

The Influence of Neurolinguistic Applications on Second Language Research: Reviewing the Issues and Refocusing the Debate

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Abstract

The influence of neurolinguistic applications on second language pedagogy has often been a controversial subject of dispute. As such, researchers in this field have faced with some blurred and conflicting views in terms of the pedagogical applicability of neurological discoveries for second language instruction. In light of this research-based concern, the current short paper attempts to review the related issues and refocus the current direction of the neurolinguistic-second language pedagogy debate. The paper also concludes with some suggestions made in favor of an alternative neurolinguistic outlook for L2 researchers.

Keywords: Neurolinguistic research, neurolinguistic applications, Second Language Acquisition (SLA), Second Language Teaching (SLT)

1. Introduction

Neurolinguistics is a branch of neuroscience which delves into the diverse dimensions of the relation between the human brain and language. It is mainly concerned with the study of language production and comprehension in relation to the brain structures and functions. As Nergis (2011) generally argues, although neuroscience is relatively a young area of research, it has not have a short life span in applied linguistics because there have been always some attempts to negotiate neurological findings with social sciences, psychology and also pedagogy in order to extract suggestions for educational practices (see for example, Sebastian et al., 2010; Blakemore, 2010; Burnett et al. 2010).

In many ways, the field of neurolinguistics has fared well to this day and offered a lot of significant research studies on how the human language is represented in the brain and how language learning neurologically takes place in L1 and L2 systems. In terms of the nature and scope of neurolinguistic research, it should be noted that neurolinguistics mainly investigates "linguistic development of normally developing subjects, language loss in patients with brain damage, and language use by people with specific language impairment" (Nergis, 2011, p. 143).

So far, some prominent brain studies have been conducted in the area of language acquisition exploring the brain functions (see Abutalebi, 2008 and also Jacobs & Schumann, 1992 for synopses) and its complex structures to propose some neurolinguistic theories, namely the *Cerebral Dominance/Lateralization* and *Critical Period Hypothesis* (for extensive reviews, see Bialystok, 1997; Bickerton, 1981; Birdsong, 2006; Lenneberg, 1967; Scovel, 1969, 1988, Singleton, 2005), *Connectionism Theory* and *Parallel Distributed Processing (PDP) Approach* (see Bowers, 2002; McClelland, Rumelhart, & PDP Research Group, 1986; Ney & Pearson, 1990; Sokolik, 1990) and the *Bimodality Theory* (Danesi, 1986, 2003). Thus, it is clear that the ever-growing knowledge of brain has been fast becoming a part of the issues that researchers and practitioners deal with in SLA and ELT professionally.

In spite of the fact that it is suggested that second language researchers look into the brain sciences such as neurolinguistics in search of more effective instruction (Danesi, 1986; Spolsky, 1989; Nergis, 2011), only a limited number of attempts such as Danesi's (2003) bimodality theory, however, have been made to particularly crystallize neurolinguistic findings into second language methodology during the last few decades (Mahmoodzadeh, 2011, 2012).

In this respect, Kim-Rivera (1998) similarly that few studies have approached language teaching from the perspective of neurolinguistics attempting "to apply neurolinguistic discoveries to the development of concrete prepositions that could guide second language teachers"(p. 91). In this

sense, Danesi (2003) likewise argues that over the last decades the inquiry into the neurosciences has clearly come to fruition for language teaching practices culminating in the design of three groundbreaking "*Neurolinguistic Methods*", namely Lozanov's (1979) *Suggestopedia*, Asher's (1977, 1981) *Total Physical Response*, and Krashen and Terrell's (1983) *Natural Approach*.

