Cross-linguistic influences in L3 visual word processing: Evidence of cognate effects in different-script trilinguals

Mariana Elias, Anat Prior and Tamar Degani
Department of Communication Sciences and Disorders, University of Haifa
m.n.e.420@gmail.com

Introduction:

Is L3 processing influenced by L1 and L2 or both?

- Transfer to L3 mainly from the dominant L1 (Sanz et al., 2015).
- Transfer to L3 mainly from the L2 (Bardel & Falk, 2007).
- Transfer to L3 from both L1 and L2 (MacWhinney, 2005).

- In the **lexical domain** evidence for contribution of L2 transfer when processing L3 cognates in same script trilinguals
  - In addition to L1 transfer (Lemhöfer et al., 2004 with Dutch-English-German unbalanced trilinguals)
  - Facilitation only for triple cognates (Szubko-Sitarek, 2011 with Polish-English-German trilinguals)

- **What about different-script trilinguals? Can cross-language influences (CLI) be mediated via phonology?**
  - Different script Arabic-Hebrew bilinguals responded to cognate primes faster and more accurately than to control primes (Degani et al., 2018) suggesting a role for phonological overlap.

The Current Study

- Dissociating the contribution of L1 and L2 by directly contrasting L1-L3 vs. L2-L3 vs. triple cognate L1-L2-L3 items
- Focusing on phonology by testing **different-script** Arabic (L1)-Hebrew (L2)-English (L3) trilinguals
  - None of the languages share a script
  - The L1 and L2 (Semitic) are typologically different than the L3 (Indo-European)

Method:

Task: Visual semantic decision task in English (participants' L3)

Participants: 63 undergraduate university students

		Linguistic profile		
Age (SD)	SES (SD)	Native language (L1)	Immersion (L2)	Formal instruction (L3)
19.72 (0.88)	13.58 (3.03)	Arabic	Hebrew	English

Note: SES indexed by maternal education in years

Stimuli:

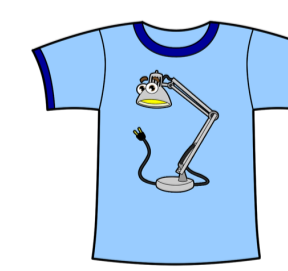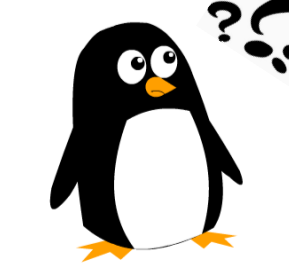Prime word included (semantically related pairs):
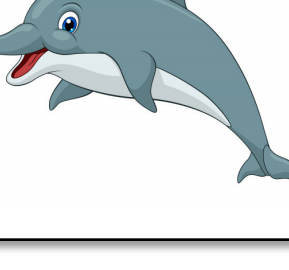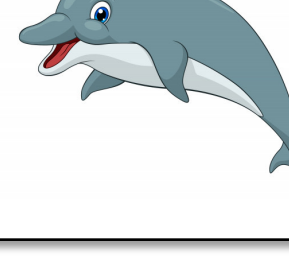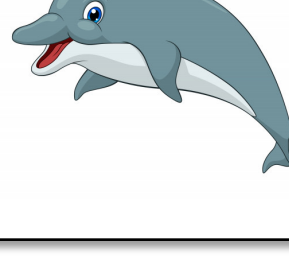- 28 L1-L3 double cognates
- 28 L2-L3 double cognates
- 28 L1-L2-L3 triple cognates.
- 84 control non-cognate words.

84 filler pairs (not semantically related).

Two counterbalanced versions based on two lists:
- Each participant presented with 168 prime-target pairs.
- Target words appeared with critical and control primes.
- Participants saw each target word only once.

