Evidence-based Journal Club
January 22, 2008 (4-6 pm)

<table>
<thead>
<tr>
<th>Locations</th>
<th>Expected Participants</th>
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<tbody>
<tr>
<td>Waterbury</td>
<td>Pam Barnard, PT</td>
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<td></td>
<td>Mary Ellen Seaver-Reid, MEd</td>
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<tr>
<td></td>
<td>Marny Mansfield, OT</td>
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<td>Marcy Pelkey, OT</td>
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<td></td>
<td>Sharon Jendrazak, OT</td>
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<td>Williston</td>
<td>Linda Kogut, OT</td>
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<td>Deanna Wilcox, OT</td>
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<td>Marie MacLeod, PT</td>
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<td>Paul Woodruff, PT</td>
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<td>Peggy Owen, PT</td>
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<td>Erin Medick, OT</td>
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<td>Ruth Dennis, OT</td>
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<td>Liz Robitaille, PT</td>
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<td>Amanda Harris, OT</td>
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<td></td>
<td>Karen Downey, OT</td>
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<td>Abby De Wolfe, OT</td>
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<tr>
<td>Johnson</td>
<td>Sarah Stutz, OT</td>
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<td>Stephanie Veit, OT</td>
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<td>Rutland</td>
<td>Susan Boles, OT</td>
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<td></td>
<td>Karen Gartner, PT</td>
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<td>Patty Thomas, OT</td>
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<td>Sally Short, PT</td>
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<tr>
<td>White River Junction</td>
<td>AJ Zwikelmaier PT</td>
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<td></td>
<td>Beth Pastor, PT</td>
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<td></td>
<td>Chris Knippenberg, OT</td>
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<tr>
<td>Brattleboro</td>
<td>Mary Coogan, PT</td>
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Instructions to Participants:
1) Please sign-in AND sign-out on the TRIPSCY sign-in sheet. This is critical for OTs who want to report this activity for continuing education credits.
2) Handouts were sent to you by email.
3) Please assign one person at each site who will collect all the material at the end (i.e., sign-in sheets, completed surveys, etc.) and mail it back to me. We will reimburse you for postage.

Thank you and see you all on the air,

Marie-Christine Potvin
Center of Disability and Community Inclusion/UVM
Mann Hall – 3rd floor
208 Colchester Ave.
Burlington VT 05405-1757
**Agenda**

4:00 Welcome, Check in with all sites, reminder to sign-in, microphone instructions, overview of the agenda and general orientation to the handout (Marie-Christine)

4:05 Today’s topic and how the articles were selected (Deanna)

4:10 What is Motor Learning (Peggy)

4:30 Article reviews summary (15 min. each with questions)
   - Heitman et al. 1997 Reviewer: Linda Kogut Co-Facilitator: Pam Barnard
   - Vera 2003 Reviewer: Patty Thomas Co-facilitator: Ruth Dennis
   - Jarus 2001 Reviewer: Karen Downey Co-facilitator: Marie MacLeod

5:15 Discussion (Peggy)

5:45 Next meeting (Marie-Christine)
   Topic: Treadmill & Down Syndrome Date: March 6, 2008
   3 Volunteers needed

5:55 End --- Remember to sign-out

**Literature Search**

**Topic**- Motor Learning: Implications for Therapy

**PICO Question**- Do children with a disability learn motor skills quicker when they have variable, random or constant practice?

**Databases searched**-
1. OvidMEDLINE (including in-process and non-indexed citations) and CINAHL dates: 1990-present
   Limits used: humans, English language, ages 0-21, peer-reviewed journals

   Keywords: Motor Learning + Pediatrics or Child$ - resulted in 191 articles (many articles were about learning disabilities). Kept 38 and hand searched these to determine applicability to topic.

2. PSYCH info (1990-present)
   Same limits used as above

   Keywords: Motor Learning + Child* - resulted in 86 articles from which ~29 were kept and hand searched for appropriateness.

   Knowledge of Results + Motor Learning + Child* - resulted in 6 articles which were hand searched.

