What is a Critically Appraised Topic?

1. Preferred categorization format for quick studies in evidence-based practice (EBP)
2. Defined as a brief "summary of a search and critical appraisal of the literature related to a focused clinical question, which should be kept in an easily accessible place so that it can be used to help make clinical decisions" (Center for Evidence-based Emergency Medicine, n.d.a.).
3. Describes the best research evidence to date, evaluates the findings and summarizes the results into 1-2 pages (Shannon, 2001)

What is a Critically Appraised Topic? (cont.)

4. Key parts of a CAT include:
   1. Purpose
   2. Reviewer
   3. Date of completion
   4. Proposed Re-evaluation
   5. Well-built questions
   6. Search strategies and results
   7. Evidence retrieved
   8. Appraisal
   9. Conclusions

Systematic review of research versus CAT

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Systematic review</th>
<th>CAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>Critical, in-depth assessment and evaluation of existing research using methods to reduce likelihood of bias; provide overview on current research base</td>
<td>Create concise summary of best evidence most central for specific clinical scenario</td>
</tr>
<tr>
<td>Focus</td>
<td>Can have wide scope, comprehensive, focus on larger body of research</td>
<td>Narrowed down to specific clinical question</td>
</tr>
<tr>
<td>Authors</td>
<td>Written by content and methodology experts</td>
<td>Clinicians and practitioners</td>
</tr>
<tr>
<td>Search</td>
<td>Comprehensive search strategy, exhaustive search</td>
<td>Limited to best and most current evidence, time-saving strategies</td>
</tr>
</tbody>
</table>

Systematic review of research versus CAT (cont.)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Systematic review</th>
<th>CAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort/Efficiency</td>
<td>Don't leave a stone unturned</td>
<td>Time-limited (high efficiency preferred)</td>
</tr>
<tr>
<td>Commonalities</td>
<td>Critical appraisal of the quality of retrieved evidence</td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Can be quantitative (meta-analysis)</td>
<td>Brief narrative summary, descriptive</td>
</tr>
<tr>
<td>Dissemination</td>
<td>Journals, books, scholarly publications</td>
<td>CAT databases, institutional collection</td>
</tr>
<tr>
<td>Potential for bias</td>
<td>Depends on comprehensiveness and transparency of methods</td>
<td>Rather high</td>
</tr>
</tbody>
</table>
Why do we need CATs?
- Almost impossible for practitioner to keep up with all the new research in a field
- Research shows that even seasoned health-care clinicians and practitioners encounter up to 5 “knowledge needs” for every in-patient, and about 2 “needs” for every three out-patients (Sauvé, 1995)
- “Knowledge needs” raise questions about the best course of action
- Critically appraised summaries of the best evidence for common clinical or educational questions address these needs
- “Gold standard” would be a systematic review, but this takes too much time and effort (up to 1-3 yrs.) and is not practicable for clinicians (Ziegler et al., 2001)
- Evidence-based decision making in clinical scenarios demands time-efficient, up-to-date evidence review

CATs as part of the EBP process
- The EBP process:
  1. Developing a well-built question
  2. Selecting evidence sources & executing the search strategy
  3. Examining and synthesizing the evidence
  4. Applying the evidence
  5. Evaluating the application of the evidence
  6. Disseminating the findings (i.e., share CAT)
(Sackett et al., 1997 - Steps 1-5; Schlosser, 2003)

How to construct a CAT
1. Formulate a well-built question
   - Identify gaps in knowledge (“knowledge needs”) from client encounters
   - Is this problem about an intervention, assessment or diagnosis?
   - Translate the problem into an answerable question
   - Avoid vague, unanswerable questions (“Is new intervention better than traditional approach?”, What does “better” mean? In what population and setting?)

