



Concreteness effect in recall of words and prose by foreign language experts

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Sinikka Hiltunen
University of Helsinki

<http://muistikuisti.net/tutkimustoiminta.html>
Department of Behavioral
Sciences

Cognitive Science Unit

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Concreteness effect in recall of words and prose by foreign language experts

1. Interpreting – what is it?
2. Expertise – who is an expert?
3. Concreteness effect in recall of words:
 - word span test results
 - possible explanations
4. Concreteness effect in recall of prose:
 - prose recall test results
 - possible explanations
 - qualitative analysis
5. Plans for future research

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Interpreting: classified by time delay

Simultaneous interpreting (SI)

- Translating and speaking while listening to source language text
 - delay 3-5 s or 3-4 words
- usually by means of technical equipment:
 - soundproof booths
 - incoming voice through headphones
 - outgoing voice through a microphone
 - unhindered view of speaker and audience
- working in pairs: 20 min each
- translation into mother tongue (L1)
- several languages at once (one booth per language)



Interpreting: classified by time delay

Consecutive interpreting

- in two phases:
 - listening and note-taking
 - speaking
- a few sentences at a time
= 1-3 min
- BUT: expert interpreters
– 5-10 min, up to ½ h



Interpreting: where?

Simultaneous interpreting

- conferences
- congresses
- symposiums
- large-scale meetings
- UN – six official lang's
- EU – 23 languages
- relaying
- bi-active: into L2
- courts
- remote interpreting: phone & video

Consecutive interpreting

- courts
 - negotiations, meetings
 - community interpreting
 - in Finland mostly refugees and immigrants
 - conferences
 - usually 1-2 languages
 - no technical equipment needed
- BUT** time consuming:
+2/3 of the speaker's time

Interpreting: how is it possible?

- excellent knowledge in both languages:
 - automatized search for equivalent words and phrases
- excellent general knowledge in:
 - politics, culture, research etc. of the countries where the languages are spoken
- thorough advance preparation:
 - background knowledge of subject in question
 - terminology and new words and their equivalents in both languages – excellent learning abilities

Interpreting: how is it possible?

Simultaneous:

- attention divided betw. listening AND:
 - reformulation
 - speaking
 - error monitoring
 - eventual error corrections
 - monitoring overall message
- anticipation
 - conference = hypertext

Consecutive:

- analysis of sentence meaning (message)
- compressing
 - chunking
- efficient reformulation
- anticipation:
 - structure in general
 - phrases, speech patterns
 - ends of sentences

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Who is an expert?

Ericsson and Smith, 1991:

- expert performance – consistently superior performance on a specified set of representative tasks for a domain
- intensive dedication = deliberate practice in one domain of expertise 10 yrs at a minimum

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Levels of expertise

Chi, 2003, 22

- Novice – noviisi
- Initiater – aloittelija
 - passed initiation rituals
- Apprentice – oppipoika
- Journeyman – ammattilainen, asiantuntija
- Expert – ekspertti, huippu-, eliitti-
- Master – mestari, opettaja

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Memory tests of consecutive interpreters

Experimental design

Participants:

- consecutive interpreters (13-14)
 - average age 47.5 y
 - experience 16.8 y (7-25 y)
- foreign language teachers (13-15)
 - average age 45.3 y
 - experience 16.2 y (5-32 y)

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Memory tests of consecutive interpreters

Experiment design

Stimuli:

- concrete and abstract Finnish nouns:
 - 5-6 letters, 2-3 syllables
- concrete and abstract passage of prose in Finnish

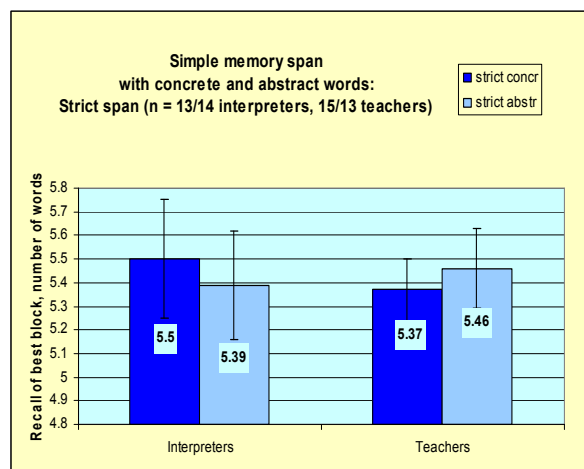
Listening and auditory recall

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Short-term memory span (Unsworth and Engle 2007)

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- words presented in blocks of 3-10 words
- 2 blocks of each length
- **Strict span = simple memory span** = number of words in the largest block correctly recalled



