Processing complexity of English comparative variants – Experimental results

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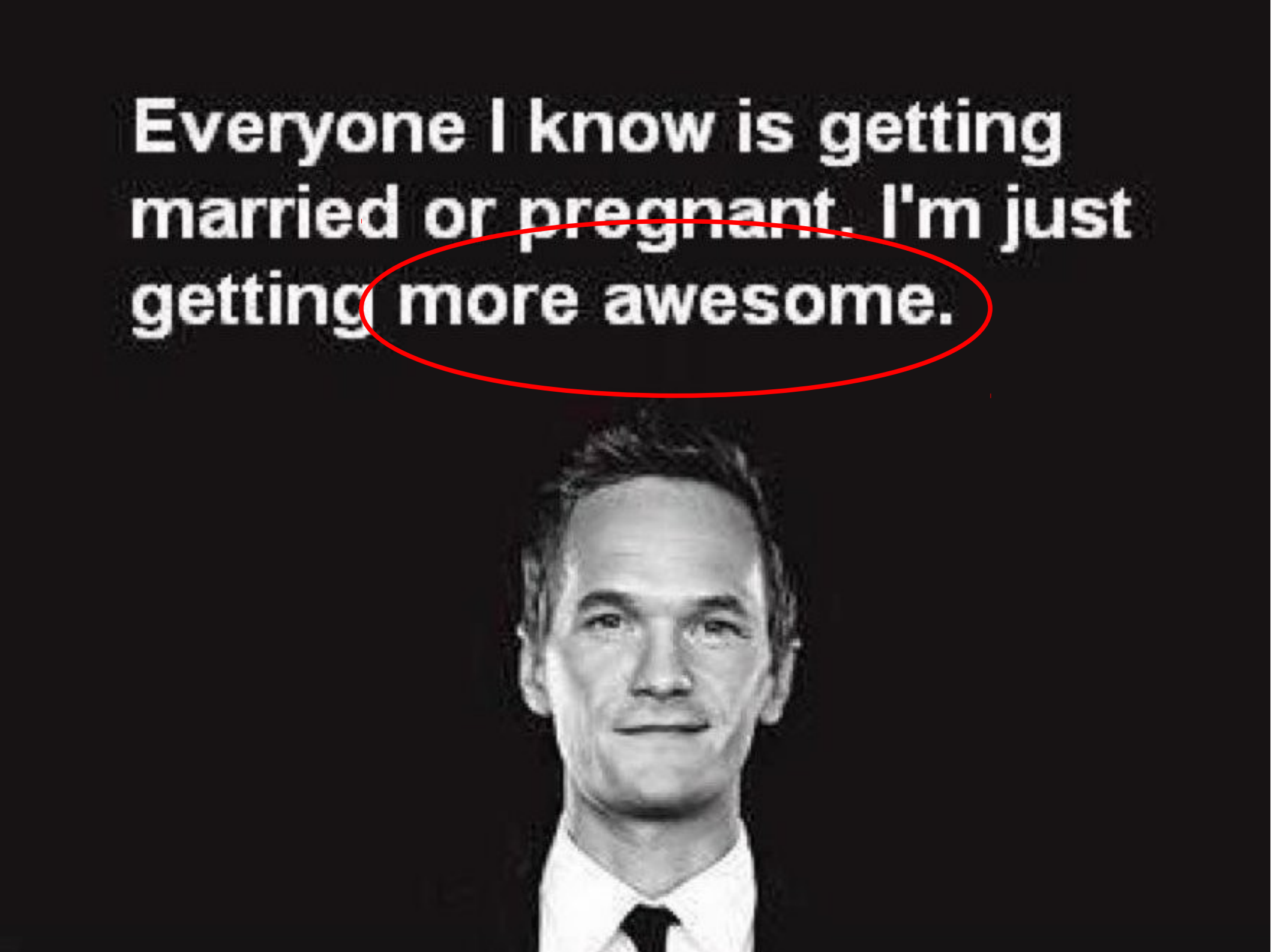
EXPANSION2012
EDMONTON INTERNATIONAL AIRPORT
FACT: When this next phase of Expansion 2012 opens, your airport will be 50% bigger and awesom-er.

Everyone I know is getting married or pregnant. I'm just getting more awesome.

