

The influence of working memory on sentence production

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Sentence production (& correction)

- Immediate
 - Reading TPSF
 - Detection (Diagnosis)
 - Revision
 - Writing new text
- Delayed
 - Reading TPSF
 - Detection (Diagnosis)
 - Writing new text
 - Revision

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Text produced so far studies

Studies already conducted:

	TPSF 1	TPSF 2	TPSF 3	Included eyetracking	
	TPSF 1	TPSF 2	TPSF 3	TPSF 4	TPSF 5
Auditory priming	yes	partly	yes	yes	partly
Complexity	causal & temporal	3 contextwords	1 versus 3 contextwords	1 versus 3 contextwords	2 contextwords
Error type	4	2	2	2	2
Completion strategy	Yes free	Yes correct error first	Yes correct error first	Yes free	Yes free
Production	No	No	No	No	Yes

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Results of previous studies

In sentence completion, writers

- look at the error before starting to write in 80% of the cases.
- prefer to complete a sentence first
- take longer to correct large errors than small errors

Writers may deal with writing tasks in a flexible manner, when sufficient WM resources are available (Quinlan et al, 2009)
... more complex writing problems might alter the dynamics of composing (Van Waes et al, 2009)

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Focus of the study

- Aim
What is the function of the textual task environment on the organisation and process of writing?
- Focus on relation between working memory span and sentence completion strategies.

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Design

- Tasks: sentence completion (TPSF)
- Context: 2 context words
- TPSF: Correct versus incorrect
 - Correct (n=8)
 - Lexical errors (n=8)
 - Typing errors (n=8)

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Procedure

- Memory span tests
 - Forward digit span
 - Reading span
 - Backward digit span
- Typing test
- Reading test
- Reading-writing tasks
 - Sentence completion: correct sentences
 - **Sentence completion: correct and incorrect sentences**
 - Sentence production

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Procedure | reading-writing task¹

- 2 context words are displayed for two seconds

drugs, find

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Procedure | reading-writing task²

- The first part of the clause is read-aloud twice



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Procedure | reading-writing task³

- First part of clause appears on the screen (correct, incorrect)

The man was arrested after crossing over from Mexico because

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* **assisted/arrasted**

Example of task

- Delayed error correction: 'The man was arrasted...'
- Immediate error correction: 'Her aunt libes in ...'



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Data collection

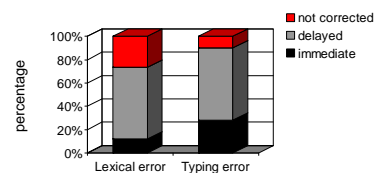
- Eye tracking (Eyelink II)
- Experiment builder (experimental flow)
- EyeWrite (data gathering and analyses)
- Inputlog 4.0 (post hoc analyses)

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Moment of revision

- 25% of the errors are corrected immediately, 75% are delayed

Percentage of lexical errors and typing errors corrected immediately, delayed or not

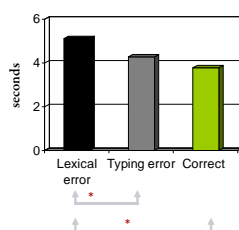


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Process time | prewriting

- The prewriting time differs per error type ($p < .001$)

Prewriting time per error type in seconds

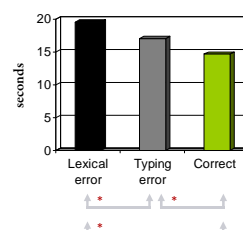


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Process time | production

- The production time differs per error type ($p = .001$)

Production time per error type in seconds



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STM & Working memory

- Simple span = STM
Writers with low simple span tend to complete sentence first.
- Complex span = STM + processing capacity
Processing capacity = ability to suppress = tendency to correct immediately.

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STM & Working memory

	EST	SE	Sign.
Constant	-.096	1.094	
% forward span	-.116	.039	*
% backward span	.075	.025	*
% reading span	.043	.023	*

→ Simple span ~ STM

→ Complex span ~ processing capacity

- The effect of low forward span is a tendency to delay
- The effect of low complex span is a tendency to correct errors immediately

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Quality | content-meaning

- Reading span X_1 → delayed error correction X_2 → quality Y
 - $X_1 \rightarrow X_2$: lower reading span, higher chance to correct errors immediate
 - $X_2 \rightarrow Y$: immediate error correction, higher chance incorrect meaning
 - $X_1 \rightarrow Y$: lower reading span, higher chance incorrect meaning
- Conclusion: writers with a low span who correct errors first, produce less meaningful sentences

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Sentence production in detail

- drugs-were-found-in-his-possession.[UP3][RIGHT5][DEL] 616 e
- [UP][LEFT4][DEL][RIGHT][DOWN][RIGHT3]- 2240 large-and-[DEL13]

Detailed

- d{192}n{112}w{192}g{384}-[256]w{120}e{81}r{175}e{96}-[384]{105}o{87}w{216}n{112}d{105}-[135]h{112}n{129}-[135]h{145}i{160}s{87}-[224]o{193}o{327}s{144}s{176}e{200}s{128}s{64}i{88}o{104}n{248},[584][UP][201][UP][216][UP][223][RIGHT][192][RIGHT][168][RIGHT][192][RIGHT][240][RIGHT][681][DEL][616]e
- [UP][319][LEFT][185][LEFT][167][LEFT][201][LEFT][608][DEL][384]v{432}[RIGHT][256][DOWN][279][RIGHT][185][RIGHT][208][RIGHT][1008]-[1232]{344}a{224}r{319}g{256}e{505}-[152]a{152}n{144}d{168}-[768][DEL][530][DEL][32][DEL][62][DEL][31][DEL][31][DEL][31][DEL][31][DEL][205][DEL][192][DEL][200][DEL][1192][DEL]





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Conclusion

- Writers prefer to complete a sentence first
- Writers with a low memory span correct errors significantly more immediate
- The content of the sentence is of less quality if the error is corrected before the sentence is completed

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More information

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These data have been gathered by Mariëlle Leijten at Staffordshire University - Leverhulme fellowship 2008

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