

EXTRA-LINGUISTIC INFORMATION IN  
LANGUAGE PROCESSING  
-  
THE INFLUENCE OF LISTENER PERSONALITY ON  
SENTENCE COMPREHENSION  
*[WORK IN PROGRESS]*

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ACOL 2016 @ University of Calgary

## PRIOR LITERATURE - PERSONALITY

- Personality influences language *use* see Park et al. 2015
- Effects of personality on comprehension:
  - found in off-line tasks Boland & Queen 2016
  - “Valuation might be an integral part of early language interpretation” Van Berkum et al. 2009, p. 1098

## PRIOR LITERATURE - SPEAKER/LISTENER IDENTITY

N400 components found in response to:

- statements colliding with a speaker's perceived identity Van Berkum et al. 2008
- statements colliding with a listener's political value system Van Berkum et al. 2009
- high empathizers showed larger effects in response to socially contradictory information Van den Brink 2012
- ~you engage in prediction, and these predictions are violated
  - high empathizers engage in **more prediction**

## PRIOR LITERATURE - SPEAKER/LISTENER IDENTITY

Suggests:

- speaker & listener identity seem to factor early in meaning-making
- engaging in stereotype-based prediction vs. relying more on bottom-up information might be determined by personality traits
  - *individual differences in personality matter?*
- cf. the classic two-step model of language interpretation...? e.g. Chomsky 1957, Van Berkum et al. 2008

Van Berkum et al. 2008, Van Berkum et al. 2009, Van den Brink 2012

# PARTICIPANTS

	male	female	transmale
NS	4	21	1
NNS	3	13	0

- 42 total
- age range: 17 to 38yrs (mean 19.8, median 19)

## METHOD

Self-paced *listening* – to capture possible accent dimension

- similar to self-paced reading Marinis 2003, Roberts 2012
  - well-suited to investigate even fine-grained comprehension processes De Vincenzi et al. 2003, Roberts 2012, Tokowicz and Warren 2010
- detects same effects as ERP, just a little later Van Berkum et al. 2005
  - cheaper & quicker
  - see if SPL is suited for this kind of research
  - if yes, this might engage more labs (e.g. those that have no access to EEG equipment)

## METHOD

- Self-paced listening can capture:
  - immediate effects at critical words
  - spillover effects
  - sentence wrap-up effects

De Vincenzi et al. 2003, Jegerski & VanPatten 2013, Just & Carpenter 1980,  
Tokowicz & Warren 2010

- E-Prime, headphones, keyboard/mouse

# MATERIALS

- Error types:
  - MO – morphological: “We never cooks dinner at home on Fridays.”
  - SE – semantic “People often read heads for pleasure at night.”
  - ID – identity clashing “I often visit strip clubs when I feel lonely.” (f)
  - UF – unrelated fillers “Goslings generally follow their mother.”

De Vincenzi et al. 2003, Ditman et al. 2007, Van Berkum et al. 2008, Van den Brink et al. 2012



# MATERIALS

Controlled for:

- syntactic patterning Jegerski 2013
- critical phrase frequency De Vincenzi et al. 2003, Ni et al. 1998
  - via COCA Davies 2008
- syllable count per segment
- speech rate & segment duration