In addition, more recently in terms of the pedagogical applications of neurolinguistic research vis-à-vis SLA and second language teaching (SLT), the Danesi's (1986) *bimodality theory* has offered L2 researchers some interesting insights and implications. This theory is indicative of a neurolinguistic foundation for language instruction in the classroom. Its underlying nuts and bolts indicate that there is a natural flow of information from the right to the left hemisphere of the brain during language learning (Mahmoodzadeh, 2012). There are four principles which formed the blueprint and basis of this theory: (1) *the modal flow principle*; (2) *the modal focusing principle*; (3) *the contextualization*; (4) *the conceptualization principle*. The consolidation of these principles would effectively enhance the learning of the language, as they integrate both structure and communication, and thus educate both hemispheres at the same time (Danesi, 2003)

Seemingly the advent of bimodality theory has produced a neurolinguistically-based explanation for success and/or failure of second language teaching methods. In effect, it can be argued that this theory being later amended and expanded by Danesi (2003) to a set of pedagogical maxims, has paved the way for the development of a "*Bimodal*" *pedagogy* (a term associated with bimodality theory) which might be considered as a preliminary step to initiate a neurolinguistically-oriented methodological undertaking to approach the circle of second language methodology (see Mahmoodzadeh, 2011 for a full coverage of the issues). However, from the other side of the argument, the field of neurolinguistics has witnessed some cautions concerning its feasible jurisdiction in the area of second language pedagogy on a number of grounds (Mahmoodzadeh, in press). For example, in the early 1980s, Scovel (1982) claims that any direct application of neurolinguistic research to foreign language teaching, in all likelihood, should be seriously turned down in vain attempts to justify good pedagogy or to condemn inadequate classroom practices; rather, the contribution of neuropsychology, like that of linguistics, should be indirect and insightful. In attempting to justify his claim, Scovel (1982) argues that

...1) neuropsychologists have studied competent bilingual, not language learners—the group we are concerned with, 2) experimental tasks are often more complex than envisioned, 3) the studies have dealt only with hemispheric lateralization and not with other dimensions of the brain, and 4) even if it were possible to teach primarily to one or more portions of the brain, quantity does not imply qualitative success at language learning (cited in Cohen, 1982, p. 306).

Moreover, quite recently Marinova (2012) likewise has stated that contacts between neurolinguistics and SLA, if present at all, may be at best described as tentative and full of mutual distrust. In another line of inquiry, Mahmoodzadeh (in press) also maintains that some researchers have expressed their disapproval for adopting an integrative approach concerning the pedagogical utility of neurolinguistic findings for second language research over the recent decades (e.g. Coch & Ansari, 2009; Goswami, 2006). In a similar fashion, Christodoulou and Gaab (2009) and Willingham (2009) discuss that it will never be possible to offer new cogent L2 teaching methods that are rightfully based on neurological findings, as neuroscience is perceived to possess a descriptive rather than a prescriptive approach to informing educators.

2. Reconsidering the research-based depth of neurolinguistic applications to second language research

From a full-scale neurological inquiry, Mårtensson, Eriksson, Christian Bodammer, Lindgren, Johansson, Nyberg, and Lövdén (2012) have claimed that the influence of adult foreign-language acquisition on human brain organization is poorly understood. Their findings confirm structural changes in brain regions known to serve language functions during foreign-language acquisition. Thus, they conclude that foreign language acquisition can even lead to brain structure

changes in young adults. The above finding interestingly endorses the utmost importance of neurological studies for the field of SLA. Arguably, whereas neurolinguistic findings, however, have been informative and insightful for second language researcher, seemingly the application of neurolinguistics, in its entirety, has not been a rich repertoire for second language practitioners during the last two decades. One possible explanation in this regard is that the fallaciously overemphasized arguments asserted against the applicability of neurolinguistic corollaries in second language teaching have made practitioners unwilling to approach language pedagogy from neurolinguistic domain.