3. COCHRANE Library
   Motor Learning + Children – resulted in 25 results which were examined for appropriateness.

**ARTICLES REVIEWED:**

ABSTRACT: The purpose of this study was to assess the effects of constant versus variable practice conditions on motor performance and learning of individuals with learning disabilities. Participants (3 females; 21 males; mean age = 10.8 years; range 9-12 years) were individuals with learning disabilities required to learn three different versions of the same serial skill after being randomly assigned to either the constant or variable practice condition. Testing was conducted on two days separated by one day. On the first day, participants of the constant practice condition practiced the same version of the serial skill continuously for 10 trials before practicing the next two variations of the same task for a total of 30 trials. On the first day, participants of the variable practice condition practiced the three versions of the serial skill for a total of 30 trials with each version being practiced a total of 10 times but in random order. On the second day, both groups performed 30 trials of the serial task in a random fashion. The dependent variable was the time (seconds) required to complete each trial of the serial skill. The constant practice group performed better (p > .05) on Day I compared to the variable practice group. There was no significant difference (p > .05) between the practice conditions on Day 2 when both groups practiced the serial skill in a random order. Based on the results, constant practice seems to influence performance but not learning of a serial type motor skill in individuals with learning disabilities.


ABSTRACT: Earlier studies have raised questions about the usefulness of variable and random practice in learning motor tasks so this study was designed to investigate the effects of contextual interference in young children, and specifically to evaluate the effectiveness of variable or random practice structure in 6-yr-old boys and girls. Participants on a variable practice schedule showed better performances than those on a blocked schedule. The differences between the two groups were significant in the acquisition, retention, and transfer phases. These results support the hypothesis that contextual interference enhances skill learning. Because the study involved groups of young children in the setting of their normally scheduled physical education class, the practical applications of the results are evident.


ABSTRACT: This experiment was designed to investigate the effect of cognitive problem-solving operations (termed contextual interference) and complexity of tasks on the acquisition retention and transfer of motor skills. Ninety-six children, ages 7.5-9.5 practiced the task of throwing beanbags under either low contextual interference (blocked practice), high contextual interference (random practice) or medium contextual interference (combined practice). Half of the participants acquired a complex task and the other half a simple task. All participants performed 30 acquisition trials, 9 retention trials and 4 transfer trials. Results indicated that participants who practiced in the blocked practice group did not differ in their performance whether they acquired complex or simple tasks. On the other hand, participants from the random and combined practice groups who acquired simple tasks performed better than those who acquired complex tasks. These findings support the hypothesis that there is a limit to the interference during practice that will benefit retention and transfer, thus creating the contextual interference effect. It seems that the complex-task condition combined with random or combined practice schedule increased the difficulty of acquisition, possibly impeding the cognitive processing during acquisition, thus impairing the learning process.
ARTICLE 1


SUMMARY

A study was conducted to determine whether there are advantages to randomizing practice during motor skill acquisition that would lead to better retention and transfer of motor skills. Two groups of students were given practice sessions of throwing balls at a target. For one group, the practice session involved varying the task, either by using different balls or moving the targets. The other group practiced throwing the same ball at the same target placement for the entire practice session. Practice sessions took place during regularly scheduled Physical Education classes. The data appears to be accurately collected and analyzed. The study found that the group of children who had varied practice was better at retaining the skill as well as transferring the skill.

COMMENTS

STUDY PURPOSE:
Was the purpose stated clearly?

_X_ Yes
___ No

Outline the purpose of the study. How does the study apply to occupational therapy and/or your research question?

--to investigate the effects of contextual interference in young children
--specifically, to evaluate the effectiveness of variable or random practice structure in 6 yr old boys and girls

LITERATURE:
Was relevant background literature reviewed?

_X_ Yes; ___ No

Describe the justification of the need for this study.
--the authors described studies supporting both aspects of practice (random/variable vs. scheduled)

DESIGN:
___ randomized
___ cohort
single case design
___ before and after
XXX case-control
___ cross-sectional
___ case study

Describe the study design. Was the design appropriate for the study question? (e.g., for knowledge level about this issue, outcomes, ethical issues, etc.)

The exact design is unclear. Two groups of children were provided two different types of intervention (blocked vs. randomized practice.) The groups were given a pre test, a post test and a test later for retention. The activity involved throwing balls at a target. The trials with the balls and target placement and distance were the same for both groups. The practice was approached differently for the two groups. Over six weeks, 18 practice sessions (50 min. each) were held during regular PE class. In the experimental group (randomized practice) one parameter was modified in each throw (e.g. type of ball, distance from target, target position.) In the “Control” group, the children repeated the same tasks with no variations between throws.

