

What underlies classifier variation?

Evidence from cross-modal priming in heritage Cantonese

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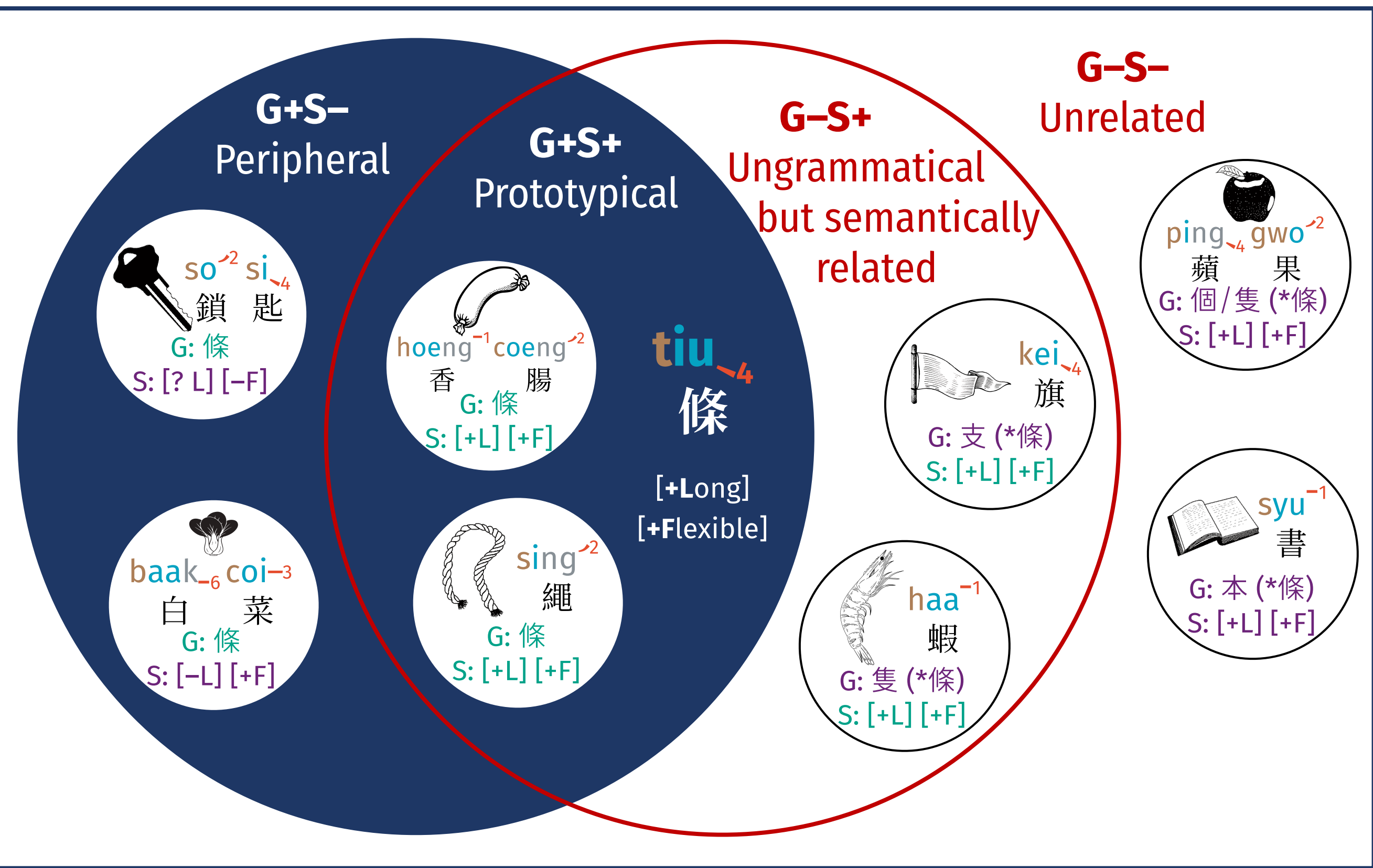
INTRODUCTION

Heritage speakers are often reported to struggle with **nominal classification devices**

