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Extending the use of Spanish Computer-assisted Anomia Rehabilitation Program (CARP-2) in people with aphasia

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ABSTRACT

Purpose: To extend the use of the Spanish Computer-assisted Anomia Rehabilitation Program (CARP-2) for anomia from a single case to a group of 15 people with aphasia. To evaluate whether the treatment is active (Phase 1) for this group (Robey & Schultz, 1998), providing potential explanations as to why.

Methods: Fifteen participants with chronic aphasia (with a range from moderate to mild anomia) were recruited to 15 weeks of computer-assisted therapy for anomia. A single treatment period with pre- and post-treatment assessments evaluated participants' ability to name 200 words using the multiple cues provided by the computer. Pre- and post-naming measures of all items examined the effect of treatment. Background linguistic and cognitive skills were measured before and after the therapy to investigate whether the improvements in naming were therapy specific.

Results: All 15 participants showed significant benefits in their naming skills after the therapy. There were no changes to cognitive and linguistic skills unrelated to anomia. There was evidence of some carry-over effects in naming.

Conclusion: The Spanish Computer-assisted Anomia Rehabilitation Program (CARP-2) for anomia is an active treatment for a range of people who have anomia as part of their aphasia profile.

Learning outcomes: By the end of the paper you will be able to answer the CEU questions and consider whether to use computer assisted therapy on a wide range of clients with anomia difficulties.

1. Introduction

The case for treatment of naming difficulties is well supported (for summary of these see Laine & Martin, 2006; Nickels, 2002a). One of the main features of such therapy is the intensity and range of stimulation methods needed (see Howard, Patterson, Franklin, Orchard Lisle, & Morton, 1985; Nickels, 2002a), hence the use of computers to provide and/or supplement face-to-face therapy for anomia. Consequently, in the last decade, there have been a proliferation of studies to examine how and what is the most useful way to use computers in anomia rehabilitation. Adrián, González, and Buiza (2003) set out a list of possible advantages of computer-assisted therapy over face-to-face. These included: mass exposure to items, varied range of multi-sensory tasks to provide the widest possible stimulation, participants able to control their own progress and have precise and on-line feedback about how they are doing, choice of how they carry out the therapy and with

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Table 1
Summary of studies using computer-assisted therapy to improve anomia from 2000 to 2010.

First author and year	Participant number	Participant type	No of items/ exercises	Range multi-sensory tasks/cues	Participant control over program	Precise feedback	Statistical evidence improvement	Evidence of wider improvements
Pedersen et al. (2001)	3	CVA	64–184	Multicue	Unsupervised	Yes	Yes	Yes
Fink et al. (2002)	6	CVA	40	Phonological	Partially self-guided Assisted	Yes	Yes	Yes
Cuetos (2003)	8	CVA TBI	50–300	Phonological Semantic	N/A	Yes	Yes	N/A
Mortley, Wade, Davies, & Enderby (2003)	7	CVA	34–52	Multicue	Unsupervised	Yes	Q	Yes
Adrián et al. (2003)	1	CVA	60	Multicue	Assisted	Yes	Yes	Yes
Mortley, Wade, & Enderby (2004)	7	CVA	262	Multicue	Unsupervised	Yes	Yes	Yes
Doesborgh et al. (2004)	18	CVA	320	Multicue	Assisted	Yes	Yes	No
Laganaro et al. (2006)	8	CVA TBI	144	Multicue	Unsupervised	Yes	Yes	No
Raymer, Kohen, and Saffell (2006)	5	CVA	60	Multicue	Assisted	Yes	Yes	Yes
Jokel, Cupit, Rochon, & Leonard (2006)	2	PPA	45	Orthographic	Assisted	N/A	Yes	N/A
Archibald, Orange, and Jamieson (2009)	8	CVA	99–498	Multicue	Unsupervised or Assisted	Yes	Yes	Yes
Choe et al. (2007)	4	CVA	75	Multicue	Unsupervised and assisted	Yes	Yes & Q	Yes
Jokel et al. (2007)	1	SD	90	Errorless Semantic	Assisted	N/A	Yes	No
Ramsberger and Marie (2007)	4	CVA	40–80	Multicue	Unsupervised	Yes	Yes	No
Jokel, Cupit, Rochon, & Leonard (2009)	2	NPA	20	Orthographic Phonological	Assisted	N/A	Yes	Yes

NB: N/A = not available; CVA = cerebral vascular accident; TBI = traumatic brain injury; PPA = primary progressive aphasia; SD = semantic dementia; NPA = non-fluent progressive aphasia; Feedback: includes any picture, spoken word or summary feedback shown; Multicue: more than two cues and exercises provided, Q: No quantitative evidence but evidence of qualitative analysis.

whom and a range of positive outcomes, not just in their naming ability but also in other language tasks, self esteem and adjustment to aphasia. Table 1 summarizes previous studies where some of these advantages have been found.

From this table, it is clear that computer assisted therapy has been useful for anomia arising from a range of etiologies (CVA, dementia, TBI) and for a wide range of participant numbers (studies varied from 1 to 18 participants). Every study used a large number of items and/or exercises with a wide and varied range of tasks to stimulate both the semantic and phonological information needed to name. Multiple cueing was the most widely used method. There was more variation in whether the computer program is participant-controlled or led by a speech/language pathologist (SLP), dividing equally between assisted and unsupervised learning. Almost all programs provided precise feedback to the participant. Importantly, there was strong statistical support to back up the claims that computer assisted therapy had positive effects on naming. Some studies also reported positive improvements on other areas such as other cognitive and linguistic skills and functional improvement and self-esteem.

Given the increased use of these computer-assisted programs, it would be important to conduct research on new programs following Robey and Schultz's (1998) 5-stage model for providing clinical outcome research. These were later modified and further described by Wertz and Katz (2004) specifically for computer-assisted therapy. In brief, those authors proposed a five-phase treatment outcome research model for computer-based interventions in aphasia: Phase 1: The purpose of Phase 1 was to show that the treatment (e.g. a computer-assisted program for anomia) was active in improving the aphasia deficits. Phase 2 refined the ideas explored in Phase 1 by specifying who was more likely to improve from the therapy, to inform clinician training, to reconsider the stimuli (type and number), determine optimal intensity and duration of the treatment and sessions, establish appropriate order of tasks and stimuli and demonstrate validity and reliability of the therapy program (by detecting pre-post improvement). Phase 3 tested the treatment's efficacy under optimal conditions while Phase 4 demonstrated the treatment's effectiveness. Phase 5 examined overall cost-effectiveness of a treatment, assessing outcomes beyond symptom remission and included evaluation of the participant's quality of life and family satisfaction with the rehabilitation.

This study aimed to build on the single case study report from Adrián et al. (2003) in order to answer the question of whether the treatment was active (Phase 1). Adrián et al.'s (2003) single case study of a woman with aphasia post CVA (MRP) provided strong evidence that naming could be improved in this specific case using a computer assisted program (CARP-1). The program was based on a 'drill and practice' regime of 12 sessions, working with 60 items (40 objects and 20 items) within 5 categories; 2 nonliving things: (furniture and household items), 1 living things (animals), 1 body parts and 1 actions. For each target stimulus, MRP attempted to name the item in the presence of 4 different cues which she selected herself from a choice of semantic, phonological, written and mixed. For example, to name a picture of a tiger [tigre], the semantic cue was: 'a wild animal, with striped fur'; the phonological cue was the first syllable /ti/; the written cue was the first two graphemes