Specify any biases that may have been operating and the direction of their influence on the results.
There is no true control group for this study. Both groups received some
form of intervention, however, this study was stated to be done to compare to different forms of practice.

<table>
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<th>SAMPLE:</th>
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<td>N = 71</td>
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</table>

Was the sample described in detail?

- XX Yes
- No

Was sample size justified?

- XX Yes
- No
- N/A

Sampling (who; characteristics; how many; how was sampling done?) If more than one group, was there similarity between the groups?

- 71 children from 4 regular education Physical Education classes
- all were considered normal and healthy
- sensorimotor deficits and abnormalities were ruled out based on results of physical exams and psych testing done regularly at school every 2 yrs
- children were divided into four groups [ 2 Experimental (A & C) and 2 Control (B & D)]
- distribution was done on the basis of pretest scores to ensure no significant initial differences between the groups in precision throwing skills which could influence results

Describe ethics procedures. Was informed consent obtained?

Director of school was informed of designs and aims of study which was subsequently approved by the School Council (whose members are elected from staff, parents, and teachers)

There was no specific informed consent, the study was based on an ongoing PE class activity

<table>
<thead>
<tr>
<th>OUTCOMES:</th>
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</table>

Were the outcome measures reliable?

- XX Yes
- No
- Not addressed

Specify the frequency of outcome measurement (i.e., pre, post, follow-up) The pre-test was done to establish a baseline and to divide the groups evenly. Data was collected on accuracy of hitting a target at 3M and at 5M, each with two different types of balls. Each group participated in either variable or blocked practice.

The post-test was a repeat of the pre-test.

There was no significant difference with the 5M targets, either type of ball.

A significant difference was reported for the 3M targets. The group with variable practice had better accuracy after the 6 weeks of PE class.
### Were the outcome measures valid?

<table>
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<tr>
<th>XXX Yes</th>
<th>No</th>
<th>Not addressed</th>
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</table>

A test done later revealed even more significant difference for retention and transfer of skills.

### Retention:

A significant difference was found in the Experimental group that had variable practice. These children had much higher scores than the group who had blocked practice with no contextual interference.

### Transfer:

Both groups were asked to throw a 15cm sand bag onto a flat target that was placed 4M away. A significant difference was also seen in the transfer of the skill for the children in the experimental group.

The conclusion of the study shows that variable practice leads to better outcomes, retention of skill and transfer of skill, than blocked practice sessions.

### INTERVENTION:

**Intervention was described in detail?**

<table>
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<tr>
<th>XX Yes</th>
<th>No</th>
<th>Not addressed</th>
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Provide a shore description of the intervention (focus, who delivered it, how often, setting). Could the intervention be replicated in occupational therapy practice?

The intervention consisted of changing one aspect of a practice session. For this study, throwing balls at a target, the variables were: type of ball, distance form target and placement of target.

Contamination was avoided?

<table>
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<tr>
<th>Yes</th>
<th>No</th>
<th>Not addressed</th>
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Contamination was not specifically addressed in the study; however, the study was professionally done with good attention to detail and possible variables.

### RESULTS:

**Results were reported in terms of statistical significance?**

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<th>XXX Yes</th>
<th>No</th>
<th>N/A</th>
<th>Not addressed</th>
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</table>

What were the results? Were they statistically significant (i.e., p < 0.05)?

If not statistically significant, was study big enough to show an important difference if it should occur? If there were multiple outcomes, was that taken into account for the statistical analysis?

Randomized practice leads to increased performance regarding motor planning/skills acquisition, retention and transfer of skills.

The analysis method involved establishing a numerical score for target accuracy. The mean of each group was calculated for each aspect of the testing. Data was collected on all conditions and on each student in each practice session.

A one-way analysis of variance was used to determine significant difference.

### Clinical importance was reported?

What was the clinical importance of the results? Were differences between groups clinically meaningful? (if applicable)
The advantages of variable practice over repetitive practice in motor skill learning are discussed in the article.

Did any participant drop out from the study? Why? (Were reasons given and were drop-outs handled appropriately?)

None reported.