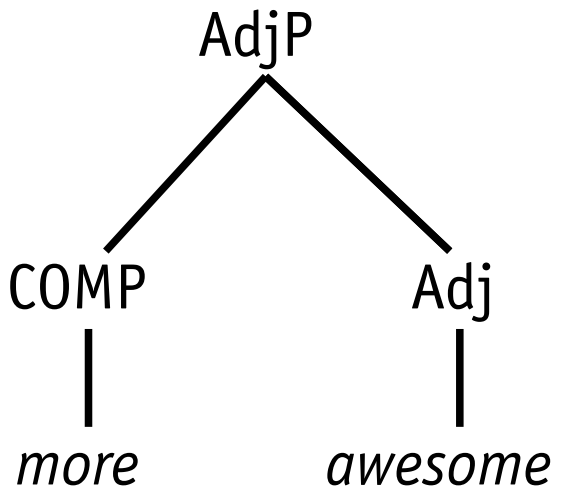


English comparative variants

Synthetic
(word)

{awesome} +	{er} →	*awesomer*
[Adj]	[COMP]	[Adj, Comp]

Analytic
(phrase)



Complexity Principle (Rohdenburg 1996)

In the case of more or less explicit grammatical options the more explicit one(s) will tend to be favoured in cognitively more complex environments.

→ Trade-off relation between grammatical explicitness and processing complexity

More-support (Mondorf 2009)

More support for more *support* (p. 6):

in cognitively more demanding environments which require an increased processing load, language users [...] *tend to compensate for the additional effort by resorting to the analytic form*

→ Analytic forms compensate for increased processing loads

What affects processing effort of synthetic comparatives?

Processing effort of synthetic comparatives

If **frequency of base adjective** is high...

... easier to process than synthetic comparatives with very infrequent bases

If **frequency of synthetic comparative form** is high...

... easier to process than adjectives with very infrequent synthetic comparatives

Strong prediction of *more* support

Analytic comparatives **always** have processing advantages over synthetic comparatives

... especially if synthetic comparative is difficult to process

... even if synthetic comparative is relatively easy to process

Weak prediction of *more* support

Analytic comparatives **sometimes** have processing advantages over synthetic comparatives:

- … if synthetic frequency is low
- … if base frequency is low

Processing efforts **may become similar:**

- … with increasing synthetic frequency
- … with increasing base frequency

Method

Auditory lexical decision task

Dependent variable	Reaction time (interval between start of playback and key press), power-transformed from milliseconds
Stimuli	60 adjectives with both comparative forms attested in COCA Produced by native speaker
Participants	36 female, 4 male undergraduates from University of Alberta, Edmonton
Analysis	Multivariate mixed-effects regression of reaction time for correct responses

