Reading influences the implicit learning of writing conventions

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Introduction

Any kind of written text involves a lot of conventions. Some of them can be learned by formal instruction, by attention and repeated practice, others correspond to specialized knowledge that cannot be acquired from lectures or from textbooks or from the exercise of writing itself. Some complex linguistic structures can be acquired implicitly even before learners receive formal instruction about them. The research here reported investigates how the written acquisition of passive constructions is influenced by reading activities before they are explicitly taught at school. The sample of the investigation was constituted by two groups (experimental and control) of ten subjects each (fourth graders).

At the beginning, both groups were asked to produce a written text based on a comic strip. This illustration provided the subjects with the opportunity to produce passive constructions. Then the experimental group was given ten sessions of specific reading activities on texts with passive constructions. Finally, both groups were asked to produce a text on the same illustration again. Comparing the production of both groups, it was found out that none of the groups produced passive constructions in the first text. For the second one, while the control group continued not producing these constructions, 60% of the experimental one produced them. As there were no others variables influencing this production, the gain obtained by the experimental group was logically attributed to the reading activities.

Theoretical support

The cognitive aspects that lend logicity and support to the hypothesis analyzed in this investigation are:

1. Learning means changing neural synapses.
2. Reading is comprehending.
3. Comprehension means recall and learning.
4. What is implicit learning?
5. How reading influences writing?

1 Learning means changing neural synapses

The basic unit of brain is the neuron. The main features of the human brain are its extreme plasticity, total flexibility and striking speed, apart from its capacity to operate with a great deal of stimuli at the same time – *parallel distributed processing* (RUMELHART & MCCLELLAND, 1986). Neurons vary considerably according to their sizes, shapes, functions and relations; their tripartite structure is what they have in common: the cell body (nucleus), the axon, and the dendrites (Fig. 1). The *axon* is the channel through which a neuron communicates with others. The *dendrites* are branches from the cell body acting as receptors of information coming from other neurons through the *axon*. The site where a neuron and a dendrite meet – where the interneural connection happens – is called *synapse.*

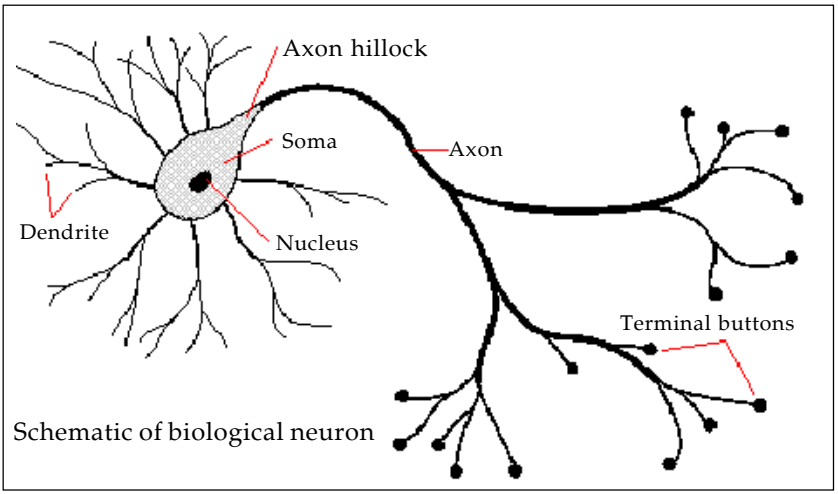

Figura 1. Representation of a biological neuron

It is postulated that the brain has to change the strength of its synapses to acquire knowledge; learning, besides reinforcing synapses, causes the existing neural networks to get rearranged. The neurons adjust the strength of their synapses during the information

processing. Hence, knowledge acquisition is related to subtle changes in neural connections (synapses, Fig. 2).

