Asymmetric Lexical Access in Second Language Learners

8th Mental Lexicon Conference, Montréal, Canada
October 24-26, 2012

Isabelle Darcy, Danielle Daidone, Chisato Kojima
DEPT OF SECOND LANGUAGE STUDIES, DEPT OF LINGUISTICS
INDIANA UNIVERSITY BLOOMINGTON

INTRODUCTION : L2 Lexical Representations can be fuzzy...

Confusable phonemic categories

- Ambiguous lexical representations
- Less effective mismatch from competitors

→ repetition priming in lexical decision (Pallier et al., 2001; Darcy et al., 2012)
false-alarm recognition of nonwords as words (Broersma & Cutler, 2008; Sebastian-Gallés et al., 2005)

...and yield asymmetric lexical access

- For confusable L2 contrasts, higher L1-L2 acoustic-phonetic *similarity* determines one L2 category as *dominant* (Cutler et al., 2006)
- Category dominance allows LRs to be separated, *independently of categorization accuracy* (Weber & Cutler, 2004; Cutler et al., 2006).

/..ɛ../ /..ɛ*../ /..ɛ../ /..ɛ*../

[pɛn…] [pæn…]

Eye-tracking: ([pɛnsɪl] - [pænda])
- When hearing /ɛ/ (dominant), the fixations to target were more selective (less or no activation of competitor containing the other sound, non-dominant)
- When hearing /æ/ (non-dominant), fixations showed activations of competitor (containing the dominant sound) until the disambiguating segment was heard.

Predicted difficulty of lexical decision if lexical encoding is fuzzy:

	Word	NonWord	Word	NonWord
L2 German:	Honig	*Hönig	König	*Konig
L2 Japanese:	akeru	*akkeru	kippu	*kipu

1st: word-old Highest Accuracy
3rd : nonwd-new Medium Accuracy
2nd: word-new High Accuracy
4th : nonwd-old Lowest Accuracy

~~[ø] and [p:]~~ are initially not "licensed"; encoded as [o*]/[p*] (Hayes-Harb & Masuda, 2008), or [o?] / [p?] > **"fuzzy" lexical representation**

RESEARCH QUESTIONS:

1) Are L2 learners' lexical representations fuzzy, even if they are able to represent lexical contrast?
   We examine the degree to which a novel contrast is merged or separated in learners' lexical representations by looking at asymmetries in lexical decision patterns
2) Does lexical "fuzziness" results from lower categorization accuracy?
   We examine categorization with ABX

Participants
1. **L1 English L2 Japanese bilinguals**
   Beginner [first-year, N = 11]
   Advanced [fourth-year, instructors, N = 14]
2. **Japanese Native Speakers** [N = 11]
3. **L1 English L2 German bilinguals**
   Intermediate [third-year, N = 55]
   Advanced [> 6 months in Germany, N = 21]
4. **German Native Speakers** [N = 18]

RESULTS: Lexical Decision

Familiarity with the words tested was verified for all learners

L2 Japanese

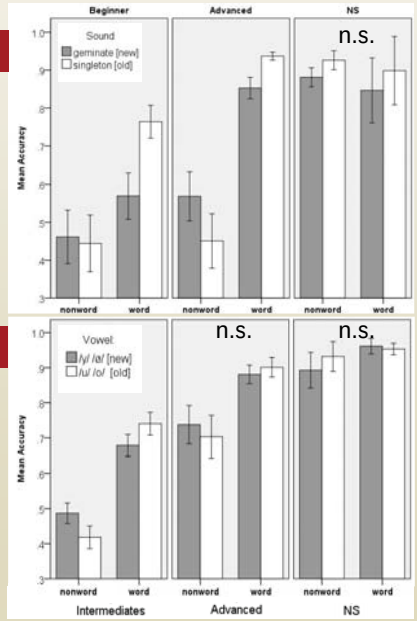
Advanced Learners:
Effect of Lexical Status
No effect of Sound
Interaction:
$F(1, 39) = 5.65$, $p < .023$

