

The neurocognitive correlates of talker-specific adaptation to Spanish-accented speech

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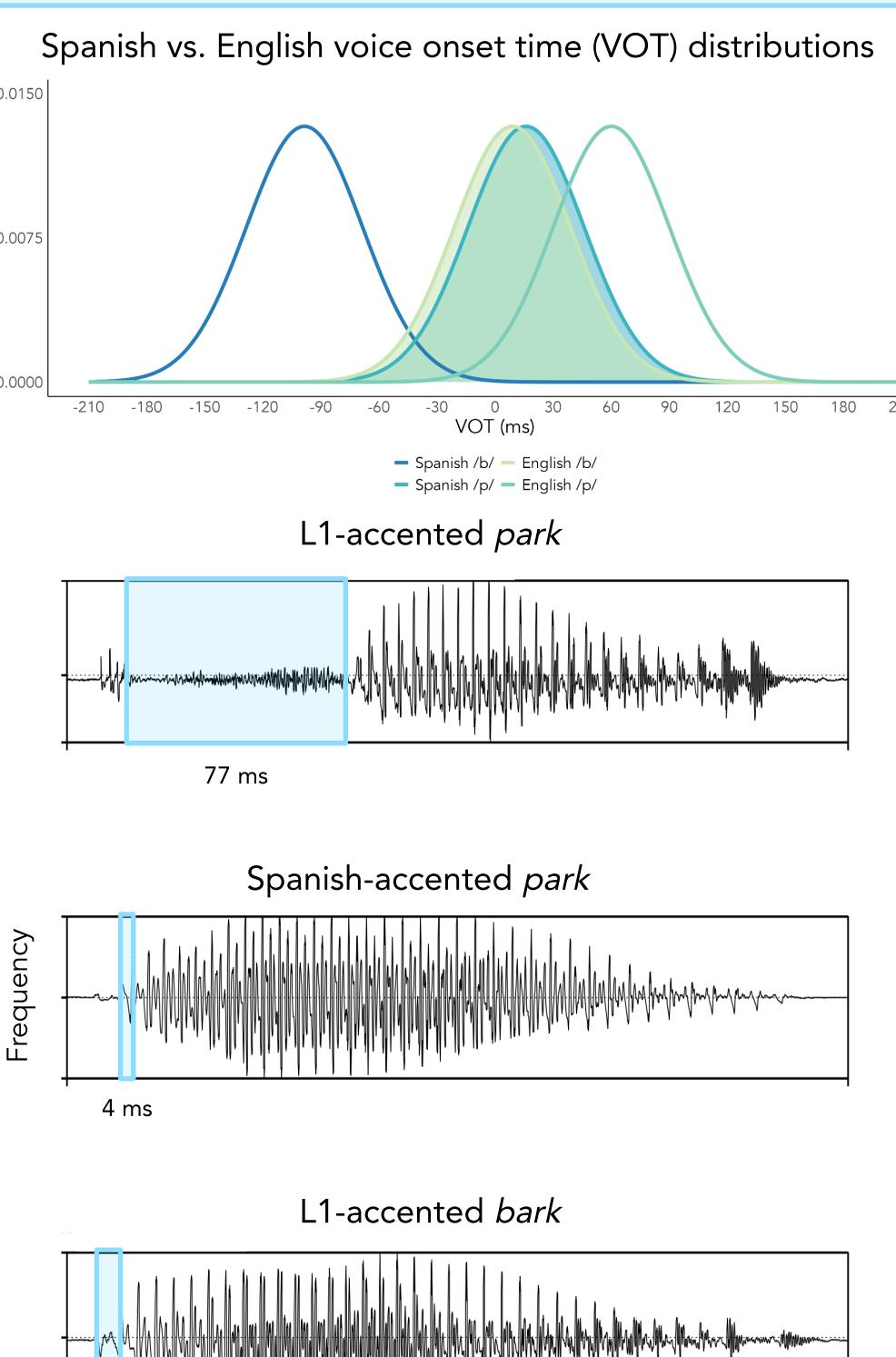