In relation to this matter, some scholars have attempted to utterly criticize the biased stance in question. For instance, Nergis (2011), in general, asserts that "researchers working on neuroscience and education should come up with a new approach or framework to negotiate these two fields of research to form sound suggestions" (p.143). In a similar way, among SLA researchers, Jacob and Schuman (1992) suggest that language acquisition researchers not neglect the role of neurological contributions and consider SLA and the interdisciplinary field of neurolinguistics as two distant and discrete research realms. Instead, they call for adopting a more integrative perspective towards the two fields and thus suggest that SLA researchers begin to incorporate "a degree of neurobiological reality into their perception of the language acquisition process. Such a neurally inspired view helps to provide a common ground for evaluating and integrating various language acquisition perspectives" (p. 282). Even from solely linguistic viewpoint, some scholars (see for example Grimaldi, 2012; Grimaldi & Craighero, 2012) have recently cast doubt on the fertile integration of linguistics and cognitive neuroscience and have redrawn our attention to the necessity and usefulness of this legitimately interdisciplinary interface instead.

Two decades ago, although Kim-Rivera (1998) rightly argues that only when a consistent pattern of salient results is achieved can neurolinguistic-based theories such as bimodality be considered worthy as a theoretical basis for instructional practice, this issue is perhaps still open to debate due to the creation of a kind of boomerange effect. Based on this boomerange effect, the voiced objections to the applications of the neurolinguistic research has almost disinclined L2 researchers to get involved and thus L2 researchers are perhaps too mindful of enquiring and investigating the practical aspects of such theories. In fact, to the best of author's knowledge, the hot perennial controversy over the practical plausibility of neurolinguistic findings for second language research and the pessimism which has formed in this respect can virtually resulted in some decision-making problems that L2 researchers and especially practitioners have to get to grips with while investigating and conducting research studies.

According to Mahmoodzadeh (in press), it can be metaphorically implied that paradoxically this field is theoretically assumed to be sufficiently fruitful, but practically of kind of 'forbidden fruit'. In a nutshell, considering the undue skepticism and caution against overgeneralizing the neurolinguistic results, it is argued that as it is important to withhold the spread of irrational generalization, it is equally important not to do so at the expense of suppressing the future opportunities. One tentative explanation for this perhaps relates to the elusive nature of truth in science. To understand this feature of the truth, Elbow (2008) has generally suggested that researchers ought to get engaged in both playing and balancing some kind of scientific or academic games: the *believing game* and the *doubting game* (see also Elbow, 1973 for further details). "The doubting game can not prove that a position is wrong-nor the believing game that it is right. The doubting game and believing game are just tools or methods and cannot make decisions for us. So, our judgments will be better if we get to use both sets of tools" (p. 10). However, it seems that in terms of the applications of neurolinguistics to second language research, practically researchers have almost tended to play the doubting game, devoid of sufficient endeavours for playing the believing game.

3. Conclusion

In sum, it seems that reopening the agenda of neurolinguistic applications to second language teaching is perhaps within the prospective changes. For the time being, Mahmoodzadeh (in press) calls for a balanced alternative neurolinguistic perspective in which the fields of neurolinguistics and second language pedagogy are not only considered mutually exclusive but also are considered mutually complementary. In this regard, the author now strongly believes that the taken stance is perhaps more sensible and inclusive and might yield a more conspicuous picture of the totality of the issue as well. Hence, the field of neurolinguistics has not overstepped its jurisdiction in second language research because its practical and theoretical aspects can be almost considered as two sides of the same coin. In this sense, we might hopefully have the warranty to rediscover the potential of neurolinguistic contribution to second language research and ideally witness a major shift of focus regarding the validity criterion of its prospective patterns of research. In conclusion, by putting further trust in applicability of the neurological achievements catered for second language research, the spotlight put against neurolinguistic applications to second language learning and pedagogy might also turn yellow soon awaiting the accompanying green light. However, such alternative view is still speculative and open-ended and it certainly needs support of the future research studies.