How to construct a CAT (cont.)
1. Formulate a well-built question (cont.)
   - Use PICO framework (Schlosser, Koul & Costello, 2005; Schlosser & Raghavendra, 2004):
     - P Patient or problem being addressed
     - I Intervention or exposure being considered
     - C Comparison intervention or exposure
     - O Outcomes of interest

How to construct a CAT (cont.)
2. Search for best evidence
   - Locate best & most current evidence first
   - Seek out reviews before individual research studies
     - Work down the hierarchy of sources
       - Database of Reviews of Effects (DARE)
       - Cochrane Database of Systematic Reviews
       - General purpose databases
     - Look for peer-reviewed evidence before non-peer-reviewed evidence

How to construct a CAT (cont.)
3. Examine and critically appraise the evidence
   - Analyze those articles most pertinent to your question
   - Evaluate evidence
     - How good is the evidence (i.e., internal validity)?
       - Quality and appropriateness of design
       - Treatment integrity
       - Interobserver agreement
     - What is the social importance or significance of the evidence (i.e., social validity)?
     - What is the transportability of the evidence (i.e., external validity)?
   - Apply hierarchy of evidence
     - Different fields have different hierarchies, e.g., AAC field: (1) participants with disabilities, and (2) participants without disabilities (Schlosser & Raghavendra, 2004)
3. How to construct a CAT (cont.)

Examine and critically appraise the evidence
- Quality and appropriateness of design
  - Experimental vs. pre-experimental designs
- Treatment integrity
  - The degree to which an independent variable is implemented as intended (Schlosser, 2002)
  - “Treatment integrity has the potential to enhance, diminish, or even destroy the certainty of evidence” (Schlosser, 2003, p. 273)
  - Evaluation Checklist for Planning and Evaluating Treatment Integrity Assessments (Schlosser, 2003)

Assessment of methodological quality
- Certainty of evidence
  - Conclusive, preponderant, suggestive, inconclusive (Simeonsson, 1994)

How to construct a CAT (cont.)

3. Examine and critically appraise the evidence
- Interrater reliability on dependent measures
  - Degree to which two independent observers agree on what is being recorded
  - Acceptable levels of observer consistency: > 80%

Assessment of methodological quality
- Certainty of evidence
  - Conclusive, preponderant, suggestive, inconclusive (Simeonsson, 1994)
How to construct a CAT (cont.)

4. Write the CAT
   - The CAT is a 1-2 page summary of your findings
   - Keep it at an easily accessible place so that other practitioners can rely on it when encountering the same or similar clinical question (Sauvé, 1995)
   - High quality CAT should be disseminated by submitting to CAT bank or professional journal

Example for a CAT in AAC (cont.)

Title
- Impact of AAC Intervention on Natural Speech Production in Learners with Autism

Type of CAT
- Related to treatment/intervention

Well-built question
- Sam is a 4-year old child who was recently diagnosed with autism. He is unable to meet his daily communication needs in his preschool through natural speech. He has recently learned to imitate words such as “mama,” “dada,” “quack-quack,” and “bye-bye.” His parents want to know, “which AAC approach(es) best support natural speech development?”

Example for a CAT in AAC (cont.)

Reviewer/s
- Ralf W. Schlosser and Doreen M. Blischak

Search
- Database Searches (to identify reviews)
  - DARE (1996 – 2002): “autism” and “communication;” yielded 6 references but none focused on AAC and autism;
  - CINAHL (inclusive 2002): “autism” and “augmentative and alternative communication” and “systematic review [DT]” and similar combinations; yielded 3 reviews but not focused on autism
  - ERIC (- 2002): “autism” and “communication” and “review;” autism and “augmentative and alternative communication;” yielded 5 reviews on autism and AAC some of which included sections on natural speech production but did not focus on this issue

Database Searches (to identify studies)
- CINAHL (- 2002): “autism” AND “augmentative and alternative communication”
- ERIC (- 2002): “autism” AND “communication,” “autism” AND “augmentative and alternative communication”
- Medline (- 2003): “autism” AND “communication” AND (“clinical trials” [MeSH terms] OR “research design” [MeSH terms] OR “evaluation study” [MeSH terms] OR “clinical trial” [PT])
- PsycINFO (- 2003): autism and augmentative communication and (LA=ENGLISH) and (PT=CLINICAL-TRIAL) or (PT=EMPIRICAL-STUDY) or (PT=EXPERIMENTAL-REPLICATION) or (PT=FOLLOWUP-STUDY) or (PT=TREATMENT-OUTCOME-STUDY)
Example for a CAT in AAC (cont.)

