especially in cognitive psychology, is called "Transfer Appropriate Processing" (TAP). What does this refer to? According to Segalowitz (2010), the brain records data with all their context, whether this is a linguistic context such as a sentence or an extralinguistic context such as gestures, mimicry, etc. In other words, the more the context in which a language is used resembles the context in

which it was learnt, the greater the odds that the user's communication abilities will rise to an adequate level. All the evidence suggests that this is why it is easier to later locate the data in the brain, by referring to the contextual similarities.



[http://www.democritique.org/Cerveau/Syst%C3%A8me\\_Limbique.svg.xhtml](http://www.democritique.org/Cerveau/Syst%C3%A8me_Limbique.svg.xhtml)

Fig. 1-3—Source: Geschwind and Levitsky, 1968

Moreover, as Paradis notes, neuroscientific research shows that the desire to communicate—in other words, the starting point for any verbal communication—is ruled by the limbic system. Without the desire to communicate, or pleasure in doing so, there is an absence of motivation.

Thus, the usual approach to learning an L2/FL—one centred on knowledge, verb conjugations, and grammatical rules—provides practically no emotional reaction related to pleasure or to the desire to communicate, and the limbic system is not activated. Conversely, when what is communicated is a real, authentic message, the limbic system is much more likely to be activated, increasing the motivation to communicate. It is this motivation that allows the limbic system to be activated.

**In summary**, a fourth lesson the neurosciences teach us is that:

- to develop implicit competence, *learning contexts* must be similar to the *usage contexts*, both orally and in writing (TAP);
- activating the limbic system requires a desire to communicate.

## **Fifth Lesson: *Intake* and Individual Cognitive Benefits of Social Interaction**

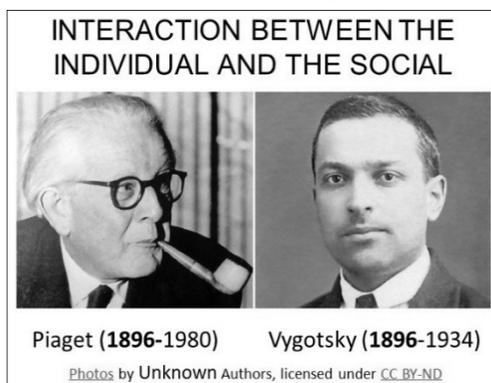
The term *interactions* refers to reciprocal actions between two or more learners during which there is a simple exchange of information. The interactions are qualified as *social* if they take place in a context where one individual's actions can influence the actions of another (as is the case in discussions about completing a project).

Establishing social interaction as a key principle of the NLA is doubly warranted, firstly by Vygotsky's model of the links between social interaction and individual development ([1934] 1985), and secondly by Paradis (2004, 2009) and Nick C. Ellis (2005) and their ideas on the role of social interaction.

### **The Individual Cognitive Benefits of Social Interaction**

As is well known, the great Swiss psychologist Piaget showed, in the context of his genetic psychology, that a child's cognitive development involves successive stages, from the concrete operational to the hypothetico-deductive, with various other stages in between ([1963] 1980). This is common knowledge.

What is less well known, however, is what explains the transition from one stage to the next: might it simply be an internal development process, not involving any external influence? In other words, according to Piaget, there would be little effect by social interaction on the cognitive development of an individual. Social development and individual development would evolve in parallel, without influencing each other.



According to Vygotsky ([1934] 1985), however, this is not the case: social interaction, in fact, is what ensures progress from one cognitive stage to the next. Thus, there would seem to be a close link between what happens on the level of social interactions and what happens in the brain of the individual. The direction of the relationship between

*Fig. 1-4*

the social and the individual would go from the social to the individual. There is even a *causal relationship* between social interaction and individual development.

On discovering this audacious theory of Vygotsky's, we adopted it, for it allowed us to explain how acquiring L2/FL in a school setting could have not only *utilitarian* aims, but also *humanist* ones—and could thereby provide the student with cognitive benefits.

### The Role of Interaction: From *Input* to *Intake*

Another argument in favour of relying on considerable social interaction emerges from the distinction, recognised by most psycholinguists, between *input*, i.e. an interlocutor's linguistic contribution, and *intake* (*what you take in*), i.e. what the listener actually retains and understands from the overall input data uttered by the speaker. In the classroom, the *input* is the same for all learners (that is, everything the teacher says), but *intake* varies from individual to individual.