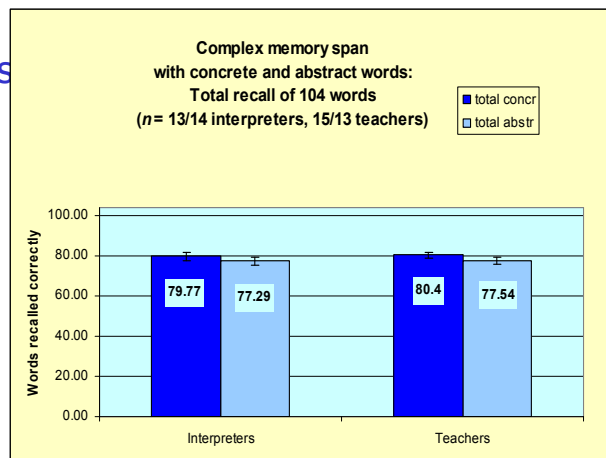
Working memory span (Unsworth and Engle 2007)

- **Complex memory span = Working memory span**
= total number of correctly recalled words (out of 104 words)

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Results: complex span

- **NO** concreteness effect
- **both** groups performed equally well:
 - in simple span
 - in complex span



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Explanations

Why no differences between the groups?

- in span tests (where influence of experience is excluded) usually **no differences** between **experts and novices** (Ericsson & Delaney 1999)

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Explanations

Why **no differences** between the groups?

- complex memory span was **not complex** enough?
 - Christoffels et al. 2006:
 - 3 blocks of each size
 - **Proactive interference (PI)**

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Explanations

Why no differences between the groups?

- both groups were foreign language experts
- compared to other expert groups?
- or to novices??

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Explanations

Why no concreteness effect?

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Concreteness effect

Marschark, Hunt, Einstein (several papers in 1980-1989), concreteness effect **emerges only IF:**

- instructions in favour (imagine, familiarity)
- enough time for imagining: 2-8 s/word
- cued recall (e.g., word pair tests)
- repeated tests of same lists
- **None of these requirements** were present

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Prose recall

Two prose passages:

- **concrete:** short novel by Sinikka Nopola (abstract)
 - 186 words, presented in 10 speech sequences (auditorily)
- **abstract:** short research article by Raimo Raitasalo in Kelan sanomat (website)
 - 197 words, presented in 11 speech sequences (auditorily)

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Prose recall

concreteness at word level

(scale: 0 – abstract; 10 – concrete):

- concrete prose - 6.39 (2.23)
- abstract prose - 4.28 (1.65)
(difference: $p < .001$)

- without note-taking
- oral recall
- recall of message and important details emphasized

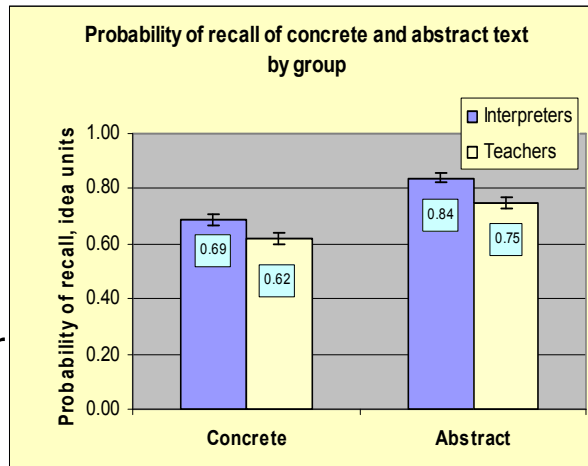
Idea unit – merkityksellinen yksikkö

Mills et al., 1993, 289:

- sentence or part of a sentence
 - that expresses a complete idea
 - contains an actual or implied verb
 - and is usually a phrase-size unit
- in Finnish – clause (lause) or shortened clause (lauseenvastike)

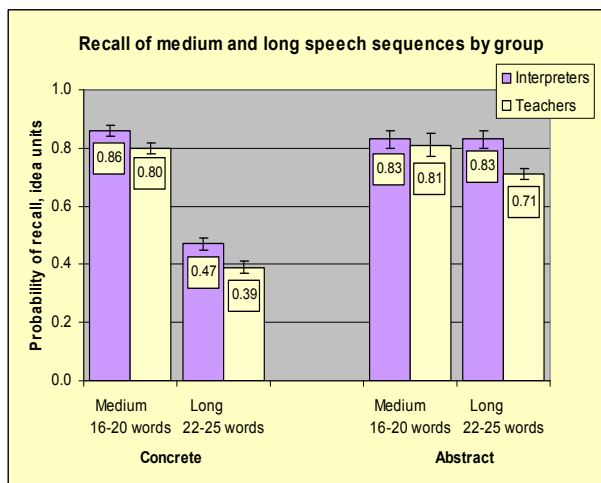
Prose recall

- Abstract prose passage was recalled better than concrete prose
- Interpreters recalled both passages better than teachers:
 - abstr. $p < .001$
 - concr. $p < .05$



Prose recall

- Abstract: long speech sequences (22-25 words) were recalled better than concrete speech sequences
 - $p < .001$



Why recall of concrete prose worse?

