

## INTRODUCTION

A multitude of studies have investigated the processing and production of morphologically complex German verb forms (e.g. Seidenberger & Gonnermann, 2000; Smolka, Zwitserlood & Rösler, 2007; Clahsen, 1999; Marslen-Wilson et al. 1994).

However, previous studies have mostly focused on fixed, invariable forms. Loan verbs and non-V2 verbs vary in participle forms and therefore represent an opportunity to study loan verb integration and variability.

### Participle forms of German multimorphemic verbs: The position of *ge*

Ge-position	Infinitive	Past participle	Morphological verb class
Initial <i>ge</i> -	<i>brand- mark -en</i> N - V -INFL	<i>ge- brand -mark -t</i> <i>ge- N -V -INFL</i>	Prefix verb (inseparable)
	<i>fire - mark -INF</i>	<i>ge- fire -mark -PTCP</i>	
	'to brand/stigmatise'	'branded/stigmatised'	
Internal <i>ge</i> -	<i>an - merk -en</i> PREP- V -INFL	<i>an - ge -merk -t</i> PREP- <i>ge</i> -V -INFL	Particle verb (separable)
	<i>on - notice -INF</i>	<i>on - ge -notice -PTCP</i>	
	'to remark'	'remarked'	
No <i>ge</i> -	<i>be - schlag -en</i> PFX- V -INFL	<i>be - schlag -en</i> PFX- V -INFL	Prefix verb (inseparable)
	<i>be - hit -INF</i>	<i>be-hit-PTCP</i>	
	'to shoe'	'shoed'	

There are also verbs which are 'undecided' with regard to which morphological verb class they belong to - this affects two special types of verbs:

(i) loan verbs from English (e.g. *downloaden* 'to download')

(ii) so-called non-V2 verbs (also: immobile verbs, Fortmann, 2015) (e.g. *bauchlanden* 'to belly-land')

Non-V2 verbs stem from a wide variety of German derivational processes, their unifying features are a syntactic constraint (can't move to V2) and their variable participle forms.

Initial or Internal <i>ge</i> -	<i>down- load -en</i> P - V -INFL	<i>ge- down -load -et</i> or <i>down- ge -load -et</i> <i>ge- P - V -INFL</i> <i>P - ge -load -INFL</i>	'Undecided'/not fixed
	<i>down- load -INF</i>	<i>ge-down-load-PTCP</i> <i>down- ge -load -PTCP</i>	'downloaded'
	<i>bauch- land -en</i> N - V -INFL	<i>ge- bauch- land -et</i> or <i>bauch- ge -land -et</i> <i>ge- N - V -INFL</i> <i>N - ge - V -INFL</i>	'downloaded'
	<i>belly - land -INF</i>	<i>ge-belly-land-PTCP</i> <i>belly - ge -land -PTCP</i>	'downloaded'
	'to belly-land'	'belly-landed'	'belly-landed'

### Research questions

- How does the formulator decide where to put the *ge*?
- Is participle formation in German multimorphemic verbs based on the application of a rule or on retrieval of a stored full form from the mental lexicon?

## METHOD

### Participants

21 monolingual native speakers of German (mean age 26.43, 11 male, not dyslexic or hearing-impaired).

### Materials

24 prime-target pairs of verbs embedded in Standard German sentences distributed evenly across 3 lists. 48 filler items with regular and irregular verbs in different tenses and verb positions.

Primes and targets were matched for length and frequency and had at least one occurrence of each *ge*-position participle form in the DWDS and COSMAS II corpora.

### Primes

- *ge*-initial participle (e.g. *gebrandmarkt* 'branded')

(1) Der Schmied hat im Zirkus das Zebra gebrandmarkt.

the smith has at the circus the zebra branded

'The smith branded the zebra at the circus.'

- *ge*-internal participle (e.g. *gebrandmarkt* 'branded')

(2) Der Schmied hat im Zirkus das Zebra brandgemarkt.

the smith has at the circus the zebra branded

'The smith branded the zebra at the circus.'