What did the study conclude? What are the implications of these results for occupational therapy practice? What were the main limitations or biases in the study?

The conclusion is that variable practice has advantages over repetitive practice for motor skill acquisition.

ARTICLE 2


Outline the purpose of the study (i.e., study objective or aim):
To assess the effects of constant versus variable practice conditions on motor performance and learning of individuals with learning disabilities

Describe the justification of the need for this study (3-4 key points)
several references dated 1984-93.
Lack of empirical data with individuals who have learning disabilities.;
Constant practice is probably not the most efficient method for learning a motor skill
Variable practice transfers better to a novel version of the same task.
Some authors feel that indiv. with LD should practice discrete skills first followed by continuous then serial skills. Improvement is only obtainable with intensive practice and over learning
Generalizations from normal to LD population may be inappropriate.

Describe the study design:
A 2x6 (practice x trial blocks) analysis of variance, with repeated measures on the trial blocks. Analysis: 30 trials performed each day were grouped into 6 blocks of 5 trials using the median score for each block as datum. 2 separate statistical analyses were performed, 1 for each day. Day 1 represented practice performance where the 2 groups practiced the same skill under different practice conditions (constant vs. variable). Day 2: transfer from Day 1 performance trials where both groups performed the same skill, but under the variable practice condition. The dependent variable was time taken to complete the task. All tests were evaluated at the .05 alpha level.
Can the author answer the study question with the study design?
No. Small numbers and genders not equal; all categorized as LD without describing type, severity.

Were the design and/or method used introducing biases. If so describe:
I don’t think so.

**SAMPLE SIZE:**

<table>
<thead>
<tr>
<th>N = 21</th>
<th>Sample Description (e.g., age, gender, diagnosis, other characteristics)</th>
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<tbody>
<tr>
<td></td>
<td>3 female, 21 male; mean age of 10.8 years. All participants randomly assigned to the treatment conditions. The teachers and examiner determined that no participant exhibited sensory dys., ED, ortho impairment that was severe enough to interfere with performance. This statement was not substantiated in the article.</td>
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<td>How was sample identified? Was it a representative sample?</td>
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<td>Selected from a pool of students who were attending self-contained special classes in schools in southern Alabama. This does not appear to be a representative sample</td>
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<td>If there were more than one group, was there similarity and differences between the groups? Describe:</td>
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<td></td>
<td>The individual groups were not described according to gender, age. None stated other than the first 12 (6 constant, 6 variable) tested on Day 1 and again on Day 2. The following week, the last 12 were tested, approx. at the same time of day</td>
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<td>Was informed consent and assent obtained?</td>
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<td>Yes. Permission was obtained from proper authorities prior to assignment.</td>
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<th>OUTCOMES:</th>
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<tr>
<td>Outcome areas (e.g., self care, productivity)</td>
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<td>learning a motor task</td>
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<tr>
<td>List measures used (e.g., Sensory Profile, VMI)</td>
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<tr>
<td>Dekan Automatic Performance Analyzer (Model 741)</td>
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<tr>
<td>Reliable and Valid?</td>
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<tr>
<td>No information provided. It is used in sophisticated kinesiological research</td>
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<tr>
<th>INTERVENTION:</th>
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<tbody>
<tr>
<td>Intervention was described in detail?</td>
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<tr>
<td>Yes</td>
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<tr>
<td>No</td>
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<tr>
<td>Not addressed</td>
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<tr>
<td>Contamination was avoided?</td>
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<td>Yes</td>
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<td>Provide a short description of the intervention including type of intervention, who delivered it, how often and in what setting.</td>
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<tr>
<td>The task was an adaptation of a procedure described in Shea Lab activities manual (Shea, 1991) “practice schedule and contextual interference.” It was provided by the same examiner in a non-distracting school setting. Task was admin. to all subjects, individually. It was conducted over a period of 3 days for each participant. The first 12 (6c, 6v) were tested on Day 1 and again on Day 2. The following week, the last 12 were tested. Testing was completed at approx. the same time. The task was explained verbally and by demonstration, followed by 5 familiarization trials.</td>
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</table>
Specify the frequency of outcome measurement (i.e., pre, post, follow-up):

Subjects were to learn 3 different versions of the same serial skill after being assigned to constant or variable practice condition. The grid had 9-5 inch squares (tic-tac-toe). Colored squares were used to create a design that the student was to duplicate. Constant group-subject practiced the same pattern for 10 consecutive trials before switching to the next practice sequence, equally 30 trials. Variable-subjects were presented the different patterns in random fashion for 30 trials. Day 2-both groups received the patterns in random to determine which group had the greatest degree of transfer. The timer was started as soon as the design was presented to the subject. The subject’s correct hand placement on the mat stopped the timer.

