

Evidence Insider

Welcome to 'Evidence Insider',

a newsletter for the research evidence databases PEDro, OTreeker, PsycBITE and speechBITE.

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Single-participant research designs *PsycBITE and speechBITE*

A distinctive feature of PsycBITE and speechBITE is the archiving of single-participant designs (SPD). Indeed, at 36% and 47% respectively, SPD are the single most frequent research designs on each of these databases. The advantages of SPD are that they can be used experimentally when there is no available evidence from a clinical trial regarding treatment effectiveness, as may occur with rare or infrequently occurring conditions, and they can be tailored to individual characteristics of the patient.

As with group designs, SPD contain a range of methodology, which we have classified into four main types: the simple case description, single-phase (training) studies, bi-phasic designs, and single-case experimental designs (SCED; or n-of-1 trials). SCEDs commonly use either withdrawal/reversal designs (often referred to as A-B-A-B designs) or multiple-baseline designs. An overview of the strengths and weaknesses of these design types is available in Perdices and Tate (2009). A range of statistical techniques appropriate for SPD, such as time-series analysis, is also reviewed in this article.

In the psychological and educational literature, the methodological sophistication of SCEDs has been recognized for decades, one of the seminal texts being Herson and Barlow (1976). By contrast, mainstream medical literature on evidence-based practice has adopted a regrettably simplistic approach to SPDs – they are either ignored or alternatively appear to be all lumped together under the rubric of “case reports” which provide a very low level of evidence. In a notable exception to this trend, Guyatt et al. (2000) advocate the value of randomized n-of-1 trials as providing a higher level of evidence than systematic reviews and RCTs for guiding treatment decisions.

Continued on page 3...

All databases are generously supported by the



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Do you have any questions or comments in regards to this newsletter? Would you like to add an item of news in the next issue? Please contact

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Overview of 4 Databases Relevant to Allied Health

PEDro

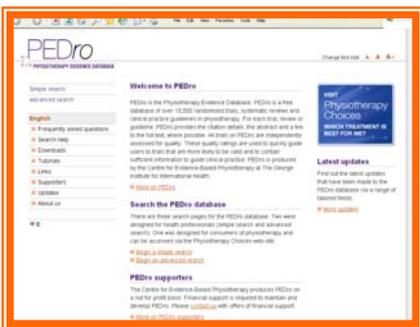
Physiotherapy Evidence Database
www.pedro.org.au or
www.physiotherapychoices.org.au

PEDro commenced in 1999 and provides rapid access to bibliographic details and abstracts of RCTs, systematic reviews and evidence-based clinical practice guidelines in physiotherapy.

PEDro also provides a searchable database for consumers including patients, their friends and families, health service managers, and insurers. Called "Physiotherapy Choices", it is an initiative of the Centre for Evidence-Based Physiotherapy (CEBP). The database provides a catalogue of the best research evidence of the effectiveness of physiotherapy interventions, namely clinical trials, systematic reviews and clinical practice guidelines. Physiotherapy Choices catalogues trials, reviews and guidelines with plain English summaries.

As of August 2010 PEDro contained 16,881 records relevant to physiotherapy, consisting of:

- ◆ 2,452 systematic reviews
- ◆ 13,704 randomised controlled trials
- ◆ 725 clinical practice guidelines



OTseeker

Occupational Therapy Systematic
Evaluation of Evidence
www.otseeker.com

OTseeker commenced in 2003 and provides access to systematic reviews and RCTs relevant to occupational therapy. Articles indexed in OTseeker have been sourced from over 1000 journals.

In June 2010 OTseeker contained:

- ◆ 6616 records
- ◆ 5022 randomised controlled trials
- ◆ 1574 systematic reviews



speechBITE

Speech Pathology Database for Best Interventions
and Treatment Efficacy www.speechbite.com

speechBITE™ commenced in 2008 and provides open access to a catalogue of **Best Interventions and Treatment Efficacy** across the scope of Speech Pathology practice. **speechBITE™** is an evidence based practice initiative between and The University of Sydney and Speech Pathology Australia. **speechBITE** recognises the scope and diversity of speech pathology practice by including studies that examine the effects of pharmacological, surgical and complementary treatments on communication and swallowing disorders. The database has received international support including endorsement by the Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA)

As of June 2010 speechBITE contained 1,735 records relevant to speech pathology consisting of:

- ◆ 117 systematic reviews
- ◆ 255 randomised controlled trials
- ◆ 181 non-randomised controlled trials
- ◆ 354 case series
- ◆ 828 single subject design studies