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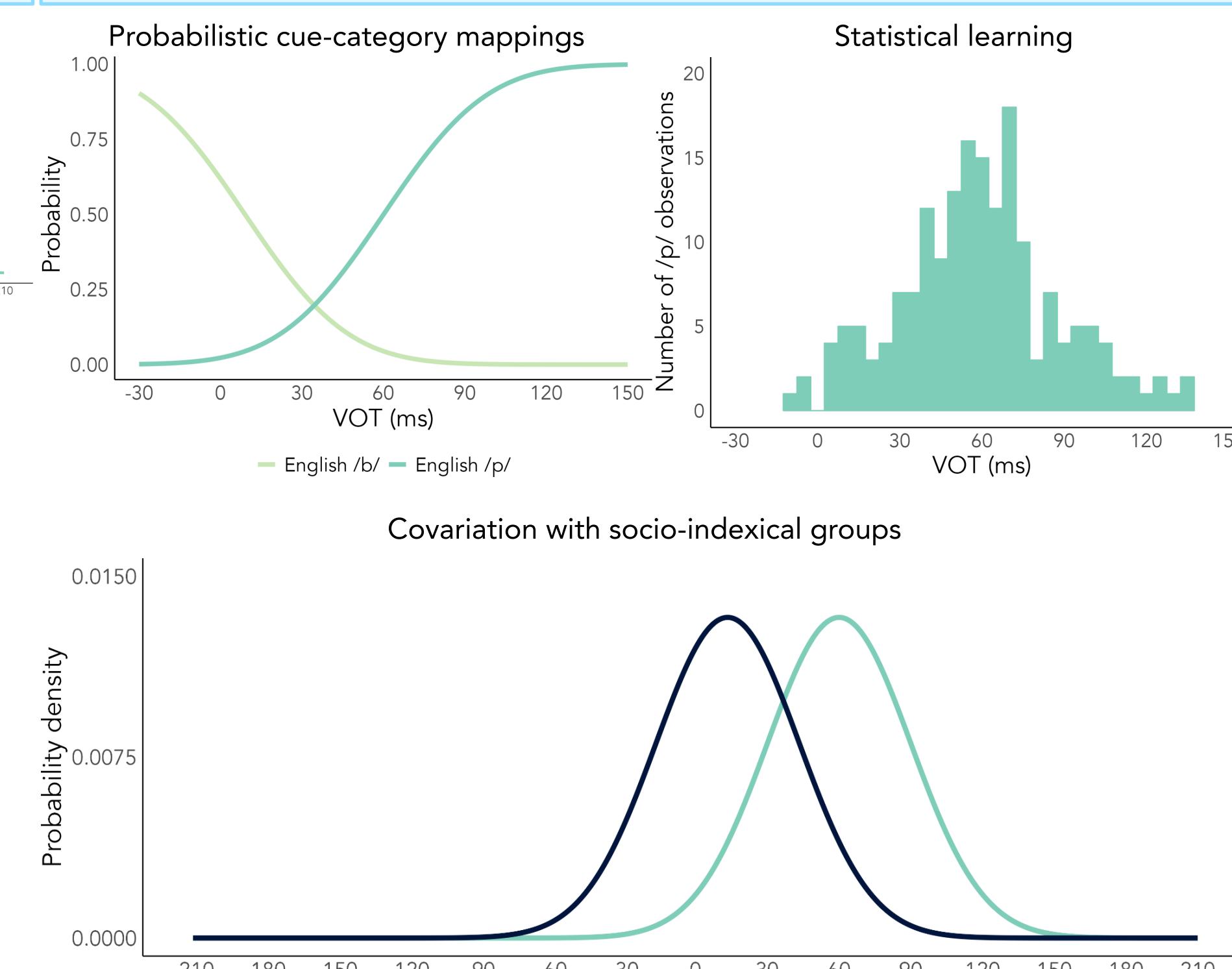
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Background

