Facilitative use of classifiers in heritage Vietnamese

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Classifiers in L1, L2 and Heritage Language processing

- **Native speakers** of Chinese can use classifiers as a cue to predict the upcoming noun (Huettig et al., 2010, Klein et al.,2012, Tsang & Chambers, 2011).
- **L2 learners** of Chinese and Japanese also showed a facilitative effects of the classifier (Lau & Grüter, 2015; Mitsugi, 2018) but potentially relying more strongly on semantic information (Grüter et al., 2020).
- Studies on Spanish and Polish have shown that **heritage speakers** can use grammatical gender as a cue to predict upcoming referents (Fuchs, 2022a; Fuchs, 2022b).

➢ No published work on processing of classifiers in Vietnamese (but see Ito et al., 2020)

Research Question

To what extent do home-country raised and heritage speakers of Vietnamese use classifiers to predict upcoming nouns?

Classifiers in Vietnamese

- "Classifiers are words used to categorize word classes based on an attribute such as shape, function, or animacy" (Pham & Kohnert, 2008, p.1).
- acquired early in Vietnamese (Tran, 2010)

Obligatory occurrence of classifier

- in expressions of quantity (e.g., *hai con mèo* "two CL cats")
- with demonstratives (e.g., *cái bàn này* "CL table this", *cái bàn kia* "CL table that") or wh-words (*gì* "what", *nào* "which"), in specific or definite noun phrases (e.g., *cái bàn nào* "CL table which")
- with question words (*bao nhiêu, mấy* "how many") that require a numeral response (e.g., *có mấy con cá* "how many CL fish")

➢ Optional in other contexts (e.g., *anh ấy thích ăn cá* "he likes eating fish")

Classifiers used in this study

- The two most common classifier in Vietnamese (Dao, 2012; Tran, 2011):
  - ➢ **cái** : generally used with **inanimate** objects (e.g., *cái ghế "*a chair")
  - ➢ **con**: generally used with **animate** objects (e.g., *con chó "*a dog"), but can also be used with ***some inanimate*** objects (e.g., *con dao "*a knife", *con thuyền "*a boat", *con diều "a kite"*)

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Participants

- recruited at the University of Hawai'i and the Vietnamese community in Hawai'i.

Table 1. Participant information (means and ranges)

	Home-country raised speakers (L1 group)	Heritage speakers (HS group)
N	19 (12 F, 7 M)	26 (15 F, 11 M)
Age	35.8 (19-55)	20.7 (18-30)
Self-rated Proficiency Vietnamese (/10)	9 (7-10)	5.5 (1-9)
Self-rated Proficiency English (/10)	7.47 (5-10)	8.96 (6-10)

Inclusion criteria

- For HS group: 1) placed in a Vietnamese class at UHM; 2) came from Vietnamese-speaking families with at least one parent speaking Vietnamese as a dominant language at home.
- For L1 group: 1) born and raised in Vietnam; 2) AOA to the US: after 18 years old; 3) currently living in Hawai'i.

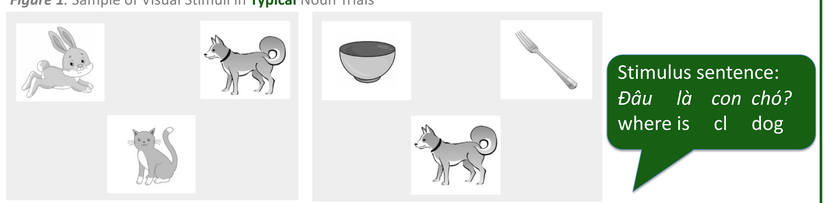
Materials

- Classifier-noun pairing test (fill in the blank, 25 items; incl. 12 target nouns)
  Example: *Tôi có hai _____chó (I have two _____dogs)*
  Expected answer: *con* [animate classifier]
- Visual world experiment
  - 24 critical trials (16 typical noun trials: 8 SAME cond., 8 DIFFERENT cond.; 8 atypical nouns trials); 16 filler trials

Table 2. List of Typical and Atypical Nouns and their Frequency in the Vietnamese Mixed Corpus (Le & Quasthoff, 2016)

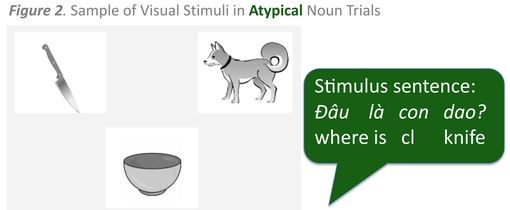
Classifier	TYPICAL Nouns	Classifier	TYPICAL Nouns	Classifier	ATYPICAL Nouns
con (animate)	*chó* 'dog' (77,093)	*cái* (inanimate)	*bát* 'bowl' (95,239)	*con* (inanimate)	*dao* 'knife' (129,914)
	mèo 'cat' (47,739)		*điện thoại* 'phone' (N/A)		*thuyền* 'boat' (153,961)
	gà 'chicken' (184,905)		*bàn* 'table' (997,400)		*tem* 'stamp' (27,001)
	chim 'bird' (118,884)		*ghế* 'chair' (152,127)		*diều* 'kite' (18,550)