# MATERIALS

- 360 sentences, split into five regions

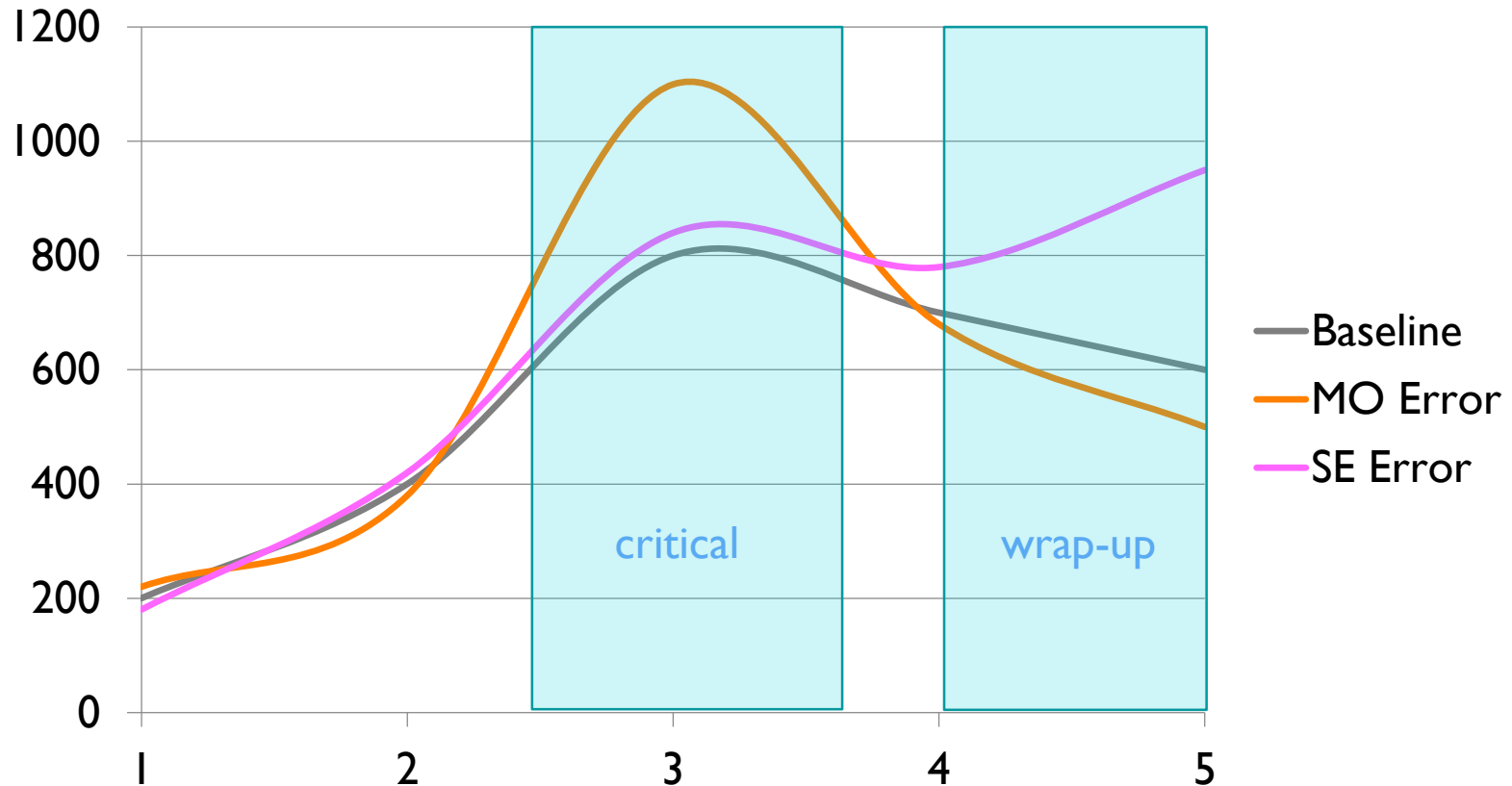
Template						
syllables	1-2	2-3	1-2	2-3	2-3	1-3
function	subject	time adverbial	verb	object	post-critical	wrap-up
region	I	II	III (critical)		IV (c+)	V
subregion			IIIa	IIIa		
example	I	sometimes	wash	the car	with a sponge	at night.

- Condition & speaker counter-balanced across four lists
  - ~30% of items followed by simple comprehension question

# PERSONALITY ASSESSMENT

- *Interpersonal Reactivity Index (IRI)* Davis 1980
  - *Empathic Concern, Fantasy, Personal Distress, Perspective-Taking*
- *Big Five* see Costa & McCrae 1985, John & Srivastava 1999
  - *Agreeableness, Conscientiousness, Extraversion, Neuroticism, Openness*
- *Empathy Questionnaire* Baron-Cohen & Wheelwright 2004
- *Political questionnaire* Grenier, School of Social Work, Louisiana State
- *Language background questionnaire*

## RESULTS REPORTED IN LITERATURE



De Vincenzi et al. 2003, Ditman et al. 2007, Just & Carpenter 1980, Tokowicz & Warren 2010