References

- [1] Abutalebi, J. (2008). Neural aspects of second language representation and language control. *Acta Psychologica*, 128, 466–478.
- [2] Antenos-Conforti, E. (2001). *The teaching of elementary Italian as a second Language in Canadian universities: Methodologies, curricula and future considerations*. Unpublished Doctorial Dissertation, University of Toronto, Canada.
- [3] Asher, J. J. (1977). *Learning another language through actions: The complete teacher's guidebook*. Los Gatos: Sky Oaks.
- [4] Asher, J. J. (1981). The Total Physical Response: Theory and Practice. In: H. Wintz (Ed.). *Native Language and Foreign Language Acquisition* (pp. 324-331). New York: New York Academy of Sciences.
- [5] Bialystok, E. (1997). The structure of age: In search of barriers to second language acquisition. *Second language Research*, 13, 116-137.
- [6] Bickerton, D. (1981). *Roots of language*. Ann Arbor, MI: Karoma Publishers.
- [7] Birdsong, D. (2006). Age and second language acquisition and processing: A selective overview. *Language Learning*, 56, 9–49.
- [8] Bowers, J. S. (2002). Challenging the widespread assumption that connectionism and distributed representations go hand-in-hand. *Cognitive Psychology*, 45, 413-445.
- [9] Christodoulou, J.A. & Gaab, N. (2009). Using and misusing neuroscience in education-related research. *Cortex*, 45(4), 555 – 557.
- [10] Coch, D. & Ansari, D. (2009). Thinking about mechanisms is crucial to connecting neuroscience and education. *Cortex*, 45(4), 546 – 547.
- [11] Curro, G. (1995). *A survey of neurolinguistic research and its implications for second language teaching*. Unpublished Doctorial Dissertation. James Cook University, North Queensland.
- [12] Danesi, M. (1986). Research on the brain's hemispheric functions: Implications for second language pedagogy. *Linguas Modernas*, 13, 99-113.
- [13] Danesi, M. (1988). *Studies in heritage language learning and teaching*. Toronto: Centro Canadese Scuola e Cultura Italiana.
- [14] Danesi, M. (2003). *Second language teaching: A view from the right side of the brain*. The Netherlands: Kluwer Academic Publishers.
- [15] Danesi, M. and Mollica, A. (1988). From right to left: A "Bimodal" perspective of language teaching. *Canadian Modern Language Review*, 45(1), 76-86.
- [16] Elbow, P. (1973). *Writing Without Teachers*. New York: Oxford University Press.

(Appendix Essay: “ The doubting game and the believing game: An analysis of the entellectual enterprise”).

