

Institution: Anglia Ruskin University
Unit of Assessment: 4 (Psychology, Psychiatry and Neuroscience)
Title of case study: Rapid improvement of language skills in stroke patients using Intensive Language Action Therapy (ILAT)
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>We have demonstrated clinical improvement of aphasic patients' language abilities within only two weeks of commencing Intensive Language Action Therapy (ILAT). In the majority of patients language improvement is more significant than that achieved with conventional aphasia therapy. This clinical improvement is accompanied by brain reorganisation as indicated by electroencephalography. ILAT positively impacts on quality of life for post-stroke patients, through rapid enhancement of communication and other language skills, and on clinical management of those patients, through reduced strain on resources, including time and financial cost.</p>
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>The underpinning research was conducted by Dr Bettina Mohr (Senior Lecturer, Department of Psychology, Anglia Ruskin University, 2002-2009; Reader 2009-2013). Primary collaborators were:</p> <ul style="list-style-type: none"> • Professor Friedemann Pulvermüller (MRC Cognition and Brain Sciences Unit 2000-2011; also Professor, Department of Psychology, Anglia Ruskin University, October 2007-October 2009). • Professor Marcelo Berthier, University of Malaga, Spain • Professor Edward Taub, University of Alabama, USA <p>Stroke is one of the major health problems worldwide and is a frequent cause of severe long-term disability, often leading to aphasia, a chronic condition whereby patients have mild to severe speech and language deficits. In industrialised countries, nearly 4 in 1000 people suffer from language impairments due to stroke, leading to significant reductions in their quality of life.</p> <p>Despite the fact that different aphasia therapy regimes have been developed, access to these treatments is very restricted, particularly for chronic patients, which means that they are not given the help they need to improve their health and quality of life. Perceived barriers to the provision of such treatment include several factors, such as cost implications and the lack of scientifically proven evidence of benefits from speech and language therapy. The purpose of our research was to address these issues and to build a proven intensive therapeutic approach that produces rapid improvement in language skills while reducing the strain on health service resources.</p> <p>Intensive Language Action Therapy (ILAT) is also known under the labels of Constraint-Induced Aphasia Therapy, CIAT, or Constraint-Induced Language Therapy, CILT. It is an innovative technique, scientifically tested by Mohr and co-authors in a randomised controlled clinical trial (Pulvermüller et al., 2001). ILAT has been demonstrated to be effective in treating patients with chronic aphasia and leading to better recovery of language functions than conventional aphasia therapy or pharmacological treatment (Berthier et al., 2009). The ILAT technique is usually applied in intensive training sessions (3-4 hours per day) over a short period of time (usually 2 weeks) and comprises a multiplicity of interventions such as a) focusing on verbal language output while restricting nonverbal communication b) "massed practice" (intensive training within a short period of time), and c) delimiting therapy to communicative actions that are relevant in everyday life (e.g., "making a request" or "planning an activity").</p> <p>This form of intensive, action-related training has been contrasted with less intensive language therapy in purely linguistic contexts, lacking any action embedding. Paradigmatic for action-embedded speech acts is, for example, the task of naming an object in the context of requesting that object, which will be handed over subsequently ("salt" in the sense of "please give me the salt"). In sharp contrast with such action-embedded language use is the naming context typical for conventional aphasia therapy, where the speech therapist shows an object and the patient is asked to utter the name of the displayed object or card. This latter example of naming is a case of purely linguistic training. We have found that intensive and action-related training is very efficient in treating chronic moderately to severely impaired patients who no longer receive any language therapy (DiFrancesco et al., 2012; Meinzer et al., 2005; Pulvermüller et al., 2001).</p>

Impact case study (REF3b)

3. References to the research (indicative maximum of six references)

All papers are published in international peer reviewed journals. Citation counts are included at the end of each reference. The successful grant applications listed below were peer reviewed. Grant 1 supported early stages of the research programme that were further developed at Anglia Ruskin University by Mohr (1999-2013) and Pulvermüller (2007-2009). Grant 2 directly supported research carried out at Anglia Ruskin University. Both grants together are presented as evidence of the quality of the research programme as a whole.

1. Pulvermüller, F. *Lexical Deficits after Stroke* 1995-1998
Granting agency: German Research Foundation (DFG)
Amount of funding: ca. 180,000 €
2. Rockstroh, B., & Pulvermüller, F. *CI Aphasia Therapy* 2001-2002
Granting agency: Stiftung ZNS (German CNS foundation)
Amount of funding: ca. 50,000 €

Peer reviewed published papers (all citation counts from Google Scholar, November 2013):

Pulvermüller, F., Genkinger, B., Elbert, T., Mohr, B., Rockstroh, B., Koebbel, P., Taub, E., 2001. Constraint-induced therapy of chronic aphasia following stroke. *Stroke*, 32, 1621-1626. doi:10.1161/01.STR.32.7.1621. Citation count: 383

Pulvermüller, F., Mohr, B., Lutzenberger, W., 2004. Neurophysiological signs of word and pseudoword processing in well-recovered aphasics and patients with right hemispheric stroke. *Psychophysiology*, 41, 584-591. doi:10.1111/j.1469-8986.2004.00188.x. Citation count = 25.

