Chapter 4.17
An Advanced Concept of Altered Auditory Feedback as a Prosthesis–Therapy for Stuttering Founded on a Non-Speech Etiologic Paradigm

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ABSTRACT

Persistent Developmental Stuttering affects 1-2% of the world adult population. Its etiology is still unknown, although modern neuroimaging techniques have shown a new and exciting perspective of earlier ideas and hypotheses. However, it is now clear that a new approach to understand the true nature of the disorder is needed. We present a new etiological model of persistent developmental stuttering based on a deep analysis of earlier models and on the stuttering phenomenology, described in basic, clinical, and even ethnographic sources. One of the more stimulating conclusions has been the suggestion that stuttering is a non-speech based disorder, in opposition to the accepted belief. The implications of this model have guided the design of a new adaptive AAF device for prosthetic and

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therapeutic functions. It is supported by a wearable multimodal intelligent system, which evolves from a preliminary proposal presented in (Prado & Roa, 2007).

INTRODUCTION

Persistent Developmental Stuttering (PDS) is a disorder that affects 1 – 2% of world adult population. It is disorder recognized from the first civilizations and recurrently cited by Greek and other classic authors. Unfortunately, the complexity and associated strange behaviors guided the research on the etiology through strange and superficial roads since the starting of orthodox medicine. References to several of these hypotheses can help to understand this asseveration.

Hippocrates hypothesized that body humors were perturbed in these subjects, and thus prescribed the delivery of sticking blistering substances to the tongue (4th century BC). That causal model could be justified in that period, but it is more difficult to understand the prescription of surgical resections of tongue's chunks with the aim of avoiding the hypothetical spasms that cause the speech blocks, at half of 19th century, in Germany, England and France. That is, a century after the explosion of advances in the mechanistic vision of life that led the definition of physiology (Bobrick, 1996).

Modern treatments and causal explicative models acquired a more scientific methodology at 20th century. Current causal models defend an integrative conception of stuttering. The origin of this perspective is usually assigned to the demands and capacities model of Starkweather (C. W. Starkweather, 1987). That model is based on the diagnosogenic theory of Johnson (Johnson, 1942), and it considers some type of innate inability of child to respond to external demands. Therefore, this model combines environmental (external) factors with biological (internal) factors. The tendency to join different types of factors has continued up to now, justifying the definition of developmental stuttering as a consequence of bio-psycho-social elements (Rodríguez Carrillo, 2002). In our opinion this definition does not throw light in its etiology either helps to design therapies or prosthetic systems.

In agreement with the integrative causal models of PDS, current therapies combine logopedic (direct) treatments with psychological (indirect) ones. Studies show a high rate of relapse in adults (nearly 100%) (Craig, 1998; Hayhow, Cray, & Enderby, 2002). The scenario is even more complex for children because the difficulty to set apart the spontaneous recovery (Rogere J. Ingham & Bothe, 2001). However, there is a lack of significant and longitudinal studies.

The consequences of the failure of biomedicine for understanding and treating PDS include the deficit of speech language professionals (SLPs) specialized in PDS, and the proliferation of a high number of stuttering therapies, which are frequently selected as a function of the subjective preferences of professionals (Limongi, et al., 2005). There is also a serious and relevant reaction among PDS subjects featured by the negation of the PDS as a disorder (Loriente Zamora, 2006).

Stuttering is a disability with a very variable gradation and strong social and personal consequences. This disorder impedes that PDS subjects can communicate ideas in the manner they wish. An important characteristic of PDS is the emergence of blocking qualia at the same time that words appear to the consciousness. This leads to an exhausting fight for avoiding or overcoming these words, producing anxiety and fear. The true problem of PDS subjects is not the dysfluency perceived by the listener, but the collateral reactions and suffering that corrupt the communication and damage the person life.

PDS subjects try to hide the disorder because the exclusion and ignorance of societies regarding this disability. Governmental actions for assisting this population are just emerging, like the "Spanish Cabinet Council Agreement on October 21 of 2005