## INITIAL RESULTS – MO CONDITION, CRUCIAL SEGMENT

Crucial segment, MO condition (linear modelling, all P's):

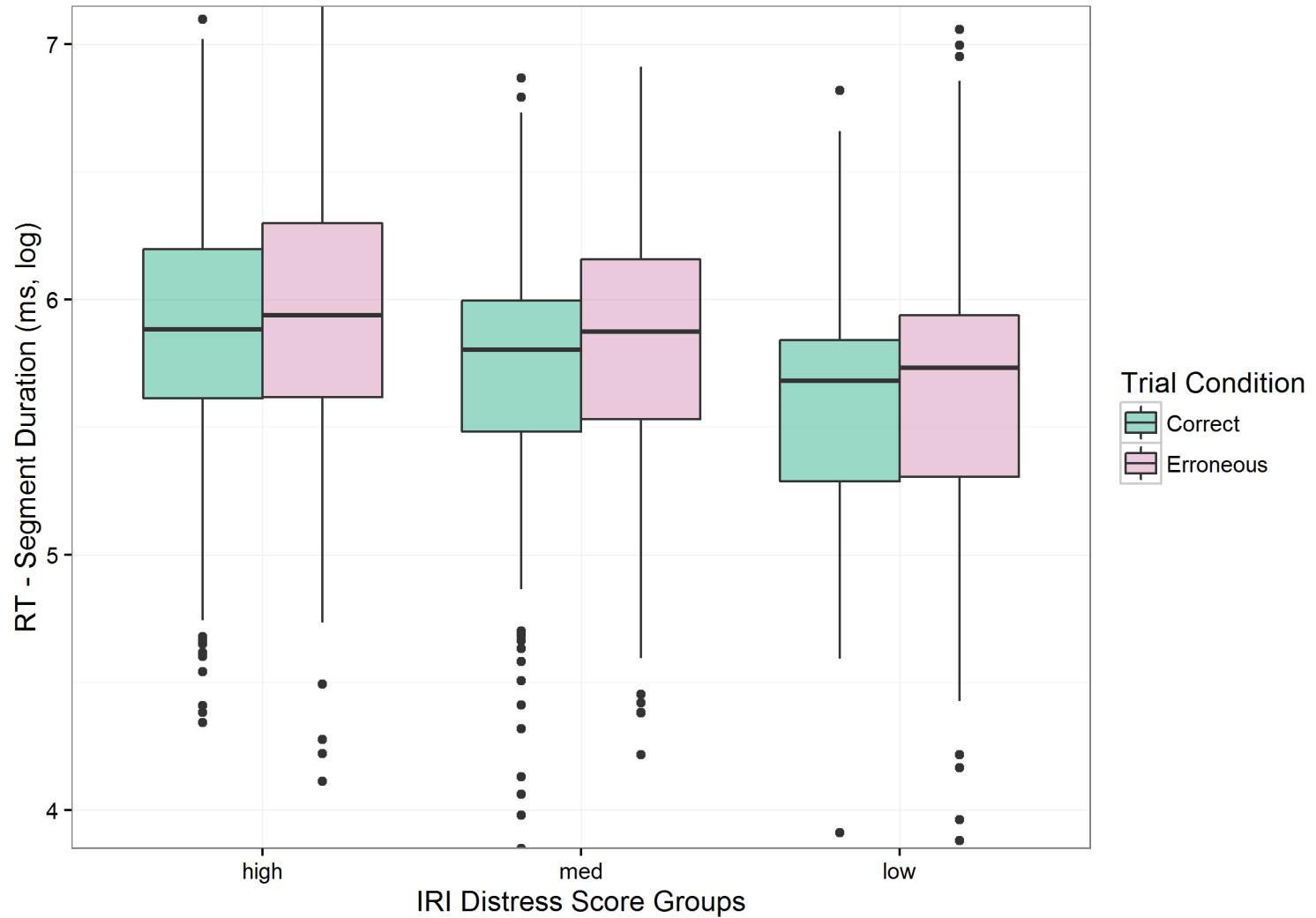
- differential RT's (log)  $\sim$  condition + segment duration + RT to previous segment + **personality measure**
- condition (correct/erroneous) **significant ( $p = 0.04$ )**
- other predictors also **significant ( $p < 0.001$ )**
  - including various **personality measures**