- Concrete prose cannot be defined by concreteness at word level
 - concrete passage was literary!
- text – a logical, coherent entity:
 - the title alone would have helped in figuring out the red thread (especially in the concrete passage) but was not given! (Bransford & Johnson 1972 and others)

Why interpreters better (even in recall of concrete prose)?

- Both foreign language groups fluent readers, but interpreters more used to listening?
- Interpreters used to quickly inferring the clue even from tiny hints?



Qualitative analysis

1. **Medium** speech sequences, **concrete** prose:
 - better recall of **tiny details** by **interpreters** :
 - "En keräisi legopaloja talteen..."
 - "Kuka rakentaisi palapelin joskus uudelleen?"
 - **essential** in understanding the **storyline**
 - about half of the interpreters were **court interpreters** used to paying attention to details!

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Qualitative analysis

2. **Long** speech sequences, **abstract** prose:
 - better recall of **leading phrases** of passages by **interpreters**:
 - "Ikääntyvien väliset suhteet muuttuivat..."
 - usually only the example part at the end of the passages was recalled by most of the participants
 - BUT: "recency effect"?

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Memory errors

1. Time definitions:

- ...vakiinnutti asemansa 1970-luvun lopulla:

was recalled as:

- sai alkunsa, tehtiin, lähti käyntiin, aloitettiin, on tehty...
- by 10 teachers vs. 8 interpreters

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Memory errors

2. Causal relations:

- ...masentuneisuuteen liittyvää yksinäisyyttä:

was recalled as:

- yksinäisyyteen liittyvää masentuneisuutta
 - although the whole passage was about lonelines!
 - by 5 teachers vs. 2 interpreters
- or the causal relation was totally missing:
- by 2 teachers vs. 3 interpreters

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accuracy emphasized in
training of interpreters

Synonymous expressions

- Yllättävältä saattaa tuntua se...

was recalled as:

- on/oli se, saattaa olla:
 - by 7 teachers vs. 4 interpreters
- kuulostaa/kuulosti:
 - by 2 teachers vs. 1 interpreter
- exactly the SAME word:
 - by 4 teachers vs. 8 interpreters (>1/2)

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accuracy emphasized in
training of interpreters

Synonymous expressions

- Tämän katsottiin johtuvan...

was recalled as:

- uskottiin, vois liittyä, johtua, ovat:
 - by 5 teachers vs. 4 interpreters
- selitettiin/selitetään:
 - by 1 teacher vs. 1 interpreters
- exactly the SAME word:
 - by 6 teachers vs. 8 interpreters (>1/2)

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accuracy emphasized in training of interpreters

Synonymous expressions

NLP (neuro-linguistic programming) - hypothesis:

- "translating" or interpreting an expression in one representational system to one's own favorite representational system
- e.g. a visual system word "see" into an auditory system word "hear"
- **interpreters NOT so prone** to this phenomenon?

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Expertise in interpreting - summary

Interpreters are better and slightly more accurate than teachers in recall of **essential details**:

- of thread or storyline
- important to the speaker

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Excellence

4 best performers in prose recall were ALL interpreters:

- abstract AND concrete prose
- the **only perfectly correct** recalled long speech sequences (22-25 words) were from interpreters
 - measured in idea units

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Criticism and questions

- relatively **few** participants
 - 13-15 in each group
 - statistically not very persuasive...
- comparison to other expert groups or novices?
- role of attention (master thesis from 2008)?
- role of innateness – temperament?

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Second phase - started

More groups and more participants:

- consecutive interpreters (20)
 - BOTH simultaneous AND consecutive (16)
 - foreign language teachers (22)
 - non-linguistic experts (24)
- mother tongue Finnish (early bilinguals < Finnish learned before 3 to 4 years of age)
 - bachelor-level education or equivalent
 - minimum of 10 years' expertise in professional field

Second phase - started

- Memory tests
 - recall of words (concrete and abstract)
 - prose recall
- Attention test: cocktail-party – dichotic listening
- Temperament inquiry (Cloninger)



Third phase: EEG planned

- Experiment(s) – which?
 - Any ideas?
- New research questions?

▪ also by e-mail, please

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Third phase: EEG planned

- possible research assistants – for bachelor and master thesis
 - contact in 2 years if still interested

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Literature

- Marschark, M., Richman, C., Yuille, J.C., & Hunt R.R. (1987) The role of imagery in memory: on shared and distinctive information, *Psychological review*, 102:1, 28-41.
- Unsworth, N. & Engle, R.W. (2007) The Nature of Individual Differences in Working Memory Capacity: Active Maintenance in Primary Memory and Controlled Search from Secondary Memory, *Psychological Review*, 14:1, 104-132.

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