Anxiety and Foreign Language Learning[1]

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Introduction

In 1986, Horwitz, Horwitz, & Cope concluded from a review of theoretical and empirical investigations that anxiety is a distinct affective variable in foreign language learning and that a significant percentage of foreign language students experience a level of anxiety that can inhibit or block the acquisition of a second language. There is evidence to suggest that 50% of students enrolled in foreign language classes experience the negative effects of language anxiety (Horwitz and Young, 1991). Additionally, some students go to extremes to avoid studying a foreign language altogether as a result of foreign language anxiety. Clearly, the role of anxiety in second language learning is an important concern for language educators and Second Language Acquisition (SLA) researchers. MacIntyre (1999) presents an extensive review of language anxiety research for teachers in which anxiety is investigated from various perspectives (e.g., the causes of anxiety, the effects of anxiety, and the relationship of anxiety to other concepts). Curiously, there is no reference in MacIntyre's lengthy review to the perspective and contributions of the neurosciences. Although recent research has added to our understanding of the complex concept of language anxiety, debate continues over its nature, effects, and causes. This paper will discuss anxiety as it applies to second language acquisition from the perspective of linguistics and neurolinguistics.

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A Linguistics Perspective

In his 1978 article on the effect of affect on the learning of a foreign language, Scovel observed that the available information on the subject was analogous to a good news-bad news joke. The good news was that affective variables could be isolated for research purposes and the bad news was that research led to a continually more complex identification of variables. In response to the conflicting data of pre-1978 anxiety research, the author stated that a clear definition of affective factors and their place in the intricate hierarchical web of learner variables was necessary. Scovel suggested that, based on a traditional psychological definition of *affect*, affective variables were those learner variables that involved the limbic system in the learning process (i.e., emotional reactions and motivation). He suggested that anxiety was one of the most important of the affective variables. Scovel concluded that through an investigation of anxiety's place in the intricate web of learner variables, we would develop a more profound respect for "the marvelous act that our students so subtly perform in front of us day by day, the act of inheriting someone else's language and culture" (p. 142).

Included in Scovel's 1978 article is a discussion of an important distinction that must be incorporated into a definition of language anxiety: the distinction between debilitating and facilitating anxiety. Scovel contrasts the "fight or flight" responses of our autonomic nervous system with these two aspects of anxiety. Evidence is cited to support the notion that debilitating language anxiety is the equivalent of a flight or avoidance response to the challenge of learning a new language and facilitating anxiety is the opposite, a motivating fight response.

Another distinction researchers have made in their attempts to define language anxiety is its classification as a state anxiety (Horwitz et al., 1986). A state anxiety is an anxiety associated with one particular situation as opposed to a trait anxiety that is experienced generally over a variety of situations. A large number of education-related state anxieties are commonly recognized, including test-taking and math anxieties. Horwitz et al. discussed three state anxieties that are closely related to language anxiety: communication apprehension, test anxiety, and fear of negative evaluation. The authors emphasized the importance of these factors in the conceptualization of language anxiety, but concluded that language anxiety is more than a mere combination of such factors. Foreign language anxiety, the authors stated, is a "distinct complex of self-perception, beliefs, feelings, and behaviors related to classroom language learning arising from the uniqueness of the language learning process" (p. 31).

A definitive understanding of the role of language anxiety is further complicated by a consideration of the possible origins of language anxiety. Not all researchers agree with the view of Horwitz et al. that negative affective factors, such as anxiety, are a cause of foreign language learning problems, but rather

that such factors are the result of foreign language learning problems. Sparks and Ganshow (1991) proposed that anxiety is a secondary factor in second language acquisition, which is negatively correlated with a student's foreign language learning aptitude. They introduced a Linguistic Coding Differences Hypothesis (LCDH) to explain variation in success in second language acquisition. According to this hypothesis, deficient first language skills (in particular, phonological/orthographic deficits) play a direct, causal role in a student's difficulty in second language learning, and this in turn leads to increased levels of anxiety.

MacIntyre (1995) critiqued Sparks and Ganshow's (1991) hypothesis, suggesting that the hypothesis was limited by its focus on a single causal factor in language anxiety. MacIntyre and Gardner (1994) conducted an experimental study designed to demonstrate the effect of externally induced, non-aptitude-related anxiety on language learning. In the study, anxiety was introduced into a vocabulary learning session by videotaping the students' task performance. As expected, being videotaped increased student anxiety levels and the results indicated a correspondence between anxiety levels and led to measurable performance deficits. MacIntyre concluded that Sparks and Ganshow's LDCH model "is at the same time compatible with the anxiety literature and incomplete without it" (p. 94).

Despite this demonstration that the LCDH does not apply to all situations in which language anxiety may affect language learning, there is increasing empirical evidence that first language skills are positively related to success in second language learning and that a deficiency in those skills is positively related to elevated levels of anxiety in many students. In a collection of essays entitled *Affect in Foreign Language and Second Language Learning: A Practical Guide to Creating a Low-Anxiety Classroom Atmosphere*, Sparks and Ganschow (1999) clarify their position on the issue of language anxiety. While acknowledging that students with an aptitude for foreign language learning can experience various types of language anxiety, the authors emphasize the need to identify those students whose anxiety is related to language deficits in order to provide them with appropriately modified instruction.