## INITIAL RESULTS – MO CONDITION, CRUCIAL SEGMENT

Test	Measure	<i>p</i>	<i>R</i> <sup>2</sup>
IRI	Distress	***	7.55%
B5	Neuroticism	**	6.95%
B5	Openness	*	6.68%
IRI	Fantasy	*	6.59%
B5	Conscientiousness	*	6.57%
IRI	Empathic Concern	*	6.47%
Pol	Agree/Disagree	*	6.44%

- low *R*<sup>2</sup>: try mixed modelling as P's & items might be responsible for a lot of the variation

### RT's to Crucial Segment in MO Condition by IRI Distress Score Groups (All P's)



## INITIAL RESULTS – SE CONDITION, WRAP-UP

Wrap-up segment, SE condition (linear modelling, NS):

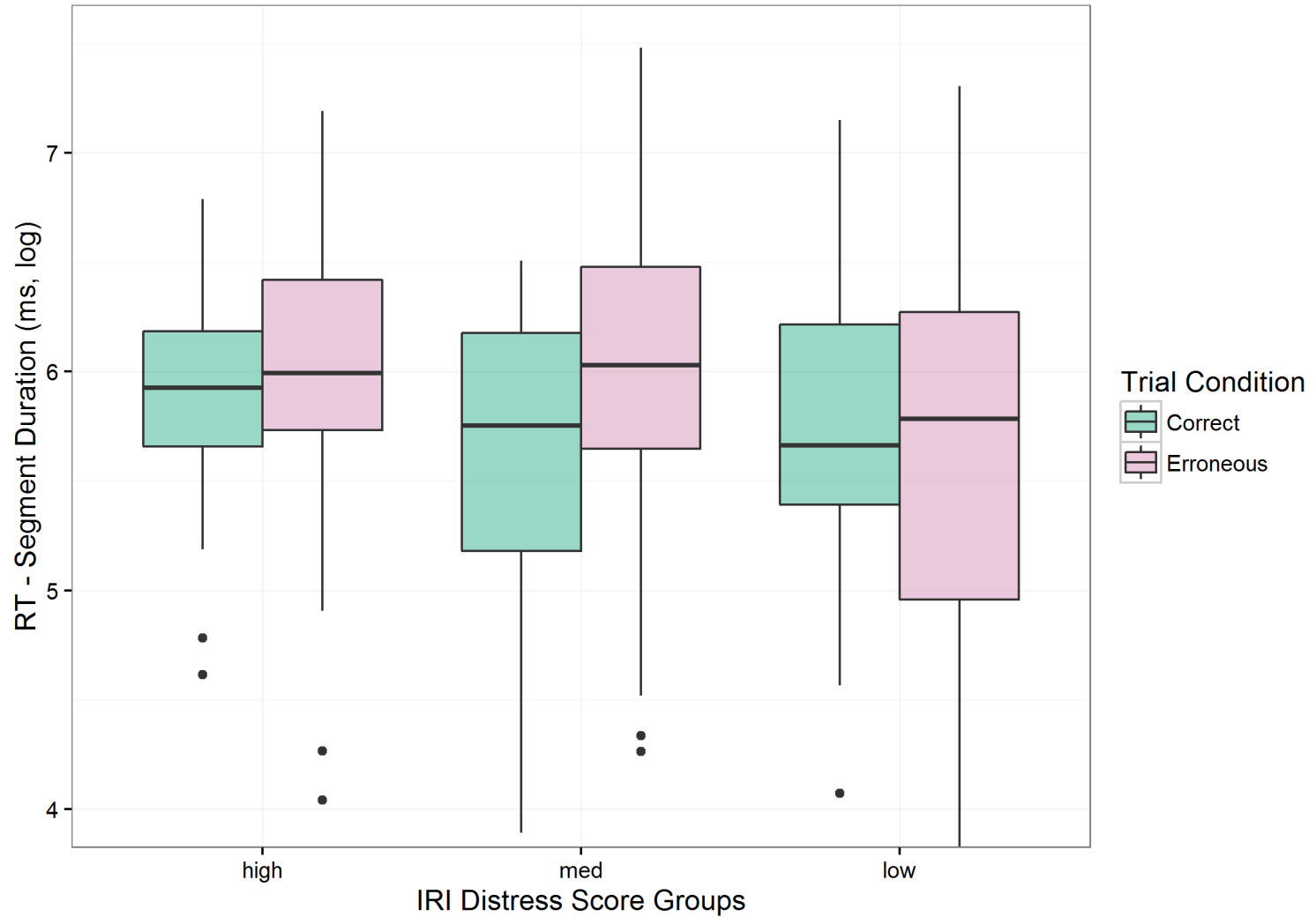
- differential RT's (log)  $\sim$  condition + segment duration + **personality measure**
- condition (correct/erroneous) **significant ( $p = 0.04$ )**
- other predictors also **significant ( $p < 0.01$ )**
  - including various **personality measures**