Stimulus classes

Synthetic (word)	*colder*
Analytic (phrase)	*more cold*
Control	**coldic*

→ 60 adjectives, 3 classes = 180 experimental stimuli

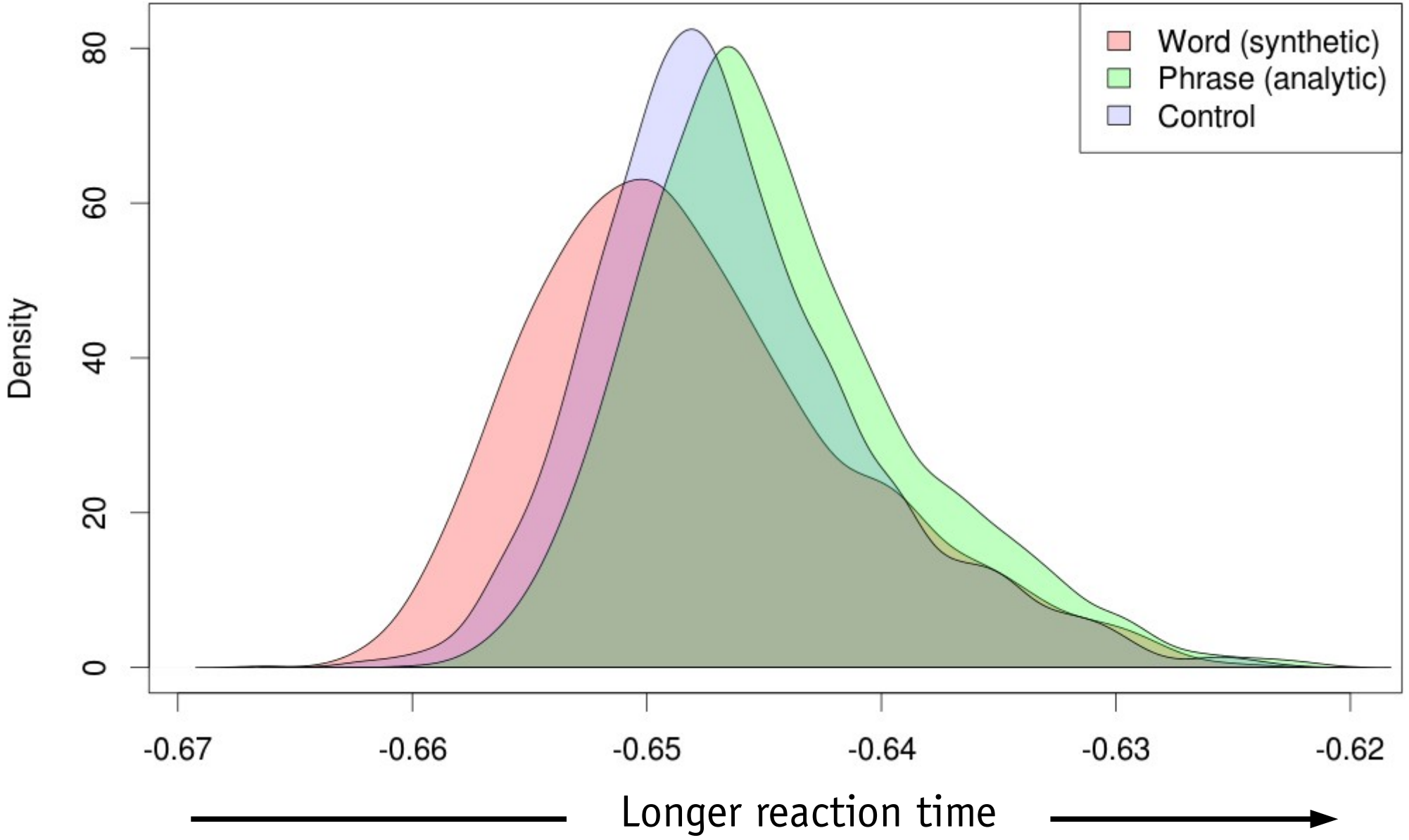
Distractors

Non-existing phrases	*more gorsty*
Existing phrases	*on wire*
Non-existing words with *-er*	*rilker*
Existing complex words	*chasting*