L2 speech production is influenced by L1 phonetic categories

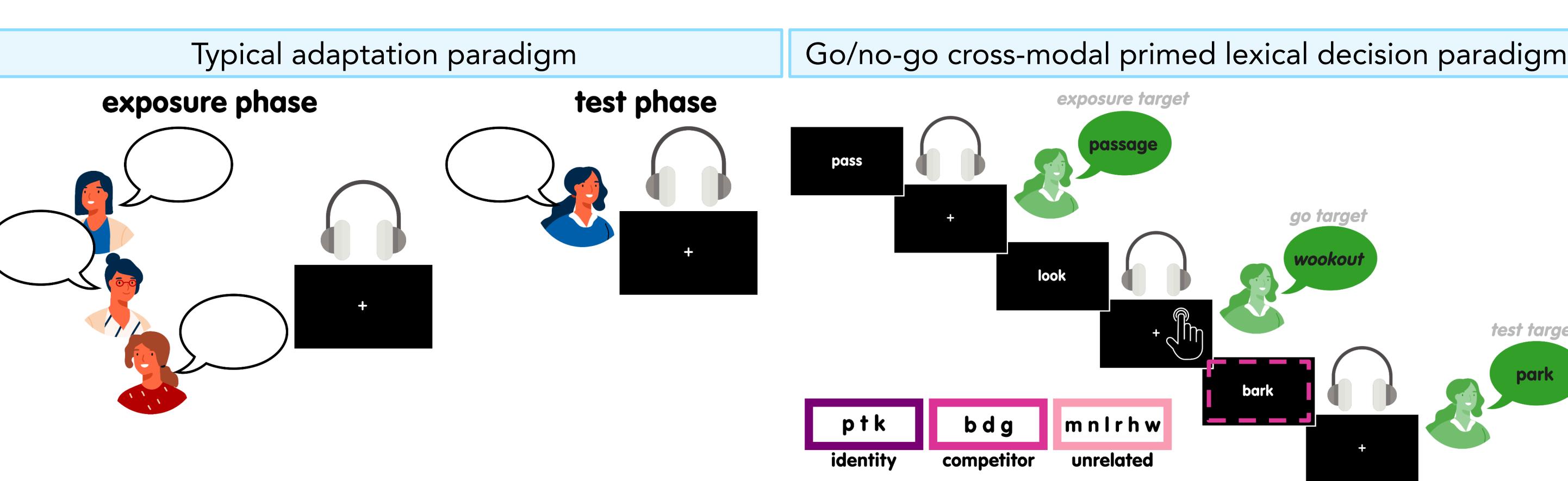


High-level accent adaptation is grounded in low-level acoustic-phonetic processes



- Talker-specific adaptation: Participants who train on Talker A during exposure tend to perform better on Talker A during test than participants who train on Talker B
- Adaptation to L2-accented talkers in behavior: Higher transcription accuracy during sentence comprehension (e.g., Clarke & Garrett, 2004) and faster reaction times during cross-modal priming (e.g., Xie et al., 2017)
- Adaptation to L2-accented talkers in ERPs has not been targeted systematically; rather, studies have compared mean ERPs between experiment halves (Gosselin et al., 2021; Hanulíková et al., 2012; Romero-Rivas et al., 2015)