PsycBITE

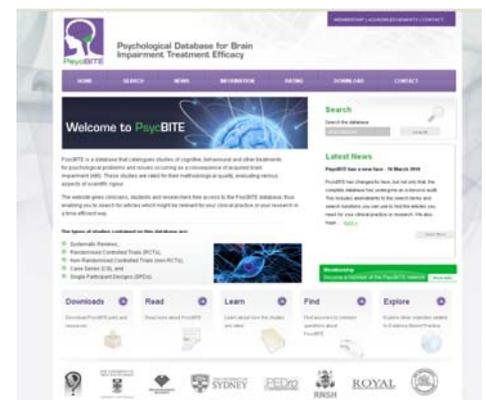
Psychological Database for Brain Impairment
Treatment Efficacy
www.psycbite.com

PsycBITE offers simplified searches for studies on various issues and diverse therapies for people with acquired brain impairment (ABI). A specialty of PsycBITE is the multidisciplinary approach, in that it aims to provide evidence of treatment efficacy for all professionals who work with people with brain impairment. Due to the rarity or unique presentation of the different conditions, a multitude of different study designs is included on the database: Systematic reviews (9%) randomised controlled trials (22%), non-randomised controlled trials (11%), case series (22%), and single participant designs (36%). The database currently holds a total of over 2600 reports.

In 2009, the PsycBITE project celebrated its 5th anniversary and took the opportunity to audit the complete database and web appearance. A number of more clearly defined indexing categories as well as the improved search functionality were designed to make online searches easier for busy health professionals. The work on the overhaul will be completed in mid 2010.

As of June 2010 PsycBITE contained 2,695 records relevant to brain injury including:

- ◆ 251 systematic reviews
- ◆ 601 randomised controlled trials
- ◆ 299 non-randomised controlled trials
- ◆ 578 case series
- ◆ 965 single subject design studies



**All databases are accessible
free of charge**

Single-participant research designs

PsycBITE and speechBITE continued from page 1

PsycBITE team has contributed to the SPD literature by publishing a method quality rating scale designed for SPDs, the SCED Scale (Tate et al., 2008). The impetus for developing the scale was to rate the method quality of SPDs archived on PsycBITE. As with group designs, there is a huge range in quality of the conduct and reporting of SPDs. It is important to be able to differentiate poor studies from high quality studies in order to inform clinical practice. Our challenge was that no scale was available for this purpose. We attempted to apply other checklists and scales for other research designs to SPD reports, but they were not able to adequately capture the quality of this uniquely different research design.

Our approach to initial item generation for the SCED Scale was to identify the weaknesses of SPDs as identified by authorities in the field. We then developed solutions that could overcome these weaknesses, and these became the items of the scale (see Table 1).

The structure of the SCED Scale was based on the PEDro Scale (Maher et al., 2003). One point is earned for each item of the scale where an explicit statement is made in the report indicating that the criterion was met. Items 2 to 11 are included in the method score, which ranges from 0 to 10. The SCED Scale shows excellent inter-rater reliability for consensus ratings on the total score (ICC=0.88; 95% CI: 0.78-0.95), and fair to excellent reliability at the item level ($k=0.48-1.00$).

These results were replicated with two independent novice raters who trained in the use of the scale.



Hopefully, the status of SPDs in the eyes of the medical establishment will improve with initiatives such as the use of the SCED Scale and implementation of new reporting standards (CONSORT Extension for N-of-1 Trials; CENT) being developed by a Canadian-led international team. Further information is available from Professor Robyn Tate (rtate@med.usyd.edu.au).

See references on page 5

Table 1: Items of the SCED Scale

1. Specify the clinical history
2. Operationally define and <u>specify the target behaviours</u>
3. Design: Build in a control condition to the design; either reversal/withdrawal design (A-B-A) or multiple baseline across behaviours.
4. Establish a stable baseline over at least 3 occasions
5. Take continuous measures of behaviour during the treatment phase
6. Present raw data record for each phase (baseline, treatment and, if applicable, withdrawal), either in tabular or graphical form
7. Establish inter-rater reliability for measures of observations of target behaviours
8. Assessor is independent from therapist
9. Use statistical analyses or describe effect sizes

Systematic reviews....



Systematic reviews are a method for systematically locating, appraising, and synthesising research from primary studies and are an important means of condensing the research evidence from many primary studies. Systematic reviews also differ from literature reviews because they are prepared using transparent, explicit, and pre-defined strategies that are designed to limit bias.

