

Assistive Technology-based Programs for Promoting Independence of Post-coma Children

Fabrizio Stasolla^{1*}, Adele Boccasini², Annalisa Albano³ and Vincenza Albano³

¹Department of Neurosciences, University of Bari, Italy

²Lega del Filo d'Oro Research Center, Termini Imerese, Italy

³Department of Educational Sciences, Psychology, Communication, University of Bari, Italy

*Corresponding author: Stasolla F, Department of Neurosciences, University of Bari, Italy, E-mail: f.stasolla@psico.uniba.it

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Post-coma children usually fail to be constructively engaged with their surrounding environment, due to extensive motor disabilities and lack of speech. In fact, they may pose serious challenges to daily life contexts (i.e., home, medical and rehabilitative settings), since they are frequently unable to correctly manage the positive stimulation by their-own and they are inadequate to be involved within conventional and traditional programs [1,2]. Thus, these children may be not capable of: (a) regulate the amount and the type of stimulation available, and (b) positively interact or communicate with their partners (e.g., parents and caregivers), with negative outcomes on their quality of life [3,4]. To overcome this issue one may resort on assistive technology-based interventions (AT) [5]. AT refers to any device, equipment or piece enabling a participant affected by severe to profound developmental disabilities with self-determination towards the outside stimuli [6].

Depending upon their levels of vigilance and consciousness, one may envisage different rehabilitative programs. For instance, for children in a vegetative state (i.e., vigilance without consciousness), one may apply a basic AT intervention with an electronic tool such as a microswitch (i.e., sensor ensuring a child with severe to profound multiple disabilities with pleasant stimulation contingent to participant's behavioral response recording). That is, a single, a double or even a prolonged eye blinking may provide the child with brief periods (e.g., 7-10 seconds) of positive stimulation (e.g., a preferred song). By implementing an ABABCBCB experimental sequence (i.e., A representing baselines, B indicating contingent intervention and C the non-contingent control phase), one may assess the participant level of consciousness remaining.

Whenever the adaptive responding varying according to the aforementioned experimental phases, one may argue on participant favorable diagnosis of minimally conscious state [7]. For individuals in a minimally conscious state, one may adopt vocal output communication aid (VOCA) issues, aimed at requesting social contact with one or more caregivers [8]. Furthermore, computer-based programs focused on providing the participants with communication of their needs and/or occupation and leisure opportunities through different options hierarchically presented and automatically scanned by the system may be outlined [9]. Moreover, special message and phone calls systems with distant partners may be pointed out as to prevent apathy, isolation and passivity by post-coma participants [10]. Finally, for children who emerged from a minimally conscious state or are emerging from it, one may argue on the possibility of literacy access [11]. For all the aforementioned intervention, indices of positive

participation (e.g., smiling, gaze oriented) may be carried out as outcome measures of quality of life as well as social validation assessment involving expert external raters for corroborating the clinical validity [12,13].

In light of the above, new research within this framework is warranted to generalize the encouraging results and to individualize the technological solutions adopted focused on responding to the sophisticated demands of both the participants and their families. Moreover, the AT based interventions should be developed keeping in mind both human and financial resources available in daily contexts [14]. Accordingly, future perspective in this research area should deal with the following topics: (a) enlarging the number of participants involved, (b) the AT-based options rigorously customer-tailored to the users, (c) conducting new social validation assessment with new groups of experts involved, and (d) providing preference checks phases for participants who emerged or are emerging from minimally conscious states [15].

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