Methods



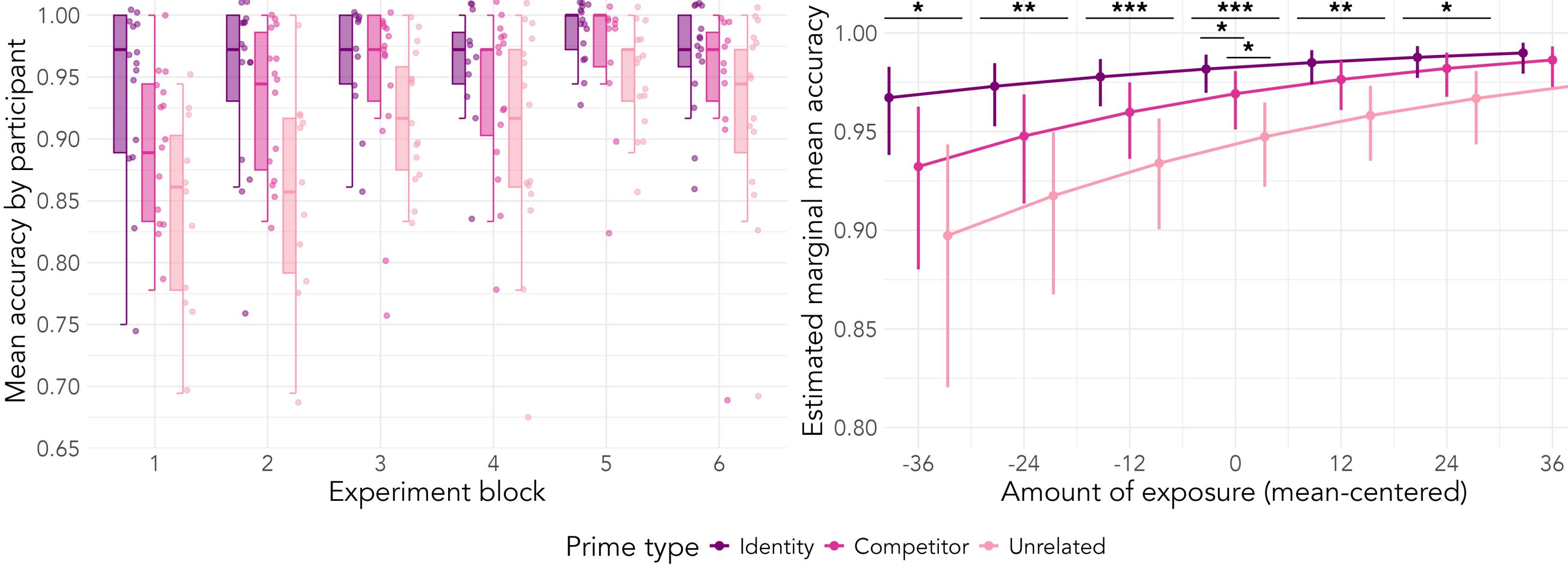
Stimuli	Trial type	Target onset	Target type	Target properties	Prime type	Number of trials	Prime-target examples
No-go	/p/, /t/, or /k/	Exposure	Multisyllabic real word	Match (first syllable)	72	pass-passage	
		Test	Monosyllabic real word	Identity, Competitor, or Unrelated	216 (72 items x 3 prime types)	park-park wand-park	
	/m/, /n/, /l/, /r/, or /w/	Filler	Multisyllabic real word	Majority match (first syllable)	144	rue-rhubarb	
		Response	Multisyllabic pseudoword	Majority match (base word first syllable)	144	look-wookout	