MacIntyre (1991) describes the effect of anxiety as a complex, cyclical interaction of factors that involves "encoding, storage, and retrieval processes" (p. 96) that can be influenced by anxiety arising from various factors and commented on the difficulty that researchers have had in demonstrating the role of second language anxiety on the learning process. He concludes that despite "a number of empirical studies demonstrating a relation between anxiety and achievement, questions remain about the manner in which anxiety exerts an influence" (p. 96). In order to answer questions of this nature, research must include investigations of language phenomena that are not directly observable. Many linguists now feel that information critical to an understanding of the complex role of anxiety and language acquisition will come from research in the field of neurolinguistics.

A Neurolinguistics Perspective

In 1981, Stephen Krashen proposed a model of language acquisition that described the effect of affective factors as a filter. Krashen suggested that this affective filter, consisting of factors such as motivation, anxiety, and self-esteem, determines the level of learning by filtering language input and limiting student intake. According to Krashen, this affective filter plays a crucial role in language learning because if input is not received by a student as actual intake, learning is not possible. High anxiety, low motivation, and low self-esteem can lead to a filtering out of much of the language input a student receives. Krashen's model has been expanded by subsequent SLA theory to include concerns with affective interference in the processing of intake and the production of output. Neurobiological investigations of affective factors are concerned with cognitive processes at the level of neuronal activity (within and among brain structures) in an attempt to provide brain-based explanations of how emotion interacts with learning.

A knowledge of the functions the limbic system and the cerebral cortex is fundamental to a neurobiological understanding of the role that affective factors play in cognition (Sylwester, 1995). Sylwester identified the amygdala, the hippocampus, the thalamus and the hypothalamus as limbic system structures involved in the processing of memory and emotion. The primary task of the amygdala is "to filter and interpret sophisticated incoming sensory information in the context of our survival and emotional needs, and then to initiate appropriate responses" (p. 44). Through its connections to other brain areas, the amygdala plays a role in sensory processing (filtering and interpreting) and influences higher levels of cognition. Experimental evidence suggests that the main function of the hippocampus is to transfer information from short-term to long-term memory (Matthews, 1998). The thalamus relays incoming sensory information to various parts of the cerebral cortex for processing, and the hypothalamus is involved in the regulation of internal systems, sexual behavior and emotion. An in-depth discussion of current hypotheses regarding the complex interplay of these brain systems and their relationship to emotion and cognition is beyond the scope of Sylwester's book.

In 1994, Pulvermuller and Schumann presented a brain-based language theory in an attempt to bridge "the gap between linguistics and neuroscience" (p. 682). Although the theory was concerned with broad issues of first and second language acquisition, a detailed discussion of a proposed neurobiological basis of affect in second language learning was included. Based on neurological evidence, the authors concluded that language learning involves the formation of synaptic connections among neurons of the cortex, neostriatum, globus pallidus, and thalamus, resulting in cortico-striato-thalamic cell assemblies (CST assemblies). These CST assembly connections must be triggered by dopamine input from the mid-

brain. The fact that midbrain neurons are connected to cortical neurons via the amygdala led the authors to theorize that the amygdala's emotional evaluation of a situation could influence critical dopamine-producing midbrain/cortex connections. In other words, positive attitudes toward language learning would encourage dopamine connections and foster learning, while negative attitudes (e.g., anxiety) would not.

This theoretical redefinition of Krashen's (1981) affective filter in neuroscientific terms highlights the potential of neurobiology to answer questions concerning the manner in which affective factors exert an influence on second language acquisition. Pulvermuller and Schumann (1994) concluded that, "language is a cognitive skill that is based on biological principles and mechanisms. Therefore, an explanation of language phenomena must necessarily deal with biological entities" (p. 722). Such an explanation of language acquisition variables (both cognitive and affective) is an exciting prospect for anyone involved in second language teaching, learning, or research. As Scovel suggested in 1978, a clear definition of affective factors is a necessary foundation for understanding their role in the learning process.

Conclusion

Data from neurolinguistic research has added depth to our understanding of language anxiety and its role in second language acquisition. Theoretical constructs based on the neurobiology of the brain are now possible and will lead to further, more definitive research. The information resulting from these studies will be of importance to ESL/EFL teachers who are faced with the difficult task of helping students deal effectively with high anxiety levels. However, as dramatic as discoveries have been in the neurosciences, educators should guard against the injudicious formulation of theory and methodology based on incomplete or incorrectly interpreted information. The field of second language teaching has a history of such "enlightened amateurism" (Richards & Rodgers, 1986, p. 10). It is important to bear in mind that the neurosciences have not provided concrete support for any specific method of language anxiety management and probably never will. Biological models of cognitive processes add new dimensions to complex concepts and provide educators with new insights; however, the role of anxiety in each student's unique language acquisition experience will continue to demand flexible and unique responses.

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