Beginner Learners:
Effect of Lexical Status
No effect of Sound ($p = .053$)
Interaction:
$F(1, 24) = 5.92$, $p < .024$

L2 German

Advanced Learners:
Effect of Lexical Status
No effect of Sound
Interaction:
$F(1, 60) = 1.91$, $p > .17$

Intermediate Learners:
Effect of Lexical Status
No effect of Sound
Interaction:
$F(1, 162) = 15.4$, $p < .001$

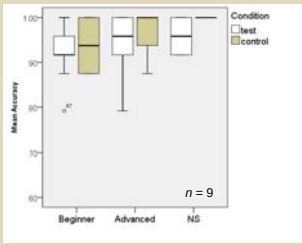


RESULTS: ABX categorization

Stimuli examples

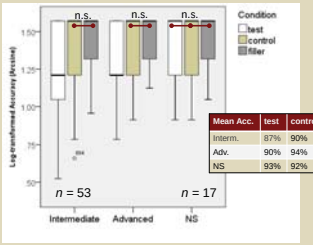
1. L2 Japanese			
	Test	[mette] – [mete] – [mette]	A
	Control	[moke] – [moki] – [moki]	B
2. L2 German			
	Test	[po:m] – [pøm] – [pøm]	B
	Control/Filler	[pøm] – [pe:m] – [pøm]	A
		[pa:m] – [pu:m] – [pa:m]	A

- A classical ABX task to verify their ability to discriminate between geminates and non-geminates, and between front-rounded and back-rounded vowels.
- L2 Japanese and L2 German show high categorization ability on an ABX task
- Tasks differ in processing demand (Japanese: 1 voice; German: 2 voices)



L2 Japanese

Effect of Group ($F(2, 90) = 5.6$, $p < .01$).
Advanced = Native speakers
Beginner ≠ Native speakers
Effect of Condition
($F(1, 90) = 5.2$, $p < .05$)
Only significant for Advanced
No interaction $p > .1$



Mean Acc.	test	control	filler
Interm.	87%	90%	95%
Adv.	90%	94%	97%
NS	93%	92%	92%

L2 German

No effect of Group ($F(2, 105) = 2.7$, $p > .05$).
Effect of Condition ($F(2, 1541) = 14.2$, $p < .01$)
Pairwise comparisons: Significant for both Intermediate and Advanced but not for Native speakers
Interaction ($F(4, 1541) = 7.2$, $p < .01$)

CONCLUSION

- Significant interactions between lexical status and category: lexical representations for new categories are not target-like; The asymmetry indicates lexical separation (no merger between new/old, even in beginners)
- G-Adv. have recovered from asymmetrical lexical access: Asymmetries can be resolved with more experience in an L2
  - more efficient lexical access; LRs gradually become more native-like
- High categorization accuracy for all groups → independence between both levels

Further Research Directions
- Is dominance is only determined by acoustic-phonetic similarity?
  - Phonetic stability of contrast?
  - Functional prominence to signal lexical contrast? (Many or very few minimal pairs?)
  - Other function such as grammatical markers?

REFERENCES

Broersma & Cutler (2008) System, *36, 22-34;* **Cutler, Weber & Otake (2006)** Journal of Phonetics *34, 269-284;* **Darcy et al. (2012)** Second Language Research *28, 5-40;* **Pallier, Colome & Sebastian-Gallés (2001)** Psych. Science *12, 445-449;* **Sebastian-Gallés et al. (2005)** Journal of Memory and Language, *52, 240-25.* **Weber & Cutler (2004)** Journal of Memory and Language *50, 1-25.*

Acknowledgements: We thank Laurent Dekydtspotter, Rex Sprouse, John H.G. Scott, Christiane Kaden, Franziska Krüger, the Department of Second Language Studies and the SLPL Lab Members for comments, help and support.

Contact: {idarcy; ddaidone; kojimac}@indiana.edu www.iub.edu/~psyling