### RESULTS:

Results were reported in terms of statistical significance?

- **x** Yes
- ____ No
- ____ NA
- ____ Not addressed

What were the results?

<table>
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<tr>
<th>Outcomes</th>
<th>Results</th>
<th>Statistical Significance</th>
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<tbody>
<tr>
<td>⇒ Stat. analysis does not support the hypothesis that constant practice compared to variable influences the skill acquisition of LD indiv. But constant practices does affect initial performance trials.</td>
<td>⇒ Significant practice conditions by trial blocks for Day 1 supports constant practice affects initial performance trials.</td>
<td>⇒ no</td>
</tr>
</tbody>
</table>

Was the analysis, that is the type of statistically tests used, appropriate for the type of outcome measures and the methodology?

- **x** Yes
- ____ No
- ____ Not addressed

Explain the analysis of variance, with repeated measures on the trial blocks. The dependent variable of the study was time taken to complete the task. All statistical tests were evaluated at the .05 alpha level. If not statistically significant (i.e., p < 0.05 or 0.01), was study big enough to show an important difference if it should occur (power and sample size)?

- No. Power is having sufficient sample size for the difference that you expect between groups so that there is a difference that can be detected. If it is under-powered, it is unclear whether is because there is truly no differences or because of inadequate sample size.

What is the clinical importance of the results (that is even if the results were statistically significant were the differences large enough to be clinically meaningful)?

- Response speed may bring into play other psychological variables inherent in learning disabilities (anxiety) that affect performance.

If yes, why did they drop out? How were drop-out participants included in the statistical analysis?

- ____ Yes
- **x** No

What did the author concluded?

Further research to examine the influence of factors such as: increase in the number of trials, type of motor task, type/degree of disability.
your point of view?

Nature of performance measure may have influenced the results. The measurement of performance was response time. If some other quantitative measure (accuracy) would have been used, possible different results. Response speed may have had a psychological effect. Statistical power wasn’t optimal (1\(B=.50\)) meaning there was a possibility that future differences existed, but not detected.

Further research to examine the influence of factors that increase in the number of trials, type of motor task, type and degree of disability.

The task was not meaningful, functional to the subjects that may have influenced their motivation, retention. Very small, unbalanced sample, the type(s) of LD not described and the presumption that all individuals with LD are apraxic.

What are the implications of these results for your practice?

Limited. Initial step in generalizing learning, considering how an individual best learns a new task. I found this very abstract and not functionally useful, as presented.

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**Critical Review Form**

**Quantitative Studies**

**REFERENCE:**

*Effects of Cognitive Processes and Task Complexity on Acquisition, Retention, and Transfer of Motor Skills, by Tal Jarus and Tzipi Gutman, 2001*

