

# THE ROLE OF SENTENCE COMPREHENSION DURING TREATMENT OF AGRAMMATIC SENTENCE PRODUCTION

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## INTRODUCTION

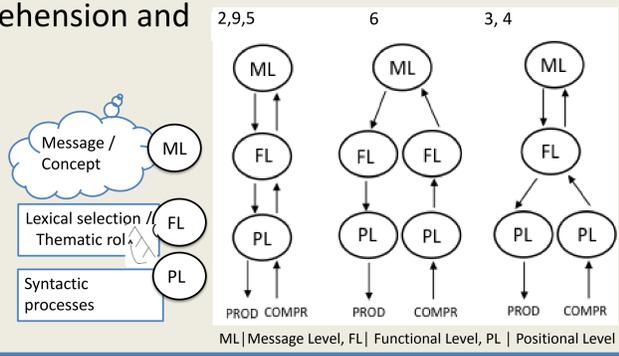
**Evidence based outcomes**<sup>1</sup>  
 | For 26 individuals with aphasia (IWA)  
 | With deficits in production & comprehension  
 | After sentence production treatment

**Uni-modal generalisation**  
 - To same (but untrained) sentence structure:  
 13/26 IWA ✓ 10/26 IWA ✗ 3/26 IWA ?  
 - To other sentence structure:  
 12/26 IWA ✓ 9/26 IWA ✗ 5/26 IWA ?

**Cross-modal generalisation**  
 - To comprehension:  
 22/26 IWA ✗ 4/26 IWA ?

## WHY SEARCH FOR GENERALISATION ?

| Achieve best possible outcome of treatment  
 | Detect functional relationship among cognitive processes underlying sentence comprehension and production<sup>11</sup>



Uni - modal ?  
 Modality - specific ?

## TREATMENT: MULTIPLE CASES

| 7 IWA (Agrammatism)<sup>15</sup>  
 | Production treatment, TUF<sup>16, 14</sup>  
 | non-canonical sentences

**Part 1 | uni-modal trained->untrained**  
 Stadie et al., 2008  
 Schröder et al. 2009

**Part 2 | cross-modal trained->untrained**  
 Schröder et al. 2014

BMBF-Projekt: 01GA01001

## PARTICIPANTS | MATERIAL | PROCEDURE

gender / age	profession	etiology	post-onset	1st treatment phase	# of sessions
JR f / 32	florist	L CVA	5	ORC	7
UW m / 65	architect	L CVA	3	ORC	12
WE m / 64	caretaker	L CVA	8	ORC	12
JK m / 51	IT specialist	R CVA	10	ORC	12
RK m / 67	electrician	L CVA	15	WhoQ	5
MP f / 57	psychologist	L CVA	12	WhoQ	8
AF f / 33	stonemason	trauma	8	WhoQ	12

Broca<sup>7</sup> | Ø Age: 53 yrs (33-67) | Ø Post-onset: 9 yrs (3-15) | Multiple case series | Phase III, efficacy study<sup>12</sup>

**BASELINE | ASSESSMENT**

Sentence Elicitation n=80  
 Sentence Picture Matching n=80

WhoQ ORC  
 SRC WhoQ

each 20 trained, 20 control  
 each 20 control

ABACA design | stable baseline | 2 unrelated control tasks

**TREATMENT**

Sentence production (ORC)  
 Treatment of underlying forms (TUF)

**1. SVO-Sentence: Verb / Thematic Roles**  
 What is the action? [VERB]  
 Who is the doer? [AGENT] Who is the recipient? [PATIENT]

**2. Derivation of ORC: Movement Operation**  
 I SEE THE FATHER WHO THE SON IS KISSING THE FATHER  
 Cycle 1: Therapist  
 Cycle 2: Patient

max. 12 sessions | 2x week à 45 min | cut-off 90% in 2 consecutive sessions | SVO SubjectVerbObject

## QUESTIONS | RESULTS

### 1 Does Treatment of Sentence Production Lead to Unimodal and Crossmodal Generalisation Effects ?

	Unimodal Training & Generalisation Effect		Crossmodal Generalisation Effect		Unimodal Training & Generalisation Effect		Crossmodal Generalisation Effect	
	Production		Comprehension		Production		Comprehension	
	pre	post	pre	post	pre	post	pre	post
JR	2 (.05)	36* (.90)	11 (.55)	16 (.80)	28 (.70)	---	19 (.95)	---
UW	0 (.00)	33* (.83)	12 (.60)	8 (.40)	0 (.00)	34 (.85)	10 (.95)	---
WE	0 (.00)	14* (.35)	1 (.05)	3 (.15)	0 (.00)	23* (.58)	11 (.55)	15 (.75)
JK	1 (.03)	11* (.28)	11 (.55)	9 (.45)	19 (.45)	28* (.70)	16 (.80)	15 (.75)
AF	0 (.00)	33* (.83)	6 (.30)	11 (.55)	6 (.15)	31* (.78)	7 (.35)	8 (.40)
RK	2 (.05)	12* (.30)	4 (.20)	9 (.45)	10 (.25)	29* (.73)	17 (.85)	12 (.60)
MP	0 (.00)	32* (.80)	11 (.55)	16 (.80)	0 (.00)	30* (.75)	12 (.60)	13 (.65)

Correct responses: absolute and proportions \* p>.05, McNemar

### 2 Does Retained Sentence Comprehension Induce Generalisation within Production ?

	Production				WhoQ
	Trained ORC		Untrained whoQ		
	pre	post	pre	post	
JR	2 (.05)	36* (.90)	28 (.70)	37* (.93)	19 (.95) N
UW	0 (.00)	33* (.83)	0 (.00)	14* (.35)	19 (.95) N
WE	0 (.00)	14* (.35)	0 (.00)	0 (.00)	11 (.55)
JK	1 (.03)	11* (.28)	16 (.40)	19 (.45)	16 (.80)

Correct responses: absolute and proportions \* p>.05, McNemar<sup>2</sup>

## SUMMARY

- ✓ All IWA show significant training + generalisation effects within the treated modality and sentence structure (i.e. in production)
- ✗ No IWA shows significant generalisation effects across modality (i.e. to comprehension) in other words: they can produce the sentences which they do not understand!
- ✓ Good comprehension performance prior to production treatment seems to enhance generalisation effects to untrained sentence structures within the trained modality

## GENERALISATION INFORMS

**Lack of cross-modal generalisation**  
 | More evidence: n=2 IWA<sup>8</sup>, n=3 IWA<sup>10</sup>  
 | Modality specific processes: Production < comprehension  
 | **But:** no double dissociation! Comprehension < production

**Functional relationship**  
 | Uni-directional interaction, supporting role of sentence comprehension for production<sup>5,10</sup>

**Treatment of sentence comprehension**  
 | Sentence comprehension deficits cannot be remediated by treating sentence production

**Treatment of sentence production**  
 | Investigate comprehension performance  
 | Treat comprehension before or in combination with production e.g. starting each session with sentence picture matching<sup>17</sup>; embedding production into discourse<sup>10</sup>

**THEORY**  
 | 14

**CLINICAL DECISION**

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