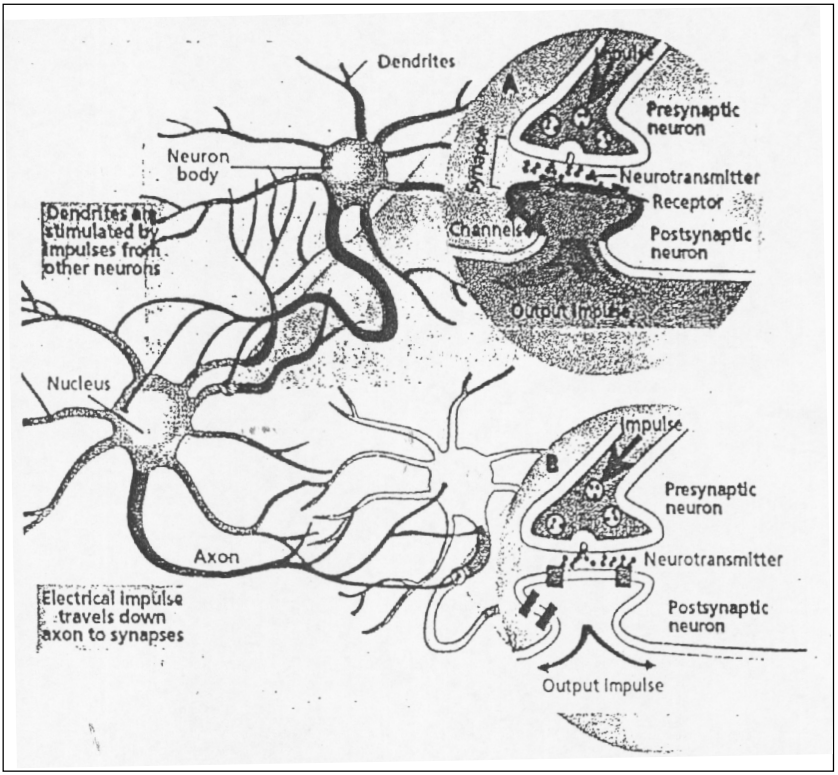

Figure 2. How neurons communicate (Young & Concar, 1992, p. 5).

Every single input is a sort of stimulus. If this piece of incoming information finds an answer, i.e., an internal path already set, it is said that an activation (a *recall*) has occurred; this is not new information, hence, it does not correspond to learning. Conversely, if a path is not tracked down, this new information will have to be integrated into existing knowledge. It is necessary to open a new path to establish a new connection. Knowledge is acquired; a *learning* process is set up.

2 Reading is comprehending

According to Kenneth Goodman (1976), the *primary* purpose of reading is comprehension, comprehension understood as a meaning

building device that, on the one hand, activates given information whilst, on the other hand, integrates new information into given information (HAVILAND & CLARK, 1974; GARROD & SANFORD, 1977). As to *secondary* purposes, we can list: being informed, getting formation, requesting, entertaining, and so on. In such a view, *acquiring knowledge* would integrate the secondary purposes.

Both procedural and declarative knowledge, engrammed in neural networks, is activated or constructed in one's brain. Such knowledge is stored in our memory in the form of neural connections. Whenever perceptual data (input) act on the stored information without establishing new connections, the output corresponds to an *activation* of connections. There is no new knowledge; rather, there is *recall* of already existing information. However, when some information not corresponding to previous connections is processed, it must be *integrated* into existing knowledge, setting up new connections. The product (output) of that neural process will be responsible for building up new knowledge (*learning*).

Bearing in mind what has been stated in the precedent paragraph, one is forced to substantially change the initial statement on knowledge acquisition as a secondary or transcendent aim of reading. The acquisition of knowledge is part of the comprehension process itself; it integrates the construction of meaning. Comprehending means both activating given information (*recal*) and integrating new information (*learning*). Therefore, reading means comprehension, i.e., *recall and learning.* Such twofold process is inherent to reading (Poersch, 1999).

Reading comprehension consists, thus, of constructing meaning (the thought the writer intended to convey) as a result of parallel distributed processing of knowledge coming straight from printed material – *explicit* information –, indirectly from knowledge taken from the text, by inferencional or pressupositional processes – *implicit* information –, and from other kinds of knowledge derived from production or reception situations – *ultraplicit* information (POERSCH, 1994: 169) – which includes the previous knowledge on a given subject matter (Fig. 3).