<table>
<thead>
<tr>
<th>STUDY PURPOSE: Was the purpose stated clearly?</th>
<th>Outline the purpose of the study (i.e., study objective or aim): To investigate the effect of cognitive problem-solving operations (termed contextual interference) and complexity of tasks on the acquisition, retention and transfer of motor skills in children.</th>
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<tbody>
<tr>
<td><strong>X</strong> Yes</td>
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<tr>
<td>____ No</td>
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<table>
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<tr>
<th>LITERATURE: Was relevant background literature reviewed?</th>
<th>Describe the justification of the need for this study (3-4 key points) ⇒ A major concern of Occupational Therapy is to identify context characteristics that facilitate performance and encourage development of new skills ⇒ How to best structure the context for best therapeutic practices with children ⇒ What are the best acquisition conditions to produce optimal retention of learned skills- how difficulty produced by the context of acquisition affects the strength of memory for the material to be learned</th>
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<tr>
<td><strong>X</strong> Yes</td>
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<tr>
<td>____ No</td>
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<tr>
<th>DESIGN:</th>
<th>Describe the study design: A group of 96 elementary students, randomly divided into 2 groups of 48 students; the first group practiced a simple-task, and the second group practiced a complex-task. Each of the 2 large groups was subdivided into three practice groups using random, blocked or combined practice techniques. The Simple Task groups only had one parameter change during the activity, namely the weight (color) of the bean bags to be tossed into the three targets. The</th>
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<tr>
<td><strong>X</strong> randomized cohort (population-based)</td>
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<td>____ before and after</td>
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<td>____ case-control</td>
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<td>____ cross-sectional</td>
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Complex Task group had three parameters change, namely the weight of the beanbags, the size of the bag and the order of the targets for each task. This phase is called the Acquisition Tasks. After one day, participants performed Retention Trials of the three tasks already practiced in the Acquisition phase. Immediately following the Retention Trials, participants performed Transfer Tasks which were done with each group, with a new color and weight beanbag—the Simple Task groups used the same size order as in the acquisition simple-task order, and the complex-transfer task included using the black bags in a new size order and a new target order. These six subgroups were measured and compared to determine how quickly the students acquired a new sequenced motor skill, as well as how the students retained and transferred their knowledge of this new motor skill.

Can the author answer the study question with the study design? Probably

Were the design and/or method used introducing biases. If so describe: No bias was discussed by the article.

Sample Description (e.g., age, gender, diagnosis, other characteristics)
96 elementary school students, ranging in age from 7.5 to 9.5 years old, median age 8.5 years old; no cognitive or motor deficits per parent and teacher report. No mention of gender in the sample group

How was sample identified? Was it a representative sample? Students from one elementary school. Not a broad representative sample.

If there were more than one group, was there similarity and differences between the groups? Describe: Not described

Was informed consent and assent obtained? Yes, parents were interviewed.

Outcomes:
Specify the frequency of outcome measurement (i.e., pre, post, follow-up):
Post acquisition of skills, and one day after for the retention and transfer skills

Outcome areas (e.g., self care, productivity) Motor control of throwing a bean bag into a target

List measures used (e.g., Sensory Profile, VMI) Reliable and Valid? Students timed to complete each trial. Accuracy of throw measure was used but not reported since this was
Evidence-based Journal Club

January 22, 2008

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INTERVENTION: Provide a short description of the intervention including type of intervention, who delivered it, how often and in what setting.

The Groups - Two groups of 46 students in Simple Task and Complex Task groups.

Each of these large groups divided into 3 subgroups - Blocked Practice, Random Practice and Combined Practice groups.

The Tasks - to throw beanbags using the dominant hand to 3 targets, 36 cm. in diameter, each a different color on the floor. Participants in each trial throw a sequence of three bags of different sizes (small, medium and large), and of the same color (each task was a different color), to three targets, one bag per target, in an order predetermined and presented on a board in front of the participants. All together the participants learned three different tasks.

The Acquisition and Retention Tasks used Turquoise, light blue and dark blue bags. The Transfer Task used Black bags that were different in weight from the blue bags.

The Procedure - 30 trials were administered to each child, 10 trials for each of the three tasks. Participants who used the Blocked Practice Schedule performed 10 consecutive trials on one task before moving to practice on the next task. Participants using the Random Practice Schedule performed 30 trials in a random order, such that each task included 10 trials with the restriction that no more than two trials presenting the same task would occur consecutively. Participants using the Combined Practice Schedule performed 5 consecutive trials on one task before moving to the other task, and then 15 trials presented in a random order. After one day, participants performed 9 Retention Trials of the 3 tasks already practiced during the Acquisition phase. Immediately following this, participants performed 4 Transfer Trials, of 2 transfer tasks.

RESULTS: What were the results?

Results were reported in terms of statistical significance?

⇒ The students in Simple Task Group did not significantly differ among the subgroups.
⇒ The students in Complex-Task Group who practiced in the Blocked subgroup...
⇒ In Acquisition phase, participants in the Simple Task group were faster in trial block 3, compared with trial block 2 and 1.
⇒ In Acquisition phase, students from the Simple Task group did not differ significantly among practice groups.
⇒ In Acquisition phase, participants in the Complex Task group who were in the Blocked practice subgroup, performed significantly faster than those from the Combined and the Random groups.