In contrast to literature reviews, systematic reviews involve a clear definition of eligibility criteria; a comprehensive search of *all* potentially relevant studies; use explicit, reproducible and uniformly applied criteria in the selection of articles for the review; rigorously appraise the risk of bias within individual studies; and systematically synthesise the results of included studies.

Systematic reviews of *randomised controlled trials* can provide strong evidence for the effects of allied health interventions. Meta-analyses are the use of statistical methods to combine the results of two or more individual studies within a systematic review.

Where can I find systematic reviews?

There are a few obvious places to look for systematic reviews of randomised controlled trials:

The Cochrane Library contains:

- ◆ **The Cochrane Database of Systematic Reviews** contains free full text-access to over 3300 systematic reviews
- ◆ **Database of Abstracts of Effectiveness (DARE)** contains quality assessed abstracts of systematic reviews

OTseeker, PEDro, SpeechBITE and PsycBITE each contain bibliographic details of systematic reviews of randomized controlled trials. To be included in these databases, systematic reviews must contain at least one randomised controlled trial and have a methods section so that readers can determine how the review was carried out.

And of course systematic reviews are found in the primary databases such as MEDLINE, CINAHL etc

As with other types of studies, not all systematic reviews are carried out using rigorous methods and therefore bias may be introduced into the final results and conclusion of the review. It is important that you critically appraise systematic reviews and determine whether you can trust their results and conclusions.

Some key questions to ask when critically appraising a systematic review

Were the methods used in the review valid???

1. Did the review address a clearly-focused question with clearly defined eligibility criteria?
2. Did the review include high-quality, relevant studies?
3. Is it unlikely that the review missed important, relevant studies?
4. Did the review include an assessment of the risk of bias of included studies and was this assessment incorporated into the review findings?
5. Did the review combine the results from studies, and if so, was it reasonable to do so?

Synthesizing evidence

Examples of meta-analyses with demonstrating effectiveness...

◆ People who receive occupational therapy interventions for stroke are less likely to decline & are more likely to be independent in activities of daily living (Legg et al, 2006).

Legg L, Drummond A, Langhorne P (2006). Occupational therapy for patients with problems in activities of daily living after stroke. *Cochrane Database of Systematic Reviews*, Issue 4. Art. No.: CD003585. DOI:10.1002/14651858.CD003585.pub2.

◆ Exercise programs starting 4 to 6 weeks post after lumbar disc surgery seem to lead to a faster decrease in pain and disability than no treatment. High intensity exercise programs seem to lead to a faster decrease in pain and disability than low intensity programs (Ostelo et al, 2009).

Ostelo RWJG, Costa LOP, Maher CG, de Vet HCW, van Tulder MW (2009). Rehabilitation after lumbar disc surgery: an update Cochrane review. *Spine*, 34(17):1839-1848

◆ A meta-analysis of word-finding treatments for aphasia found intervention for word-finding deficits efficacious (Wisernburn & Mahoney, 2009).

Wisernburn B, Mahoney K (2009). A meta-analysis of word-finding treatments for aphasia. *Aphasiology*, 23 (11):1338-1352

◆ Treadmill training for people with Parkinson's disease improved gait speed, stride length and walking distance (Merholz et al, 2010)

Mehrholz J, Friis R, Kugler J, Twork S, Storch A, Pohl M (2010). Treadmill training for patients with Parkinson's disease. *Cochrane Database of Systematic Reviews*, Issue 1. Art. No.: CD007830. DOI: 10.1002/14651858.CD007830.pub2



Single-participant research designs:

References:

Guyatt G, Rennie D, & Hayward R, (Eds) (2000). *User's guide to the medical literature: A manual for evidence-based clinical practice*. AMA Press.

Hersen, M., & Barlow, D. H. (1976). *Single case experimental designs: Strategies for studying behaviour change*. New York: Pergamon.

Maher, C. G., Sherrington, C., Herbert, R. D., Moseley, A. M., & Elkins, M. (2003). Reliability of the PEDro scale for rating quality of RCTs. *Physical Therapy*, 83, 713-721.

Perdices M, Tate RL. (2009). Single-subject designs as a tool for evidence-based clinical practice: are they unrecognised and undervalued? *Neuropsychological Rehabilitation*. 19(6): 904-927.

Tate RL, McDonald S, Perdices M, Togher L, Schultz R. & Savage S. (2008) Rating the methodological quality of single-subject designs and n-of-1 trials: introducing the Single-case Experimental Design (SCED) Scale. *Neuropsychological Rehabilitation*. 18(4): 385-401.