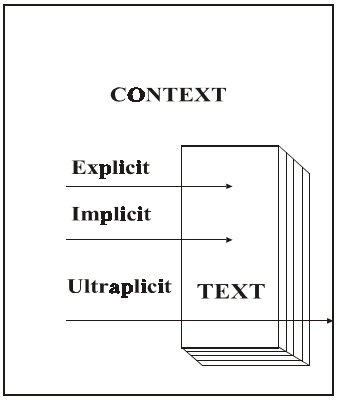

Figure 3. The deepness of meaning

In fact, the text is nothing but a mediator between the poles of written communication: the source (the writer's brain) and the target (the reader's brain). The text does not carry meaning; rather, it is the trigger device to activate and/or construct this meaning. This highlights the fundamental importance of the role the previous knowledge plays in the comprehension process.

3 Comprehension means recall and learning

Reading consists of constructing meaning (*content*, in HJELMSLEV'S (1969) terminology) from a text (*expression*). It consists of transforming – in a communicative goal – a discrete string of language units (letters, words, sentences), serially presented, into an analogic reality, as if it were a photo (thought). Such reality represents the continuum (either a map, a picture, a drawing, a sketch) of a set of frames, of facts, of ideas or of arguments.

Hence, the comprehension process is fundamentally inserted into the thought/language relationship. That relationship permeates both reading and writing, although following opposite directions: from thought (content) to text (expression) – in writing – or from text to thought – in reading.

Reading comprehension requires the explanation of how to shift from a digital, discrete reality (text) to an analogic, continuous one (thought). Such transformation cannot be explained by means of a serial processing of abstract and fixed symbols stored in mind, but rather by a parallel distributed processing of flexible and fine-grained constituents (SMOLENSKY, 1988) engrammed across neural networks (brain), where mind is nothing but such neural functioning.

Meaning is built up as follows: the text supplies data which are perceived by the eyes; the optic nerve transmits these perceptions to the brain. It is in the brain that the data coming from the text, along with the data previously stored, start to be processed. As knowledge means synaptical connections, if input data find the path or the connection onto other stored data, these stored dada are activated: we say that recall occurs and the previous synapses are reinforced. If the input data do not find a previously trailed path, they have to be integrated into some already stored data. That integration consists of setting up a new connection; in other words, it means to learn. Then this knowledge becomes part of the prior knowledge and both are used to process the remaining part of the text.

Although such processing is serial, that is, it is processed as the way the text is read, each stage in this process is the answer for an endless number of stimuli operating in parallel. When the reading

is completed, the reader recalls the content as if it were an "ad hoc" photograph of all the connections established. In recalling the content of the text, the most strongly embedded information comes first, followed by the content not so strongly connected. If someone wants to summarize a text, he/she will have to follow an inverse path; he/she has to make the information discrete and present it in a text that corresponds to the gist, to the kernel of the entire original text.

4 What is implicit learning?

Learning is the acquisition of knowledge. Learning a language is not learning only things about language but also about its use. This knowledge can be declarative or procedural. Declarative knowledge about language can be translated into formal instruction and can be learned by means of that formal instruction or from the environment. The way it is learned can be through formal instructional procedures, in an attentional and conscious reception (intake) called explicit learning, or through the environment, without attention or consciousness, (input) called implicit learning.

The knowledge about language must reach the learner's brain (must be perceived or detected) through, at least, one of the senses: the sight, the hearing, or the feeling (blind, or dead learners).

Krashen (1981; 82-85) states that "language acquisition is a largely subconscious process in which conscious learning serves merely to monitor or edit an unconsciously acquired base".

Schmidt (1990) claims that consciousness in the sense of awareness of the form of input at the level of "noticing" is necessary for language learning to take place. This claim rums counter to Krashen's one. Noticing is necessary and sufficient condition for the conversion of *input* to *intake*, i.e., for learning.