- **Date**
  - The search was completed August 10, 2003;
  - Proposed re-evaluation: August 2006

- **Citations (only those that are relevant)**
  - *Relevant Narrative Reviews (only sections):*
    - Bondy & Frost (1998); Bondy & Frost (2001); Goldstein (2002);
    - Kouf, Schlissel, & Sanson-Brian (2001); Miranda (2001); Miranda &
    - Erickson (2000); Schlissel (2003a); Schlissel (2003b); Schlissel &
    - Bilschak (2001); Sigafous, & Dragow (2001); Sundberg, & Michael
    - (2001)
  - *Relevant Systematic Reviews (to locate appraised studies):*
    - quantitative synthesis of single-subject research. Poster presented
    - at the Annual Convention of the American Speech-Language
    - Hearing Association. ASHA Leader, 6(15), 189.

Example for a CAT in AAC (cont.)

- **Relevant Studies (Suggestive evidence or better):**
  - Charlop, C. M. H., Carpenter, M., Le, L., LoBlanc, L. A., & Kellet, K.
    - (2002). Using the picture exchange communication system (PECS)
    - with children with autism: Assessment of PECS acquisition, speech,
    - social-communicative behavior, and problem behavior. Journal of
  - Kouf, T. A. (1998). Effects of simultaneous communication in a child-
    - directed treatment approach with preschoolers with severe disabilities.
    - synthesized speech and no speech on the spontaneous
    - communication of children with autism. Australian Journal of Human
    - Communication Disorders, 21, 12-31.
    - training in autistic children with minimal verbal language. Journal of
    - Autism and Developmental Disorders, 18, 217-229.

Example for a CAT in AAC (cont.)

- **Relevant Studies (Inconclusive evidence):**
  - Bondy & Frost (1994); Bonta & Watters (1993); Dyck, J. (1989); Felskine
    - & Fouts (1976); Fouts et al. (2002); Schwartz et al. (1998); Sigafoos
    - et al. (1995); Blischak (2001); Sigafoos, & Drasgow (2001); Sundberg, & Michael
    - (2000); Schlosser (2003a); Schlosser (2003c); Schlosser &
    - Koul, Schlosser, & Sanscribrian (2001); Mirenda (2001); Mirenda
    - & Bondy (1998); Bondy & Frost (2001); Goldstein (2002);
    - Kouf, Schlissel, & Sanson-Brian (2001); Miranda (2001); Miranda &
    - Erickson (2000); Schlissel (2003a); Schlissel (2003b); Schlissel &
    - Bilschak (2001); Sigafous, & Dragow (2001); Sundberg, & Michael
    - (2001)

Example for a CAT in AAC (cont.)

- **Summary and appraisal of studies**
  - Studies were appraised in terms of design, interobserver
    - agreement, and treatment integrity
  - Depending on how these three issues were addressed,
    - outcomes were appraised as
    - Conclusive
    - Preponderant
    - Suggestive
    - Inconclusive
  - 5 studies remained and were all ranked as “suggestive”:
    - certain speech outcomes are plausible and are within
    - the realm of possibility as the result of AAC intervention; minor
    - flaws in design, interobserver agreement, and/or treatment
    - integrity