→ 320 distractors

Analysis and results

Overall distribution of reaction times



Variables relevant for hypothesis

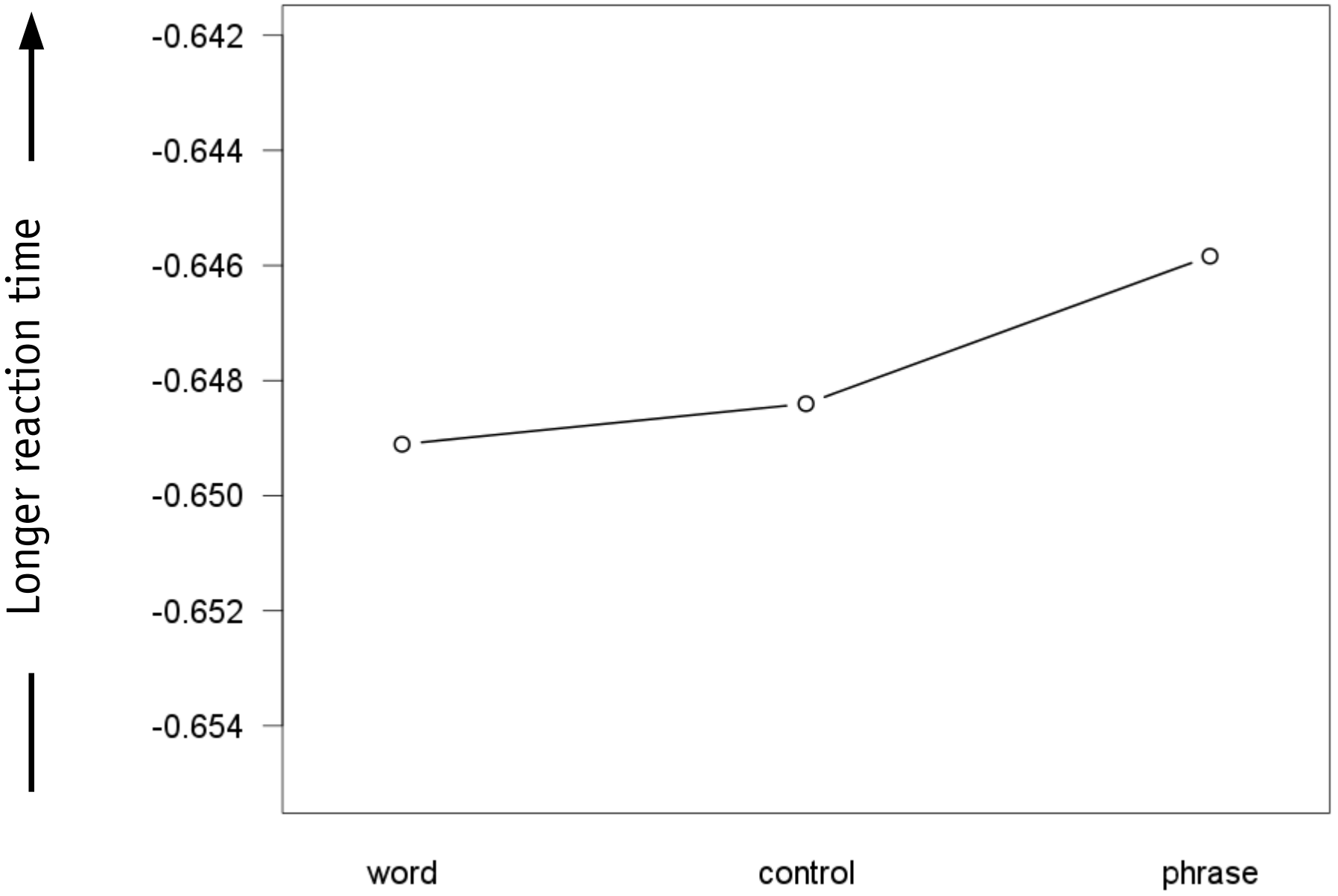
Base frequency by Class
Synthetic frequency by Class
Analytic frequency by Class

(all from COCA)

Control variables

Experimental	Experimental booth, Trial by Class, Trial by Prepause, Previous RT by Class
Subject	Handedness, Sex, Age
Phonological	Number of phonemes, Number of syllables, Coda type (none, C, CC)
Lexical	Number of phonological neighbours, Mean RT both by Class (from English Lexicon Project, Balota et al. 2007), Age of Acquisition by Class (from Kuperman et al. 2012), Inflectional Entropy by Class (Moscoso del Prado Martín et al. 2004)
Random intercepts	Participant, Base adjective