Pulvermüller, F., Hauk, O., Zohsel, K., Neininger, B. & Mohr, B. 2005: Therapy-related reorganization of language in both hemispheres of patients with chronic aphasia. *Neuroimage*, 28, 481-489. doi:10.1016/j.neuroimage.2005.06.038. Citation count = 60.

Pulvermüller, F., * Berthier, M. L. (2008). Aphasia therapy on a neuroscience basis. *Aphasiology*, 22, 563-599. doi:10.1080/02687030701612213. Citation count = 82.

Berthier, M.L. & Pulvermüller, F. (2011). Neuroscience insights improve neurorehabilitation of poststroke aphasia. *Nature Reviews Neurology*, 7, 86-97. doi:10.1038/nrneurol.2010.201. Citation count = 29.

Difrancesco, S., Pulvermüller, F., & Mohr, B. (2012). Intensive language-action therapy (ILAT): The methods. *Aphasiology*, 26, 1317-1351. doi:10.1080/02687038.2012.705815. Citation count = 5.

4. Details of the impact (indicative maximum 750 words)

Impact has been achieved through a series of stages. First we identified genuine problems with clinical management and rehabilitation of post-stroke language impaired patients (limited resources and restricted access to treatment, a poor evidence base for therapeutic benefits of standard treatments). Second, we established that action-embedded training promotes rapid improvement of language skills, thereby potentially enhancing patients' quality of life. In response, we developed an innovative training programme incorporating action-embedded training to promote rapid improvement of language skills, with low cost implications for healthcare providers. The positive impact of this programme on communication skills is supported by robust research evidence. Third, we developed interest in our therapy through provision of training courses and dissemination in targeted journals. Fourth, successful independent implementation in clinics in Europe and the United States is driving further interest in the benefits of ILAT for patient and health service providers.

Intensive language action therapy (ILAT) has been employed by a range of clinical groups worldwide (see Berthier et al., 2009; Kurland et al., 2012; doi: 10.1044/1058-0360(2012/11-0113)), thereby rapidly improving patients' communication and language skills while reducing the strain on

Impact case study (REF3b)

clinical resources (including time and money). Patients and clinical staff managing the rehabilitation of those patients are the primary beneficiaries. Cost and time savings and more efficient rehabilitation of language abilities are the primary benefits achieved through adoption of this therapy. A specific form of ILAT focusing on training of “activity/action planning” has led to significant clinical improvements of language abilities in chronic aphasia patients within two weeks of intensive intervention (Difrancesco et al., 2012). Moreover, language improvements are accompanied by cortical reorganisation measured by fMRI and MEG indicating long term, stable improvement in language. Pulvermüller and Mohr developed the therapy, and conducted efficacy studies. They were the first to design and test the therapy for aphasia patients. The theoretical approach was based in part on constraint-induced motor therapy (CIMT), developed by Taub specifically for rehabilitation of patients with motor problems/ hemiparesis. Other clinicians have combined our therapy with drug interventions to improve neurorehabilitation of language skills in post-stroke patients (e.g., Berthier, University of Malaga).

ILAT is a short-term and low cost aphasia therapy and has been implemented in several hospitals and clinics in Europe and the United States (see sources to corroborate impact). It provides straightforward and cost-effective access to language therapy for many patients, helping to significantly improve the quality of life for stroke sufferers. Clinical interest in (and uptake of) ILAT has been driven by our academic publications and aided via the provision of ILAT training courses (by Pulvermüller) to speech and language therapists (e.g., Bristol, UK 2010 and Leuven, Belgium 2011). In addition to those clinics that have implemented ILAT in Spain, Germany and the United States, many requests from speech and language therapists to observe ILAT sessions in the UK have been received.

5. Sources to corroborate the impact (indicative maximum of 10 references)

Intensive language action therapy is offered for stroke patients at the following clinics:

1. Unit of Cognitive Neurology and Aphasia
Centro de Investigaciones Médico-Sanitarias (CIMES)
University of Malaga
C/Marques de Beccaria 3
29010 Malaga, Spain

Documented benefits of ILAT/CIAT for rehabilitation of post-stroke aphasia from this clinic (including long-term follow-up findings) are included in the following paper (see also Berthier & Pulvermüller, 2011 cited in section 2):

Berthier, M.L., et al. (2009). Memantine and constraint-induced aphasia therapy in chronic poststroke aphasia. *Annals of Neurology*, 65(5), 577–585. doi:10.1002/ana.21597

2. Elks Rehab Hospital
600 North Robbins Road Boise,
Idaho 83702, USA

Web reference to CIAT programme: <http://www.idahoelksrehab.org/iciat.aspx>

3. University of Alabama
Medical Centre
Birmingham
Alabama, USA

Reference to CIAT treatments on the following web pages:

<http://www.uabmedicine.org/career/rehabc-speech-pathology>

<http://www.uabmedicine.org/location/spainrehab-clinics>

4. NRZ Magdeburg Median Kliniken
Gustav-Ricker-Straße 4
39120 Magdeburg
Germany

Web reference to CIAT programme: <http://www.median-kliniken.de/nc/de/standorte/median-klinik-nrz-magdeburg/behandlungsspektrum/neurologie/behandlungskompetenzen/logopaedie/>