## INITIAL RESULTS – SE CONDITION, WRAP-UP

Test	Measure	<i>p</i>	<i>R</i> <sup>2</sup>
IRI	Distress	**	8.39%
IRI	Empathic Concern	*	7.05%

# RT's to Final Segment in SE Condition by IRI Distress Score Groups (NS)



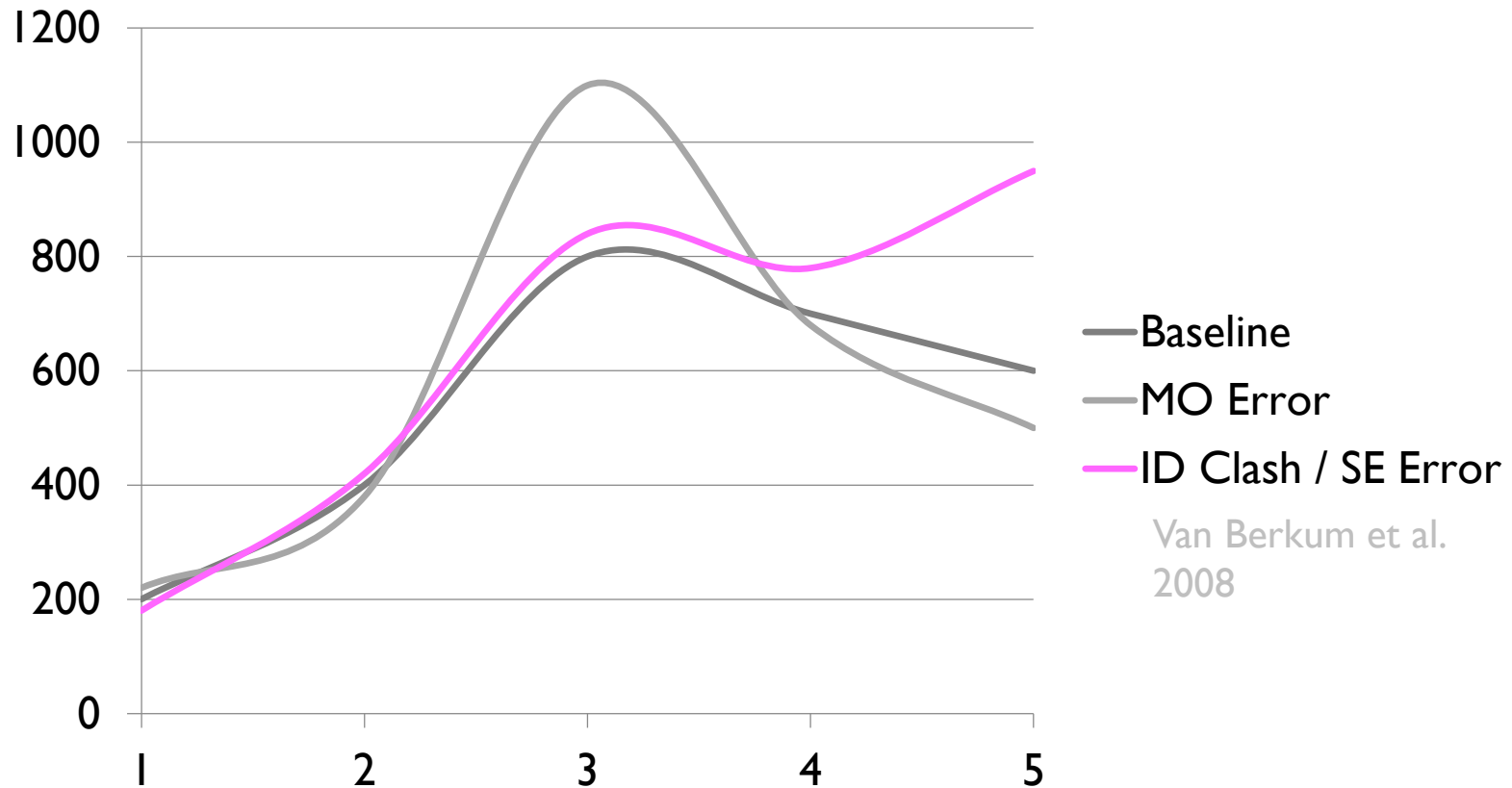
## INITIAL RESULTS – SUMMARY

- Replicated:
  - MO errors causing processing delay in **crucial region**
  - SE errors causing processing delay in **wrap-up region**

cf. De Vincenzi et al. 2003, Ditman et al. 2007, Just & Carpenter 1980, Tokowicz & Warren 2010

- Models suggest:
  - **Certain personality traits have a significant effect** on RT's
  - (even if it wasn't always the ones traditionally found in the literature)

# IDENTITY CLASHES?



## INITIAL RESULTS - ID CONDITION, WRAP-UP

Wrap-up segment, ID condition (linear modeling, NS):

- differential RT's (log)  $\sim$  condition + segment duration + RT to previous segment + **personality measure**
- condition **not** found to be significant ( $p = 0.17$ )
- some personality scores found to be **significant in response to clashing trials**
  - *only in NS data* – NNS process identity differently? Proficiency?

## INITIAL RESULTS - ID CLASHES, WRAP-UP

Test	Measure	<i>p</i>	<i>R</i> <sup>2</sup>
IRI	Empathic Concern	***	13.35%
IRI	Fantasy	***	12.74%
B5	Agreeableness	***	11.21%
B5	Extraversion	***	10.92%
EQ	EQ	**	10.63%
Pol	For/Against	*	9.67%
IRI	Perspective-Taking	*	9.6%

- in line with previous ERP findings Van den Brink 2012
  - (minus the fact that condition has no effect)

## PRELIMINARY CONCLUSIONS (THE GOOD ONES)

- SPL appears to be suited for research on fine-grained effects in sentence comprehension; replicated delays:
  - for MO errors at crucial segment, and
  - for SE errors at sentence wrap-up (irrespective of personality)