Robinson (1995, p. 296-297) attempted to reconcile these two positions by proposing to define the concept of *noticing* to mean "detection plus rehearsal in short-term memory, prior to encoding in long-term memory". Robinson identified *noticing* with what is "both detected and then further activated following the allocation of attencional resources from a central executive" Leow (1997, p. 494-495) reexamined the previous positions through a qualitative and a quantitative analysis on think-aloud protocols produced by L_2 learners of Spanish. He suggested the following conclusions:

1. Different levels of awareness lead to differences in processing;
2. More awareness contributes to more recognition and accurate written production of noticed forms by enhancing further processing of these forms.

These findings provide empirical evidence for the facilitative role of awareness. However, the issue of whether awareness is *essential* for processing to take place remains unsolved.

5 How reading influences writing?

All texts, from the simplest one to the most complex one, involve a vast number of conventions which could never be organized into formal instructional procedures (SMITH, 1983). Writers need to detect and to assimilate a multitude of facts, ranging from individual ones to appropriate complex stylistic structures. These complex and subtle facts are not available in lectures, text books, and exercises to which children are exposed in classroom. These facts can only be found in what other writers have written, i.e., in existing texts.

Prescriptive or formal instruction is not sufficient for conveying everything writers need to know. Knowledge that writers require resides in existing texts. All of this specialized knowledge cannot be acquired through deliberate formal analyses. It is too intricate and subtle for that. Instead, we conclude that learning takes place without deliberate effort, even without awareness. We learn to write without knowing we are learning or what we learn. Everything points to the necessity of learning to write from what we read.

Children learn features of written language from their environment, that is to say, from reading (ECKOFF, 1983). Chomsky (1972) has already suggested that children can learn complex language patterns from reading. Zeman (1969) found that better readers in second and third grades use more compound and complex sentences in their writing. Calkins (1980) observed that children learn about punctuation from their reading and that exposure to written language may help them learn about print and language structures which may in turn influence writing. Smith (1983) proposes that a great part of the writing conventions enter into our memory without awareness of the learning that is taking place. It is an unconscious, an effortless, an incidental and an essentially collaborative learning. We learn when learning is not our primary intention and we learn from what somebody else does. It is essentially collaborative because we learn through others helping us to achieve our own ends. This is an implicit learning.

Procedure

This paper reports the investigation on the implicit learning of complex linguistic patterns by means of reading activities on prose passages instantiating exemplars of these patterns. The

structures to be learned are passive constructions; it is known that these constructions are acquired in later periods of language acquisition (SLOBIN, 1985:759). The specific purpose is to verify whether reading influences the written acquisition of passive constructions before they are explicitly taught at school.

The working hypothesis states that: Children learn to produce passive constructions by executing reading activities on passages containing these constructions. The variables analyzed by the hypothesis are: the exposition to texts that contain passive constructions (reading activities) and the production of these structures in compositions.

The sample was constituted by twenty fourth-graders divided in two groups: a control one and an experimental one. Every subject was asked to produce two compositions, one before the experiment and another one after the experiment. The experimental group was given ten sessions of specific reading activities on texts having some original active structures transformed into passive ones. The reason of this transformation was to supply the subjects with passive structures. These transformed passages did not alter significantly the whole meaning. The specific reading activities consisted, among others, of reading aloud, of silent reading, of expressive reading, of comprehension exercises, on true-and-false questions. They had a twofold purpose: to improve the understanding of the reading passages and to deviate the attention from the passive constructions.

The written production task consisted of writing a story on a comic strip. The illustration provided the subjects with the opportunity to produce passive constructions. The set of compositions constituted the corpus to be analyzed. The analysis consisted in verifying and counting the number of passive structures. As the compositions had different lengths it was necessary to choose a common denominator for calculating the relative scores. The number of sentences would be a good denominator. But, as many of the subjects had punctuation problems, we preferred to count the T-UNITS for calculating the relative frequence of passive constructions.

The data collected showed that the control group did not produce passive structures, neither in the pre-test nor in the post-test. The same happend with the experimental group, in the pre-test. The performance of the subjects in the post-test was as follows (Table 1).

So, passive constructions have only been produced by the experimental group, in the post-test, after the application of reading activities. Since there were no other variables influencing this

production, the gain of the experimental group was logically attributed to the reading activities.