- Common manifestation: ‘retreat to the default’ (Polinsky 2018)
- Heritage Cantonese: use of general classifier 個 *go3* instead of specific sortal classifiers (Kan 2019, Nagy & Lo 2019)

For Cantonese listeners, classifiers (CLFs) primarily enforce **grammatical constraints** (G) on predicting noun, despite having generalizable **semantics** (S) (Tsang & Chambers 2011)

- L2 Mandarin listeners rely more on classifier semantics (Grüter et al. 2020)
- Previous research on classifier processing among heritage speakers inconclusive (Nguyen & Grüter 2025)



▲ Figure 1. Possible relationships between nouns and a given classifier, exemplified with 條 *tiu4*.

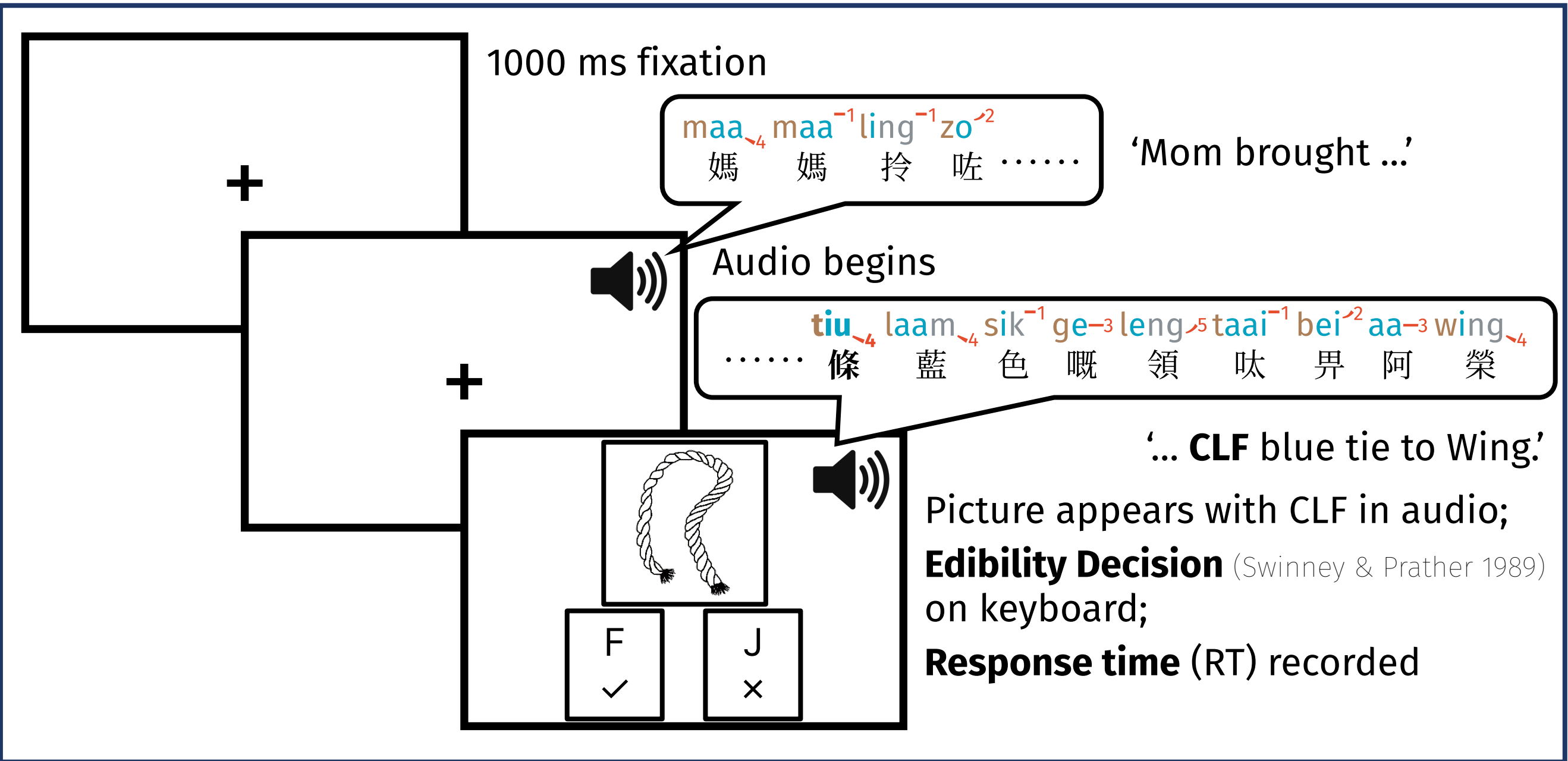
RESEARCH QUESTIONS

1. Do homeland and heritage Cantonese listeners use grammatical and semantic information from nominal classifiers to the same extent?
2. How does this inform us about variation in classifier choice?

EXPERIMENT: CROSS-MODAL PRIMING

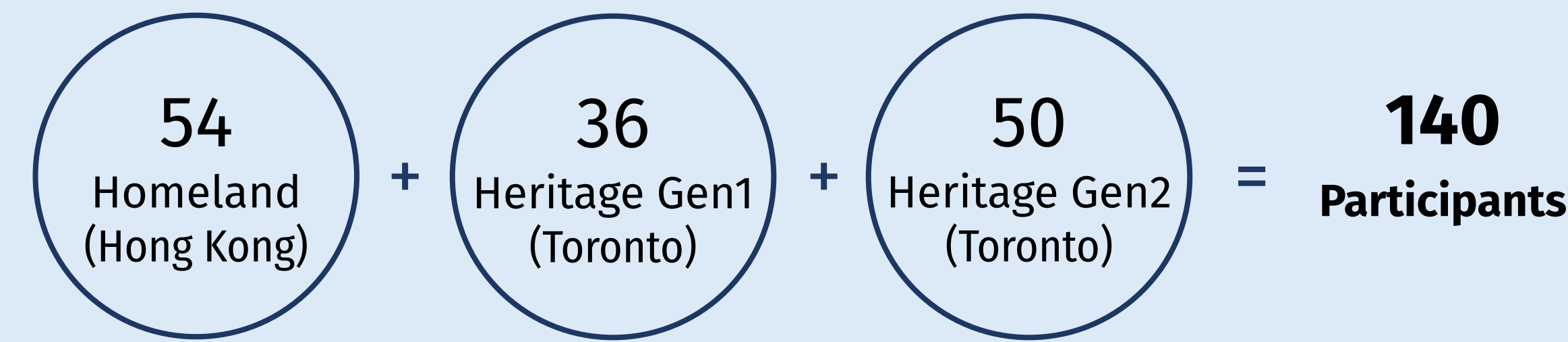
Novel application of paradigm (Swinney & Prather 1989) to classifiers

- Ecologically valid for speaker-listeners, regardless of language background (Marinis 2018)
- **Edibility decision** while listening to sentences (Fig. 2)
 - Pictures varied w.r.t. grammatical/semantic match (Fig. 1)
- **Comprehension checks** after edibility decision in some trials to ensure attention to audio
- **Questionnaire** including the Bilingual Language Profile → measure of language dominance (Birdsong et al. 2012)



▲ Figure 2. Schematic representation of a trial in the cross-modal picture priming task.

ANALYSIS



Control variables

- Age ↑ = slower RTs
- Trial Number ↑ = faster RTs

▲ Figure 3. Linear regression best-fit lines for response times by English dominance, split by grammatical match and generation.

TAKEAWAYS!

1. Cantonese speakers, heritage or homeland, rely on **grammatical knowledge** in sentence processing!
2. Language dominance modulates the strength of their reliance, which may explain ‘retreat to the default’

DISCUSSION & FUTURE DIRECTIONS

Overall priming effect of **grammatical match** (Hypothesis #1)

- Matches findings from previous eye-tracking studies (Tsang & Chambers 2011)
- Heritage patterning with homeland rather than with L2
- But why is the priming effect **slower** rather than faster?
 - Priming can sometimes be **inhibitory** rather than facilitatory (Dufour et al. 2023)
 - Participants try to integrate the picture into the sentence

Eng. dominance = weaker associations between nouns and their canonical classifiers (Hypothesis #5) → ‘retreat to the default’