- Unrelated condition, no *ge*- in participle (e.g. *beschlagen* 'shoed')

(3) Der Schmied hat im Zirkus das Zebra beschlagen.

the smith has at the circus the zebra shoed

'The smith shoed the zebra at the circus.'

### Targets

English multimorphemic loan verbs (e.g. *downloaden* 'to download') were given in brackets at the end of a short German sentence.

(4) Der Techniker hat das Virenprogramm \_\_\_\_\_ (downloaden).

the technician has the virus program to download

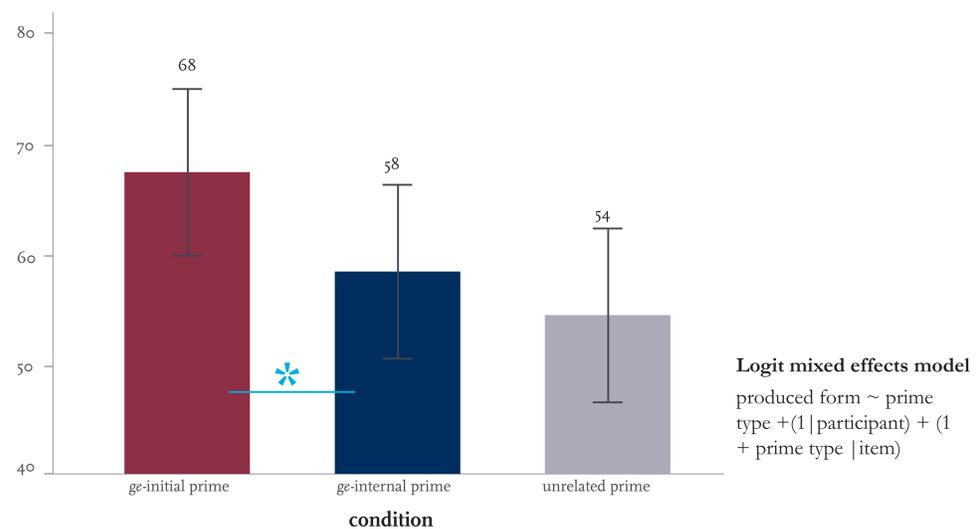
'The technician downloaded the antiviral program.'

### Procedure

Oral cloze task presented on a Monitor using DMDX. Participants were instructed to read the sentences aloud and to add a verb form promptly and naturally when required.

## RESULTS AND DISCUSSION

### Percentage of produced *ge*-initial forms after prime by condition (excluding "other" completions)



- Significantly more *ge*-initial forms following *ge*-initial primes than following *ge*-internal primes.

⇒ The position of the *ge* can be primed.

- The significant priming effect suggests that participle formation is based on a rule.
- Rules specifying *ge*-position are activated during processing of the prime and are still active during production of the target.

### Results by loan verb

BABYSITTEN  
DOWNLOADEN  
AIRBRUSHEN  
BUNGEEJUMPEN  
INLINESKATEN  
UPDATEN

Target type	Produced form			
	overall	after <i>ge</i> -initial prime	after <i>ge</i> -internal prime	after unrelated prime
updaten	78%	86%	71%	79%
airbrushen	77%	78%	78%	76%
downloaden	67%	77%	57%	67%
bungeejumpen	51%	64%	51%	38%
babysitten	48%	46%	58%	41%
inlineskaten	40%	52%	39%	29%

- Participles of multimorphemic English loan verbs behave like **non-V2 verbs** in production and produce both *ge*-initial and *ge*-internal participles.
- Priming effects vary considerably between different verbs.
- In contrast to off-line studies such as Hausmann (2006), no loan verb showed an inability to produce either participle form.
- Monosyllabic morphemes (*up*, *air*, and *down*) show over 67% preference for *ge*-initial completions, while those with at least two syllables (*bungee*, *baby*, and *inline*) prefer *ge*-internal participles.

## CONCLUSIONS

⇒ Data suggest that the participle forms of these specific English loan verbs are not stored as separate entries in the mental lexicon. Instead, the fact that *ge*-position can be primed suggests that participle formation is rule-based.

⇒ Multimorphemic loan verbs are similar to non-V2 verbs in that they allow both *ge*-positions.

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