Chapter 10

A Selective Overview of Microswitch-Based Programs for Promoting Adaptive Behaviors of Children With Developmental Disabilities

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ABSTRACT

Assistive technology (AT) refers to any device, equipment and/or piece enabling children with developmental disabilities with self-determination and independence towards the outside world. Within this framework, microswitches represent electronic devices ensuring children with severe to profound developmental and/or multiple disabilities (i.e. a combination of intellectual, sensorial and motor impairments) to the independent access to preferred stimuli. This paper provides a selective overview of some illustrative examples available in the last fifteen years (i.e. 2000-2015) of the empirical evidences published on this topic. Overall, 35 studies were reviewed. Results were widely positive, although some failures occurred. Educational, psychological and rehabilitative implications of the findings were discussed.

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INTRODUCTION

Assistive Technology (AT) is an umbrella term which includes any device, piece or equipment ensuring children with severe to profound developmental and/or multiple disabilities (i.e. combination of intellectual, motor and sensorial disabilities) with independence and self-determination towards the outside world. That is, based upon learning principles (i.e. a causal association between a behavioral response and environmental consequences) a child with multiple disabilities may reduce his/her own passivity, and isolation by practicing positive and constructive interactions with the environment, with positive outcomes on his/her social image, status and quality of life (Lancioni & Singh, 2014). Within this framework, a critical role is assigned to microswitches (Lancioni, Sigafoos, O’Reilly, & Singh, 2012).

Microswitches are electronic devices (i.e. sensors) enabling a person with multiple disabilities with the autonomous access to preferred stimuli through the performance of small behavioral responses (Chantry & Dunford, 2010). In fact, to introduce a participant to a microswitch-based program (MBP) a plausible response should be selected. Thus, the response should be already available in the person’s repertoire as to be performed without effort and easily. Moreover, it should be reliable as to correctly activate the adopted microswitch. Subsequently, a pleasant stimulation should be retained. That is, the stimulation should be adequately (i.e. high) motivating as to efficiently compensate the overall response cost. Once the association between the behavioral response detected by the microswitch and the positive stimuli delivered contingently to it through a control system unit is learned by positive practice, the participant will be capable of independently access to such stimuli (De Pace & Stasolla, 2014). Although no specific rules exist, one may reasonably argue that by following the aforementioned requirements, a MBP will be successful (De Pace & Stasolla, 2015).

Depending upon the levels of functioning of participants involved, one may design a simple MBP involving a unique response allowing the access to a category of stimuli (e.g. auditory inputs as preferred songs). Otherwise, one may envisage a MBP aimed at enhancing choice skills. For the latter purpose, at least two behavioral responses with relatively adopted microswitches should be considered. By exhibiting a first response and activating the first microswitch, a child exposed to that program may, for instance, access, to visual reinforcements such as preferred videos. By producing the second response detected by the second microswitch the same child may receive brief periods (e.g. 8-10 seconds) of preferred songs (i.e. auditory stimuli). Finally, the participant may have the opportunity of choice between both (Lancioni et al., 2008a). Else, one may opt for request and choice chances through a microswitch and VOCA (i.e. vocal output communication aid) intervention. Once again, two behavioral responses and two related-adopted microswitches will be required. With the first response (i.e. microswitch), participants will access to positive stimulation, with the second response (i.e. VOCA), they will request for social contact with a caregiver. As further option, participants could choose between both (Lancioni et al., 2009a). Furthermore, a microswitch-cluster technology may be considered as an essential strategy aimed at enhancing an adaptive response with the simultaneous decreasing of a challenge behavior (Stasolla et al., 2014).

Microswitches may be also viewed as crucial tools for promoting ambulation responses and/or locomotion fluency (Lancioni et al., 2010a; Stasolla & Caffà, 2013). That is, a child with multiple disabilities in his/her walker device may be motivated to perform step responses independently, detected by the microswitches, with brief periods of pleasant stimuli delivered by the system contingently to such responses (Lancioni et al., 2009b). For individuals with higher levels of intellectual functioning, one may plan MBP combined with a personal computer, as to provide participants with leisure/recreational op-
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