TABLE 1 – Performance in passive constructions of the experimental group

Subjects	T-UNITS	Raw score	Relative score
1	7	3	9.0
2	15	7	9.8
3	15	3	4.2
4	7	4	12.0
5	16	3	3.9
6	14	–	–
7	21	–	–
8	7	3	9.0
9	10	–	–
10	19	–	–

Conclusion

The data previously presented demonstrate that complex structures of language – the passive construction – can be learned through reading activities even before they are taught at school by means of formal instruction. It means that they are learned in an implicit way, i.e., effortless, incidentally, and without awareness of the learning that is taking place.

Generalizing this finding we can state that a lot of writing conventions are learned this way, implicitly. Everything points to the necessity to claim that people learns to write from what they read. Revaluating Krashen's (1981) and Smith'(1990) positions about subconscious and "noticing" learning, the data support the claim that there are writing conventions that can be learned in a complete awareless situation. We can conclude that reading activities influence the learning of writing conventions and that learning takes place without deliberate effort, even without awareness. We learn to write without knowing we are learning or what we are learning.

The findings of the present investigation give also support to what Leow (1997, p. 494) has stated: "Future studies will need to investigate this aspect of language learning by finding ways to operationalize and measure the complete absence of awareness".

References

CALKINS, L. When Children want to punctuate: Basic skills belong in context. *Language Arts*, v. 57, p. 567-573, May 1980.

CHOMSKY, Carol. Stages in language development and language exposure. *Harward Educational Review*. n. 42, p. 1-33, 1972.

DIENES, Zoltan; PERNER, Josef. Implicit knowledge in people and connectionist networks. In: UNDERWOOD, Geoffrey. (Ed.). *Implicit Cognition*. Oxford: Oxford University Press, 1996.

ECKOFF, Barbara. How reading affects children's writing. *Language Arts*, v. 60, n. 5, p. 607-616, May 1983.

ELLIS, Nick. Implicit and explicit language learning-an overview. In: ELLIS, N. (Ed.). *Implicit and explicit learning of languages*. San Diego: Academic Press, 1997.

GOODMAN, Kenneth. Reading: a psycholinguistic guessing game. In: Singer, H.; Ruddell, R. (Ed.). *Theoretical models and processes of reading*. Newark: International Reading Association, 1976. p. 497-508.

HJELMSLEV, L. *Prolegomena to a theory of language*. Madison: University of Wisconsin, 1961.

KRASHEN, S. D. *Second language acquisition and second language learning*. Oxford: Pergamon, 1981.

LEOW, Ronald P. Attention, awareness, and foreign language behavior. *Language Learning*, v. 47, n. 3, p. 467-505, Sept. 1997.

POERSCH, José Marcelino. How can unity of content be obtained from the diversity of expression; from symbolism to connectionism. In: SCLIAR-CABRAL, Leonor. (Ed.). *Unity and diversity in communication*. Florianópolis: Academic Press of UFSC, 2002. p. 83-100.

ROBINSON, Peter. Attention, memory, and the "noticing" hypothesis. *Language Learning*, v. 45, n. 2, p. 283-331, June 1995.

RUMELHART, D.; McCLELLAND, J. On learning the past tense of English verbs. In: McCLELLAND, J.; RUMELHART, D. (Ed.). *Parallel distributed processing: explorations in the microstructure of cognition: psychological and biological models*. Cambridge: M.I.T., 1986. v. 2. p. 216-271.

SCHIMIDT, Richard. The role of consciousness in second language learning. *Applied Linguistics*, v. 11, p. 129-158, 1990.

_____. Implicit learning and the cognitive unconscious of artificial grammars and SLA. In: ELLIS, N. (Ed.). *Implicit and explicit learning of languages*. San Diego: Academic Press, 1997.

SLOBIN, D. J. A cross linguistic study. *Language Arts*, v. 60, n. 5, p. 558-567, May 1983.

SMOLENSKY, P. On the proper treatment of connectionism. *Behavioral and Brain Sciences*, v. 11, p. 1-74, 1988.

ZEMAN, S. Reading comprehension and writing of second and third grades. *Reading Teacher*, v. 23, p. 144-150, Nov. 1969.