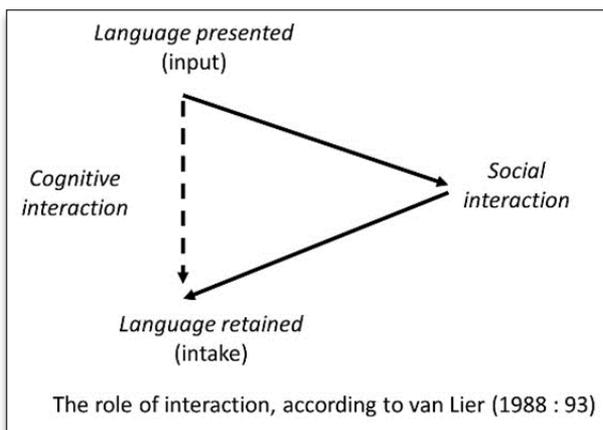


Fig. 1-5

As van Lier suggests (1988), it is probably social interaction that leads to increases in *intake* quantity and improvements in quality, because that is what mediates between *input* (the language introduced) and *intake* (the language retained). This allows us to speak of cognitive interaction between *input* and *intake*.

To get a better grasp of the above, think of a language teacher giving a lecture on a grammatical rule to students who just need to listen and take a few notes. Now imagine a language teacher who, after giving an example of the rule being applied in a written text, asks the students to form small groups and find other instances in the text of a similar construction to the case being studied, and, through induction, derive the rule and its applications. Despite the voluminous language *input* from the teacher, it is probable that *intake* would be much smaller in the first instance (lecturing and using a deductive approach) than the second (demonstrating a practical application and using inductive reasoning).

**In summary**, a fifth lesson from the neurosciences is that

- numerous social interactions are important for improving *intake* quantity and quality.

These, then, are the five lessons drawn from our explorations in neurosciences and which form the NLA's theoretical foundations:

- The absence of a direct connection between declarative memory and procedural memory;
- The complexity/flexibility of the brain and two neuronal mechanisms: the conscious (*vocabulary*) and unconscious (*lexicon*);
- Focusing on the meaning or the task in order to develop implicit competence;
- The importance of “Transfer Appropriate Processing” (TAP) and the limbic system's role;
- *Intake* and the individual cognitive benefits of social interaction.

It is from these neuroscientific lessons that the NLA gradually developed around five fundamental principles, discussed in the next chapter.

## CHAPTER TWO

### THE NLA'S FIVE FUNDAMENTAL PRINCIPLES

This chapter presents and explains the NLA's five fundamental principles, highlighting each one's links to the theoretical bases drawn from the neurosciences, particularly Paradis's neurolinguistic theory of bilingualism (2004). This is followed by a table summarising the links between the principles and their neuroscientific origins, as well as, more specifically, the links between Paradis's theory and the NLA. Finally, we consider neuromyths.

Beginning in the late 1990s, my colleague Joan Netten and I eventually formulated the following five fundamental principles governing the NLA:

1. Two grammars, internal and external;
2. Literacy and the pedagogy of the sentence;
3. Emphasising meaning and using a project-based pedagogy;
4. Authenticity;
5. Social interaction.

#### **First Principle: Distinguishing between Two Grammars, Internal (Implicit Competence) and External (Explicit Knowledge)<sup>1</sup>**

Our approach places very strong emphasis not on ONE single grammar, as is usually done, but on TWO grammars that must be acquired/learnt: an implicit, unconscious grammar (for verbal communication), which we call "internal grammar," and an explicit, conscious grammar (for written language), which we call "external grammar." Given that the internal grammar is a skill that can only call on unconscious, implicit processes, it is sustained by procedural memory. External grammar, meanwhile, consists of a collection of conscious, explicit knowledge and is therefore sustained by declarative memory. In other words, internal grammar is *acquired* but external grammar is *learnt*.

---

<sup>1</sup> Though the idea of acquiring/learning "two grammars" is ours rather than Paradis's, it stems from his theory.