- [17] Elbow, P. (2008). "The Believing Game--Methodological Believing". *English Department Faculty Publication Series*, 5. Retrieved July 11, 2012 from http://scholarworks.umass.edu/eng_faculty_pubs/5.
- [18] Goswami, U., (2006). Neuroscience and education: from research to practice? *Nature Reviews Neuroscience*, 7, 406-413.
- [19] Grimaldi, M. (2012). Toward a neural theory of language: Old issues and new perspectives. *Journal of Neurolinguistics*. <http://dx.doi:10.1016/j.jneuroling.2011.12.002>
- [20] Grimaldi, M. & Craighero, L. (2012). Future perspectives in neurobiological investigation of language. *Journal of Neurolinguistics*. <http://dx.doi:10.1016/j.jneuroling.2012.02.001>
- [21] Jacobs, B. & Schuman, J. (1993). Language acquisition and neurosciences: Towards a more integrative perspective. *Applied Linguistics*, 13, 282-301.
- [22] Kim-Rivera, E. G. (1998). Neurolinguistic applications to SLA classroom instruction: A review of the issues with a focus on Danesi's bimodality. *Texas Papers in Foreign Language Education*, 3(2), 91-103.
- [23] Krashen, S. D. and Terrell, T. (1983). *The Natural approach: Language acquisition in the classroom*. Oxford: Pergamon Press.
- [24] Lenneberg, E. H. (1967). *The Biological foundations of language*. New York: John Wiley & Sons.
- [25] Lombardo, L. (1988). Helping learners to establish criteria in an L2: Promoting learner autonomy in the foreign language classroom. In G. Cecioni (Ed.). *Proceedings of the Symposium on Autonomy in Foreign Language Learning* (pp. 70-79). Firenze: Centro Linguistico di Ateneo.
- [26] Lozanov, G. (1979). *Suggestology and outline of Suggestopedy*. New York: Gordon & Breach.
- [27] Mahmoodzadeh, M. (2011). The quest for resolving second language teaching dilemma: A review of the proposed solutions during the last two decades. *Theory and Practice in Language Studies*, 1(10), 1375-1382.
- [28] Mahmoodzadeh, M. (2012). The study of principles and techniques of bimodality theory from ELT teachers' perspective: The case of Iranian teachers. *Iranian EFL Journal*, 8(1), 183-207.
- [29] Mahmoodzadeh, M. (in press). A critical inquiry into the current state of neurolinguistic research neglect in second language pedagogy. *Iranian EFL Journal*.
- [30] Marinova, M. (2012, June). From theory to practice of second language aquisition. Paper presented at the *21st BETA-IATEFL Annual Conference*, Ruse. Retrieved July, 4, 2012, from <http://www.beta-iatefl.org/cogitoergosum/wp-content/uploads/2012/06/From-Theory-to-Practice-of-Second-language-acquisition.pdf>
- [31] Mårtensson, J., Eriksson, J., Christian Bodammer, N., Lindgren, M., Johansson, M., Nyberg, L. & Lövdén, M. (2012). Growth of language-related brain areas after foreign language learning. *NeuroImage*, 63(10), 240–244.
- [32] McClelland, J. L., Rumelhart, D. E., & the PDP Research Group (1986). *Parallel distributed processing: Psychological and biological models* (Vol. 2). Cambridge, MA: MIT Press.
- [33] Nergis, A. (2011). To what extent does neurolinguistics embody EFL teaching methods? *Procedia Social and Behavioral Sciences*, 15, 143–147.
- [34] Ney, J. & Pearson, B. A. (1990). Connectionism as a model of language learning: Parallels in foreign language teaching. *Modern Language Journal*, 74, 474-482.
- [35] Omaggio, A. (1986). *Teaching language in context*. Boston: Heinle & Heinle.
- [36] Pallotta, L. L. (1993). The "Bimodal" aspect of proficiency-oriented instruction. *Foreign Language Annals*, 26(4), 429-434.
- [37] Scovel, T. (1969). Foreign accents, language acquisition, and cerebral dominance. *Language Learning*, 19, 245-254.
- [38] Scovel, T. (1982). Questions concerning the application of neurolinguistic research to second

language learning/teaching. *TESOL Quarterly*, 16, 323-331.

[39] Scovel, T. (1988). *A Time to speak: A psycholinguistic inquiry into the critical period for human speech*. New York: Newbury House.

[40] Singleton, D., (2005). The critical period hypothesis: A coat of many colours. *International Review of Applied Linguistics*, 43, 269-285.

[41] Sokolik, M. E. (1990). Learning without rules: PDP and a resolution of the adult language learning paradox. *TESOL Quarterly*, 24, 685-696.

[42] Spolsky, B. (1989). Communicative competence, language proficiency, and beyond. *Applied Linguistics*, 10, 138-156.

[43] Stavrakaki, S. (2012). Clinical case studies in neurolinguistics and language pathology. *Journal of Clinic Case Reports* 2:e109. <http://dx.doi:10.4172/2165-7920.1000e109>

[44] Willingham, D.T. (2009). Three problems in the marriage of neuroscience and education. *Cortex*, 45(4), 544-545.

[45] Young, B. A. & Danesi, M. (2001). *Studying how the brain learns: Are there any useful implications for instruction?* Retrieved July 4, 2010, from <http://www.arrowsmithschool.org/howbrainlearns.htm>