Overall prediction: Identity = Competitor → Identity <→ Competitor

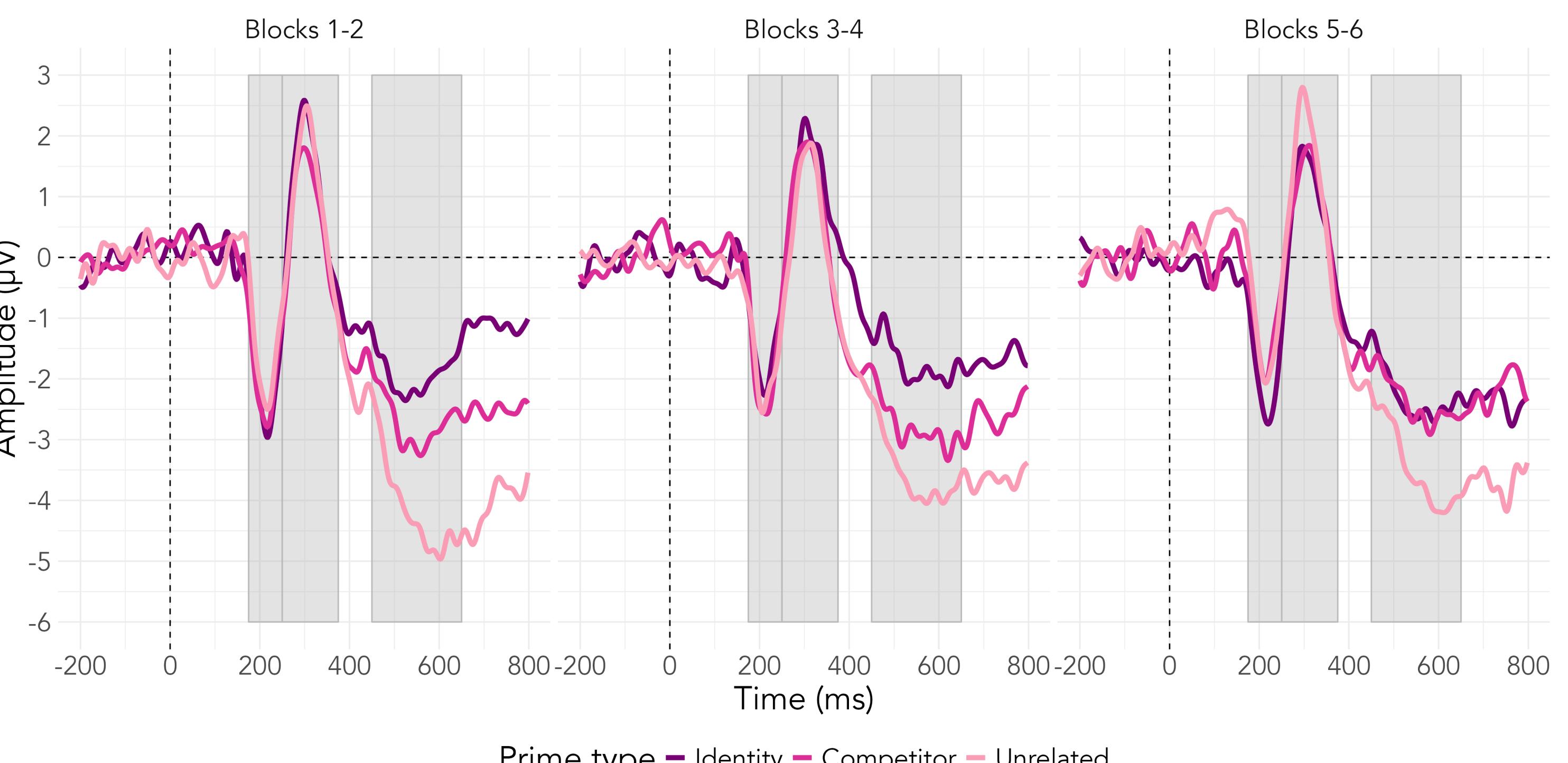
Component	Typical peak (ms)	General linguistic process	Specific correlates	Time window (ms)
N1	100	Acoustic	Gradience in speech perception; engagement of selective attention	175-250
P2	200	Phonetic	Perceptual learning performance	250-375
N200/PMN	200	Phonetic/phonological	Accented speech normalization	250-375
N400	400	Lexical/semantic	Lexical access during accented speech processing	450-650