Example for a CAT in AAC (cont.)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Method</th>
<th>Subjects</th>
<th>Results</th>
<th>Appraisal</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Anderson et al.</em> (2002); PECS</td>
<td><em>manual</em> signing</td>
<td>6 children, (2 to 4)</td>
<td>3 signs raised; no comparable baseline; strong internal validity; some threats to treatment integrity.</td>
<td>Strong</td>
</tr>
<tr>
<td><em>Charlop et al.</em> (2002); PECS</td>
<td>Children (3, 7, 12)</td>
<td>Spontaneous speech and initiation increased even without use of (a) partners, (b) gestures and (c) stimuli.</td>
<td>Strong</td>
<td></td>
</tr>
</tbody>
</table>

**Summary and Appraisal of Studies**

- **Suggested:** Sets were appraised in terms of preference; a teaching
  - criterion was used; strong internal validity; some threats to treatment
  - integrity and interobserver agreement were strong; because
  - comparisons were measured only during correct responding, there is no comparable baseline.

- **Preponderant:** The speech design fails to address threats to internal validity; strong interobserver agreement; data; treatment integrity data; and fading.

- **Suggestive:** The speech design fails to address threats to internal validity; strong interobserver agreement; data; treatment integrity data; and fading.
### Example for a CAT in AAC (cont.)

**Conclusions cont’d**
- It is plausible that:
  - Simultaneous communication and alternating between speech alone and simultaneous communication yield better speech production than signing alone (Yoder & Layton, 1988);
  - Computer-based instruction with synthetic speech output increases natural speech production compared to computer-based instruction without speech output (Parsons & LaSorte, 1993); and,
  - Pre-treatment vocal imitation skills predict natural speech production (Anderson, 2002; Yoder & Layton, 1988).

### Further approaches to critical appraisal

**“Journal clubs”**
- Example: University of Copenhagen, Dept. of General Practice
- General practitioners from local community invited to meet for 2-hrs-session once a month; anyone can join
- Each practitioner gets a copy of an article and an appraisal checklist
- Everybody reads same article and evaluates it, then group discussion to arrive at final conclusion about the evidence
- However, this has not produced completely written CATs that can be stored and shared beyond the club (Makela & Witt, 2005)

### Validation Criteria for CATs (cont.)

**What is the CAT’s message?**
- How strong is the message?
- Is it expressed in terms likely to be helpful in clinical management?
- Will the CAT’s message help me in the care of my clients?
- Can I apply the message in my client setting, to my clients?
- Were all clinically important outcomes, benefits, harms and costs discussed?

(Dawes, 2005)
Validation Criteria for CATs (cont.)

- Criteria for authority of authors, disclosure of competing interests, and feedback mechanisms
  11. Is the academic or training level of the authors or commentators clearly stated?
  12. Have the authors, site developers, and sponsors disclosed all competing interests?
  13. Is there a mechanism to contact the authors?  
    (Dawes, 2005)

Limitations of CATs

CATs can have shortcomings:

- Individual CATs can be wrong or inaccurate
  - CATs appear first as drafts without peer review
  - These first drafts may contain inferior evidence, or errors of fact, calculations, or interpretation
  - Can be turned into educational benefit: revise CATs in group discussions with clinicians or in other educational events
- Individual, “one-article” CATs contain only a single element of the relevant research literature
  - These CATs are not comprehensive explorations for all useful articles
  - Non-representative of the entire body of evidence

Limitations of CATs (cont.)

- Individual CATs may have a short shelf life
  - Become obsolete as soon as newer, better evidence becomes available
  - Without constant updating for newer, better evidence, their clinical bottom line becomes out of date
  - Good quality CATs specify update or “expiration” dates after which they should be considered obsolete
    (Centre for Evidence-Based Medicine, 2005)

Possible difficulties

- Time pressure and heavy caseload of clinicians
- Development of the necessary skills for
  - Formulating well-built, searchable question
  - Searching the literature
  - Critical appraisal (evaluating and rating evidence)
  - Can be overwhelming for busy clinicians
- Resources for instant access to the evidence where and when it is needed is lacking in most clinical/educational settings (Sutherland, 2004)