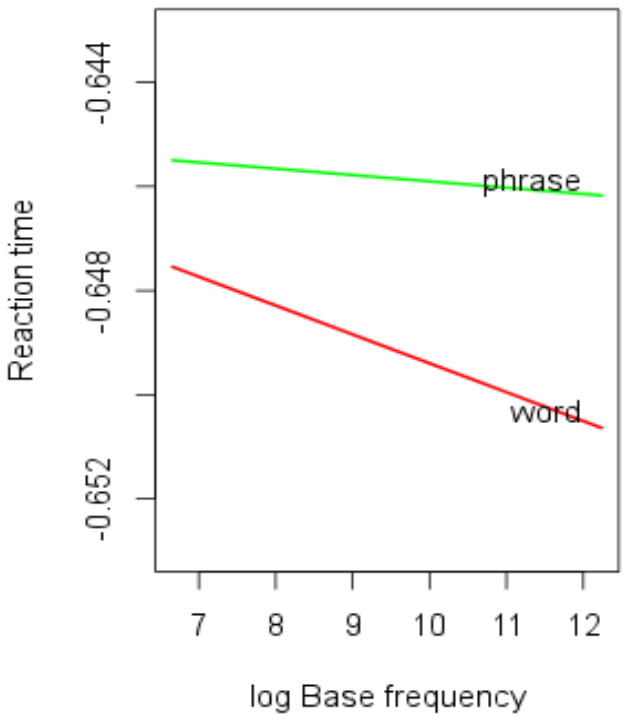
Main effect of Stimulus class

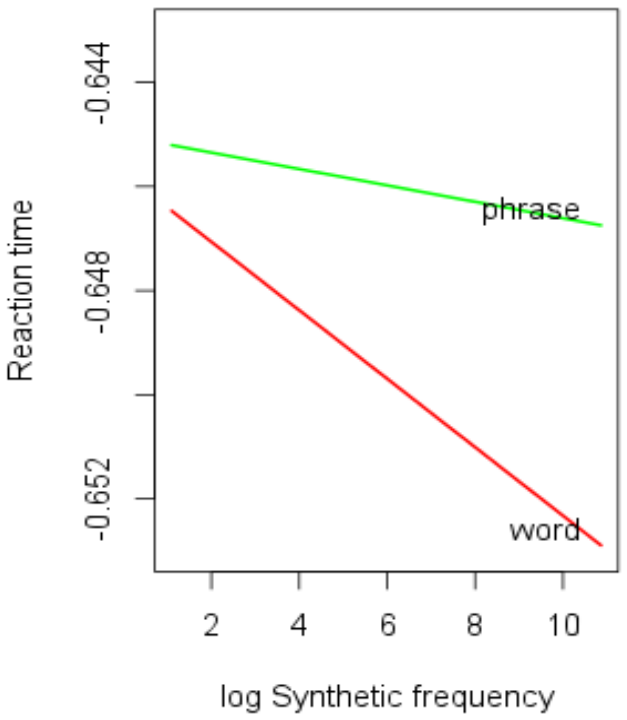


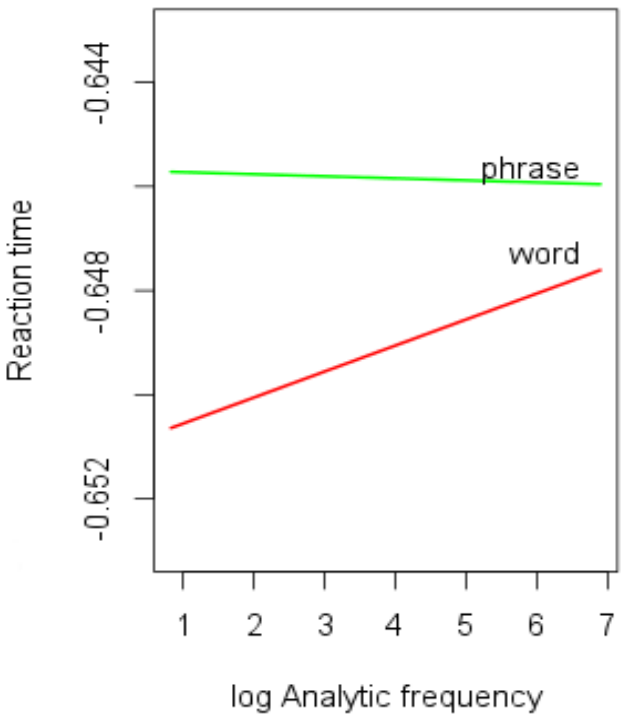
Frequency effects

Frequency effects of synthetic comparatives as expected

Reaction time of synthetic comparatives always shorter – analytic comparatives never have a processing advantage!







Discussion

Processing effort of comparative variants

- Reaction times for analytic comparatives are consistently longer than for synthetic comparatives
- Even non-existing control items have shorter RTs

→ Morphologically complex constructions have a processing advantage over corresponding phrasal constructions

No support for *more* support!

Other types of processing benefits?

Lexical decision task: focus on form – perhaps analytic comparatives facilitate **semantic processing**?

(But: semantic factors **are** involved in lexical decision, cf. Dilkina et al. 2010, Yap et al. 2011, Evans et al. 2012)

Speakers attempt to balance informational load within sentences (cf. Jaeger & Tily 2011) – perhaps analytic comparatives facilitate **information processing**?

Complex for listeners – or for speakers?

- Complexity Principle: unclear which type of complexity
- *More* support: listener-oriented (cf. Mondorf 2009: 7)

Next step: production experiment

Can processing complexity predict which form is used by speakers?

Conclusion

Mondorf (2009: 6)

in cognitively more demanding environments which require an increased processing load, language users [...] *tend to compensate for the additional effort by resorting to the analytic form*

BUT:

- No processing advantage of analytic forms
- Analytic comparatives are cognitively more complex
- Compensation for higher processing effort rather unlikely

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