- found significant effects of a number of personality traits:
  - MO: e.g. Distress, Neuroticism
  - SE: Distress, Empathic Concern
  - ID: Empathic Concern, Fantasy, Agreeableness, Extraversion

## PRELIMINARY CONCLUSIONS (STRANGER THINGS)

- congruent/incongruent condition has **no effect** on ID wrap-up segments
  - too little data?
- Distress/Neuroticism are **not** usually traits found in prior literature
  - ... & they are pretty much the **opposite** of what is usually found to be significant (like Empathic Concern, Fantasy, or EQ)
  - but: higher Distress score > harder time with **surprisal**, and
  - prior literature has not looked at IRI subscales or a similar effect



## FURTHER ANALYSES & FUTURE PLANS

- more models (poss. **mixed** – participants, items)
- even out female bias - recruit **male NS's**
- investigate influence of **ID clash strength**
- do some good thinkin' on why **Distress & Neuroticism scores** might be significant in MO condition



Borkow & Bonerz (1997). [Image source.](#)

## FURTHER ANALYSES & FUTURE PLANS

- more models (poss. **mixed** – participants, items)
- even out female bias - recruit **male NS's**
- investigate influence of **ID clash strength**
- do some good thinkin' on why **Distress & Neuroticism scores** might be significant in MO condition
  - or, more generally, why different personality traits affect different types of errors
- poss. look at **post-critical / pre-wrap up region**
- compare native to **non-native speech**
  - differences in ERP responses Hanulikova et al. 2012
- tie things in with theories (**surprisal, situation models**, etc.)

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THANK YOU!

Questions? Suggestions?



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