⇒ P<.001
⇒ P<.01
⇒ P<.01

Statistical Significance

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described as not significant
performed significantly faster than those in the Random and Combined subgroups ⇒ Students in the Simple Task Group Random and Combined subgroup performed faster than those in the Complex Task Group. Therefore the contextual interference main effect was not significant. P<.05

⇒ In the Retention phase, both the Random and Combined practice groups of the Simple Task group performed significantly faster then those from the Complex-Task group. P<.001

⇒ In the Retention phase, the performance of the children practicing in the Simple Task group was faster than those in the Complex Task group. Therefore the contextual interference main-effect was not significant. P<.05

⇒ Transfer analysis of variance indicated a significant task complexity main effect, performance of the children who practiced the Simple Task group was faster than the Complex Task group, contextual interference main-effect was not significant. P<.05

⇒ In the Transfer phase, there was no significant difference among practice subgroups. P<.05

⇒ In the Transfer phase, the Random Practice subgroup of the Simple Task group was significantly faster than those from the Complex Task Random subgroup.

Was the analysis, that is the type of statistically tests used, appropriate for the type of outcome measures and the methodology?

X Yes

No

Not addressed

Clinical importance was reported?

X Yes

Explain:

Statistical significance was reached in many of the group comparisons

If not statistically significant (i.e., p < 0.05 or 0.01), was study big enough to show an important difference if it should occur (power and sample size)?

Study was large enough

What is the clinical importance of the results (that is even if the results were statistically significant were the differences large enough to be clinically meaningful?)
In children, participants who practiced in a context that elicits low level of cognitive operations (low contextual interference - blocked order) performed faster than those who practiced in a context that elicits high level of cognitive operations (high contextual interference - random order or the combined order) as predicted by Battig (1979). During Retention and Transfer phases, contextual interference did not affect the performance as expected by Battig. It is possible that the effect of contextual interference as found in adult participants is different from that found in children. For the children who practiced the complex task, it seemed that the low contextual interference practice context (blocked order) was more beneficial for retention and transfer.

If yes, why did they drop out? How were drop-out participants included in the statistical analysis?

What did the author concluded?

Children are different from adults in this area of study of cognitive operations (contextual interference) and task complexity when it comes to retention and transfer of new tasks. Too much change in a task can make it too difficult for the children to learn, retain and transfer. Children did better with one parameter of change, rather than three parameters.

What were the main limitations of the study as stated by the author(s) and from your point of view?

Perhaps number of trials, by the authors’ point of view.

Perhaps the task was not a meaningful motor task, too contrived- authors’ point of view.

This study was very confusing to read and understand- it could have been written more clearly- my point of view.

What are the implications of these results for your practice?

Do not make tasks too complex with variables when teaching students new tasks that they will hopefully retain and transfer to other skills.

Potvin 2007 modified from Law, Stewart, Pollock, Letts, Bosch, & Westmorland, 1998
Evidence-based Journal Club
Questions to Guide Clinical Implications Discussion

**EBM Efficacy Criteria:** (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000)

1a Systematic reviews (with homogeneity) of randomized controlled trials
1b Individual randomized controlled trials (with narrow confidence interval)
1c All or none randomized controlled trials
2a Systematic reviews (with homogeneity) of cohort studies
2b Individual cohort study or low quality randomized controlled trials
2c 'Outcomes' Research; ecological studies
3a Systematic review (with homogeneity) of case-control studies
3b Individual case-control study
4 Case-series (and poor quality cohort and poor quality case-control studies)
5 Expert opinion

1. Are the results of the studies reliable and valid (quality of studies)? Explain?

2. Using the efficacy criteria above, what is the level of evidence of the studies reviewed today as a group? Are there additional studies in the literature (not reviewed today) that may enhance the level of evidence?

3. Considering the quality of the studies and the level of evidence, what do the studies’ results mean for your clinical practice? What may you do differently in your practice with this new information (think of assessment, intervention, education, data collection, rational, etc.)? What information could you share with parents and other team members?

4. What additional information do you need about this topic to enhance clinical practice/decision making? For example: additional journal club topic? Data collected at your agency? Suggestions for future research? How will you obtain this additional information?

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<th>Information Needed:</th>
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5. Combining the evidence of these studies and the discussion about clinical practice implications, what is the take home message (2 sentences)?