Figure 1. Sample of Visual Stimuli in **Typical** Noun Trials



SAME classifier condition *DIFFERENT classifier condition*

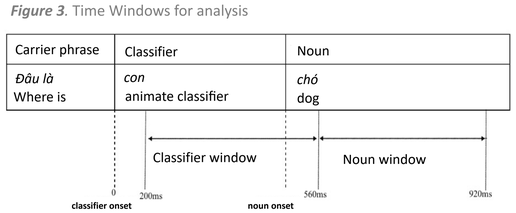
Figure 2. Sample of Visual Stimuli in **Atypical** Noun Trials



Procedure

- Language Background Questionnaire
- Visual world experiment (SMI RED250 eye-tracker, 60 Hz)
- Vietnamese listening proficiency test
- Classifier-noun pairing test

Figure 3. Time Windows for analysis



Results

TYPICAL nouns

- Accuracy on fill-the-blank test: L1 group: 100%; HS group: *M*=66.9% (*SD*=21.5)
- Mouseclick accuracy in VWP task: L1 group: 100%; HS group: *M*=95% (*SD*=5.5)
- Eye gaze analysis excludes trials with incorrect mouseclicks and items with incorrect fill-the-blank responses

Figure 4. Typical Nouns: Mean Proportion of Looks to Target by Group, Time Window, and Condition. Error bars indicate 95% CIs.

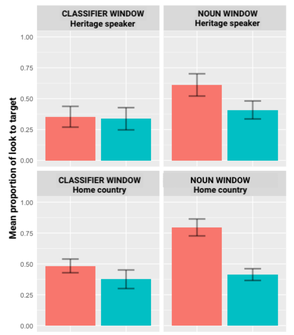
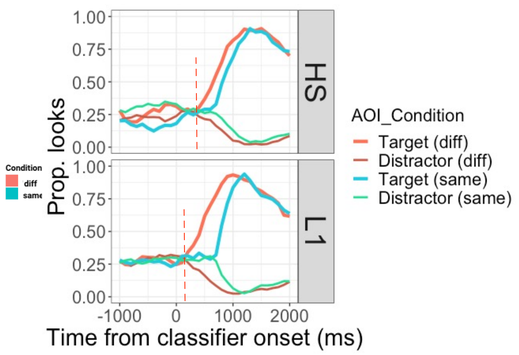


Figure 5. Mean Proportion of Looks over Time (by Group and Condition)



lmer: prop ~ Group * Condition + (1 | Participant) + (1 | Stimulus)

➢ **Classifer window:** marginal interaction (*b* = -0.12, *t* =-1.65, *p* = .10); more looks to target in home-country than HS group in the DIFF condition (*b* = .12, *t* = 2.26, *p* = .03)

➢ **Noun window:** significant interaction between condition and group (*b* = -0.20, *t* = -3.05, *p* = .002); significant differences by condition within both groups but larger effect in home-country (*b* = -0.38, *t* = -5.46, *p* < .001) than HS (*b* = -0.18, *t* = -2.49, *p* = .02)

ATYPICAL nouns

- Responses on fill-the-blank test and during debriefing indicated variable knowledge and use of the classifier *con* with these nouns.
- Eye-gaze analysis (exploratory) includes data from all trials (no exclusions)

Figure 6. Atypical Nouns: Mean Proportion of Looks to Target by Group, Time Window, and Condition. Error bars indicate 95% CIs.

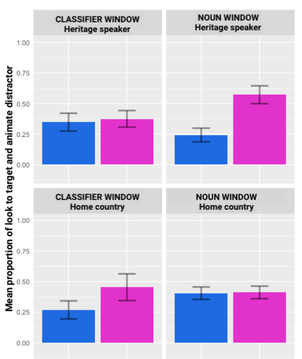
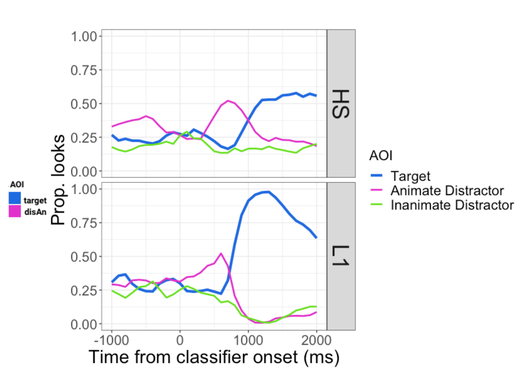


Figure 7. Mean proportion of Looks over Time (by Group)



lmer: log((prop_target +.5) / (prop_disAn +.5)) ~ Group + (1 | Participant) + (1 | Stimulus)

➢ **Classifier window:** no significant effect of group (*b* = 0.17, *t* = 1.55, *p* = 0.13)

➢ **Noun window:** effect of group (*b* = -0.38, t= -4.30, *p* < .001); heritage speakers look ***more at the animate distractor*** than the Home country group.

➢ Both home-country raised and heritage speakers of Vietnamese use classifiers predictively to create expectations about the animacy of upcoming nouns in real-time processing,

➢ yet heritage speakers may do so at a slight delay when compared to home-country raised speakers.

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