- Lower activation of features = more dissociation between functional (CLF) and lexical features (specific classifiers) (Putnam & Sánchez 2013)
- Can individuals of lower Cantonese dominance still form social meaning around classifier variation with weaker grammatical knowledge? → matched guise test



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Supplementary material

1 Linear mixed-effects model

The following table shows the linear mixed-effects model testing fixed interactions among G(RAMMATICAL) MATCH (sum-coded), S(EMANTIC) MATCH (sum-coded), GENERATION (Helmert-coded), and ENGLISH DOMINANCE, fixed effects of AGE and TRIAL NUMBER, and random intercepts of PARTICIPANT, PICTURE, and AUDIO on the logarithm of response time in edibility decision. Coefficient estimates reported in log-odds; *t*-tests use Satterthwaite's method.

Fixed effects	Estimate	S.E.	<i>t</i>	<i>p</i>	
INTERCEPT	7.285	1.879	38.764	<<0.001	***
GRAMMATICAL MATCH	9.163×10^{-2}	3.497	2.620	0.011	*
SEMANTIC MATCH	1.639×10^{-2}	3.497	0.469	0.641	
GENERATION					
Homeland vs. Heritage	6.939×10^{-2}	2.460	0.282	0.778	
Heritage Gen1 vs. Heritage Gen2	-3.931×10^{-3}	2.587	-0.015	0.988	
ENGLISH DOMINANCE	1.982×10^{-3}	1.122	1.767	0.080	
AGE	1.589×10^{-2}	3.991	3.981	<0.001	***
TRIAL NUMBER	-4.904×10^{-3}	3.836	-12.785	<<0.001	***
GRAMMATICAL MATCH : SEMANTIC MATCH	2.345×10^{-2}	7.000	0.335	0.738	
GRAMMATICAL MATCH : GENERATION					
Homeland vs. Heritage	-5.702×10^{-2}	6.282	-0.908	0.364	
Heritage Gen1 vs. Heritage Gen2	-9.134×10^{-2}	5.908	-1.546	0.122	
SEMANTIC MATCH : GENERATION					
Homeland vs. Heritage	1.575×10^{-2}	6.285	0.251	0.802	
Heritage Gen1 vs. Heritage Gen2	-5.425×10^{-2}	5.919	-0.917	0.359	
GRAMMATICAL MATCH : ENGLISH DOMINANCE	-6.643×10^{-4}	2.896	-2.294	0.022	*
SEMANTIC MATCH : ENGLISH DOMINANCE	-2.053×10^{-4}	2.899	-0.708	0.479	
GENERATION : ENGLISH DOMINANCE					
Homeland vs. Heritage	-2.090×10^{-4}	2.380	-0.088	0.930	
Heritage Gen1 vs. Heritage Gen2	3.932×10^{-3}	2.740	1.435	0.154	
G. MATCH : S. MATCH : GENERATION					
Homeland vs. Heritage	9.248×10^{-3}	1.257	0.074	0.941	
Heritage Gen1 vs. Heritage Gen2	2.598×10^{-3}	1.181	0.022	0.982	
G. MATCH : S. MATCH : ENGLISH DOMINANCE	3.536×10^{-4}	5.799	0.610	0.542	
G. MATCH : GENERATION : ENGLISH DOMINANCE					
Homeland vs. Heritage	8.556×10^{-4}	6.270	1.365	0.172	
Heritage Gen1 vs. Heritage Gen2	7.929×10^{-4}	6.950	1.141	0.254	
S. MATCH : GENERATION : ENGLISH DOMINANCE					
Homeland vs. Heritage	6.703×10^{-5}	6.271	0.107	0.915	
Heritage Gen1 vs. Heritage Gen2	-2.799×10^{-5}	6.957	-0.040	0.968	
G. MATCH : S. MATCH : GENERATION : ENGLISH DOMINANCE					
Homeland vs. Heritage	8.069×10^{-4}	1.253	0.644	0.520	
Heritage Gen1 vs. Heritage Gen2	1.530×10^{-3}	1.389	1.101	0.271	
Random effects	Variance		N		
PARTICIPANT	0.2257		140		
PICTURE	0.0029		24		
AUDIO	0.0002		12		