Key results

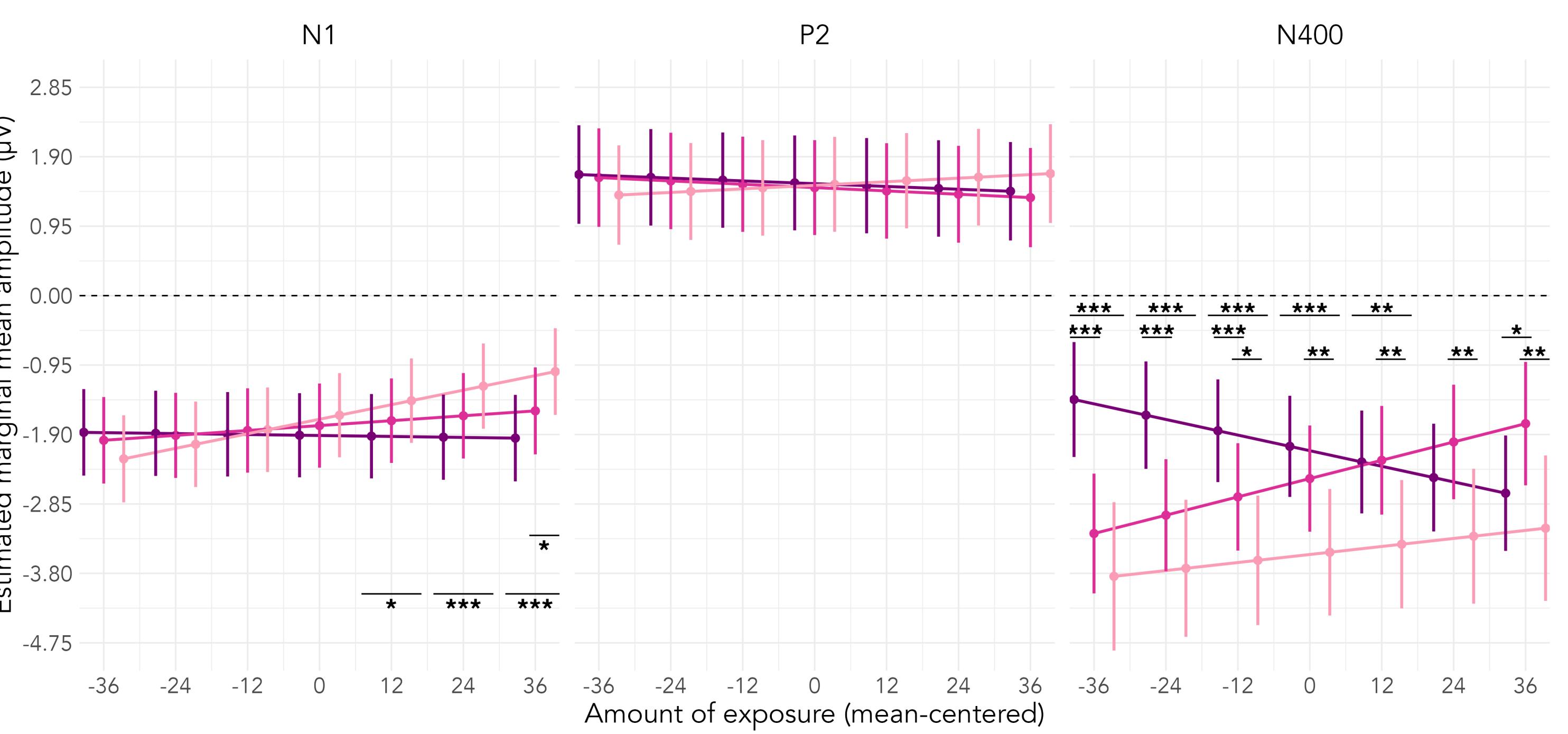
Target accuracy by prime type



Grand mean ERPs by prime type



ERP responses by prime type

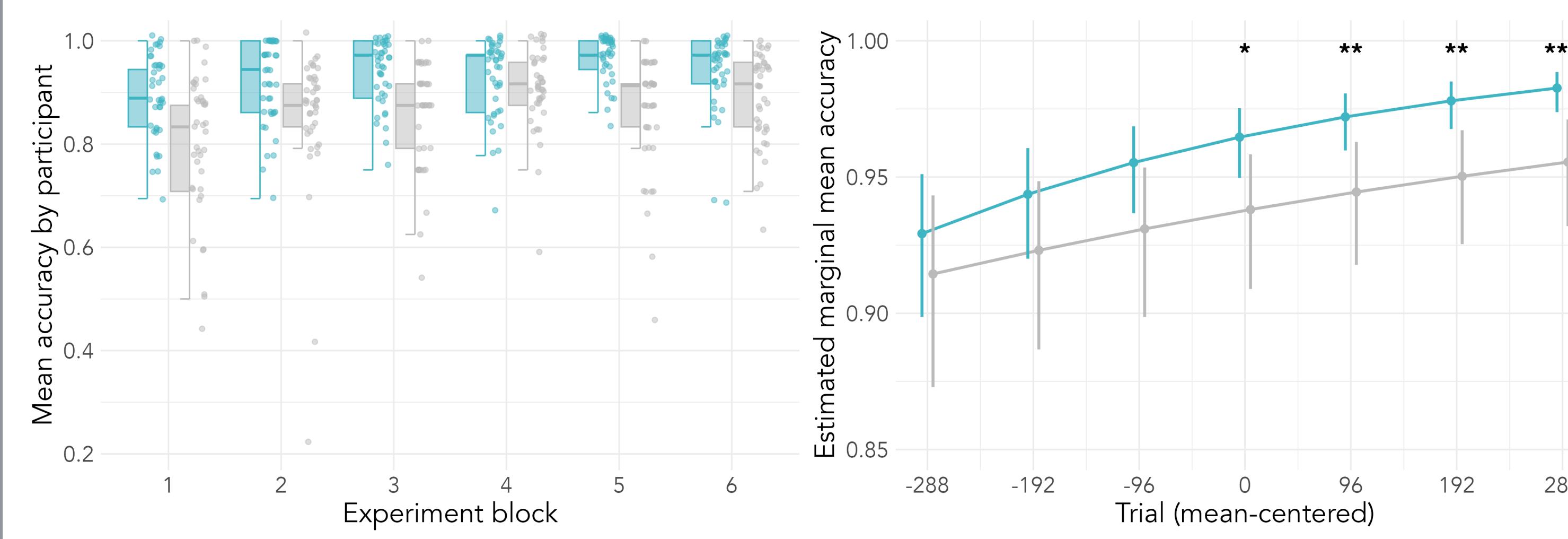


Key take-aways

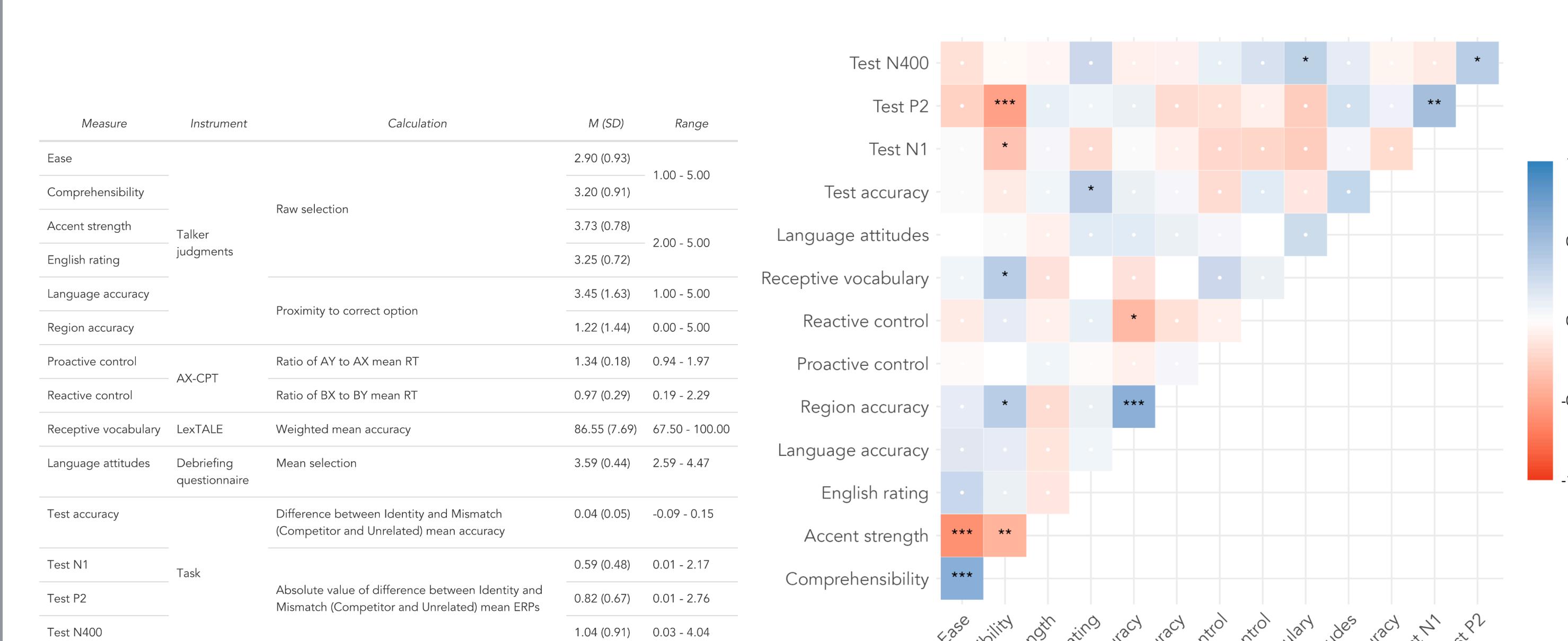
- Differential sensitivity to prime type emerged on the N1 as differences in priming decreased on the N400
- N1 modulation may reflect a shift in selective attention toward acoustic information (Joos et al., 2014)
- Accent adaptation may involve a shift from top-down to bottom-up word recognition mechanisms

Additional results

Target accuracy comparison



Correlation analysis



Additional methods

- Participants: 41 Penn State undergraduates, graduate students, and community members
 - Mean age of 20 (18-35)
 - One excluded from ERP analyses (head injury)
 - All grew up speaking English at home
 - Four identified as bilingual (self-rated proficiency less than 3/5)
 - Four grew up in multilingual households
 - Three indicated a dialect background other than American English (British, Canadian, Caribbean)
- Talker: Spanish-English bilingual from Mexico City, Mexico; age 31 at time of recording; moved to US at age 28; began acquiring English in school (age 5)

References

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