Educational value

- Because they are client-centered and based on “real-life” clinical scenarios, CATs have appeal to clinical learners at all levels from student clinicians to faculty members (Sauvé, 1995)
- Focus on research evidence:
  - Promotes the acquisition and polishing of literature-searching skills
  - Enhances critical appraisal and research evaluation skills
  - Fosters translation of research into clinical practice
- Writing CATs can be part of pre-service training
  - Include in educational curriculum, teaching units
- Established practitioners and researchers can benefit from journal clubs where designs, results and relevance of published articles are discussed and written up as a CAT

Tools for dissemination

- It takes too long for each clinician to perform a critical appraisal of evidence for all clinical questions
- In the medical and health care fields professionals have started systems to share CATs via CAT banks
  - Make the information needed by clinicians more widely available and accessible
  - CAT checked by a second person/expert
Tools for dissemination (cont.)

- Dawes (2005) identified 13 major CAT banks for health care fields in North America, e.g.,
  - EBM journal (http://ebm.bmjournals.com)
  - ACP Journal club (http://www.acpjnc.org)
  - Evidence-Based on Call (http://www.eboncall.org)
- Meta-search engine, the “CAT Crawler”, available to search eight of the major CAT banks at one time
  - Web-based application
  - Finds relevant CATs following key word input
  - High precision and recall

EBP relevant journals for the SLP field

New, secondary journals for review and critical appraisal of research in communication disorders:
- Communicative Disorders Review (since June 2006)
  - Editor: Raymond D. Kent
  - Publishes systematic and critical reviews, meta-analyses, and scholarly commentaries
  - No CATs per se, but expert reviews that can be subject of a CAT
- Evidence-Based Communication Assessment and Intervention (started in 2007)
  - Editors: Ralf W. Schlosser and Jeff Sigafoos
  - Publishes CATs, original articles advancing review methodology, experiential accounts by clinicians, structured abstracts on research evidence

Evidence-based Communication Assessment and Intervention

- Selects and appraises the latest and highest quality studies and reviews related to
  - Assessment, intervention, diagnosis, and prognosis published across 60+ professional journals in speech-language pathology and related fields
  - Published by Informa Healthcare
  - 4 issues/year
  - ISSN 1748-9539 (print)
  - 1748-9547 (online)

Evidence-based Communication Assessment and Intervention

- Seeks to publish original and exemplary Critically Appraised Topics (CATs)
- Full peer review
  - To be published, CATs must meet criteria for content, currency of information, attribution, and documentation

Software for writing CATs

- In the medical community, software has been written to facilitate the process of creating CATs and help clinicians save time
  - Stand-alone programs: CATmaker (http://www.cebm.net/catmaker.asp)
  - Web-based forms: Critical Appraisal Skills Programme (CASP) (http://www.phru.nhs.uk/casp/casp.htm)
CATmaker

Making a CAT

- Systematic Review
- Therapy
- Diagnos
- Prognosis
- Aetiology / Harm

Available through the Oxford-Centre for Evidence Based Medicine
For Windows or MacOS
Prompts clinician for clinical question, search strategy and key information about the study
Provides on-line critical appraisal guides for assessing validity and applicability of evidence
Helps formulate clinical “bottom line” summary
Creates 1-page summary print-out to store or publish on the web as html-file
Reminder function to update CATs

CATmaker (cont.)

- BUT: tailored for medical research literature; limited utility for some research (e.g., single-subject designs)

CATmaker (cont.)

CASP

Critical Appraisal Tools

Further issues and discussion

- What formats should CATs have in different sub-disciplines of communication disorders?
- What resources and supports are needed to facilitate critical appraisal of evidence (e.g., time, EBP infrastructure, etc.)?
- How to teach CAT writing to current and future clinicians?
- How will we disseminate and share CATs within our community?
- Experiences of clinicians when writing CATs

Questions ????
References


References (cont.)


Contact information

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