Target words selected to be related/not based on association strengths (Small World of Words, De Deyne et al., 2018).
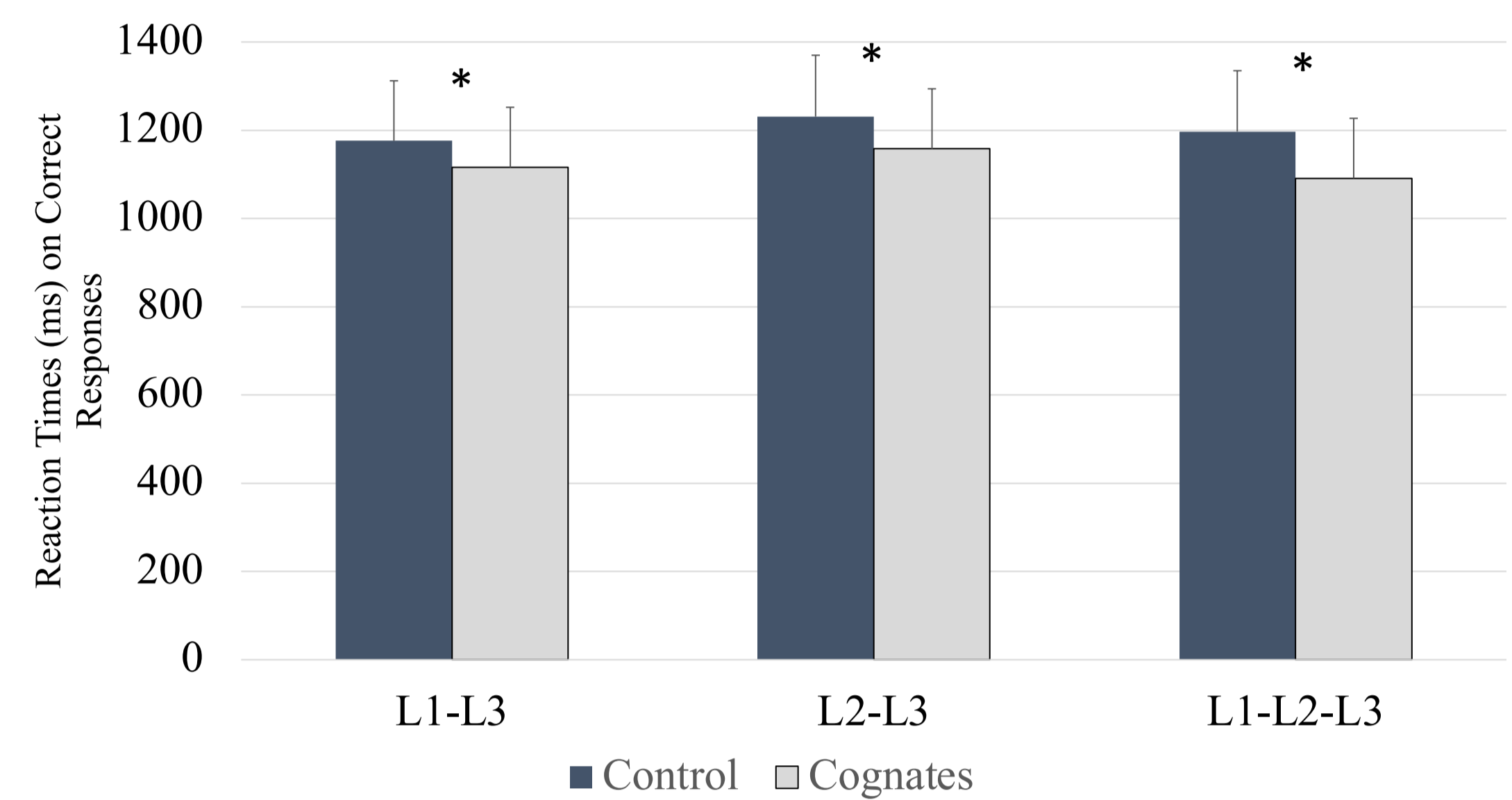
- Matchings of critical and control primes (overall and across conditions)

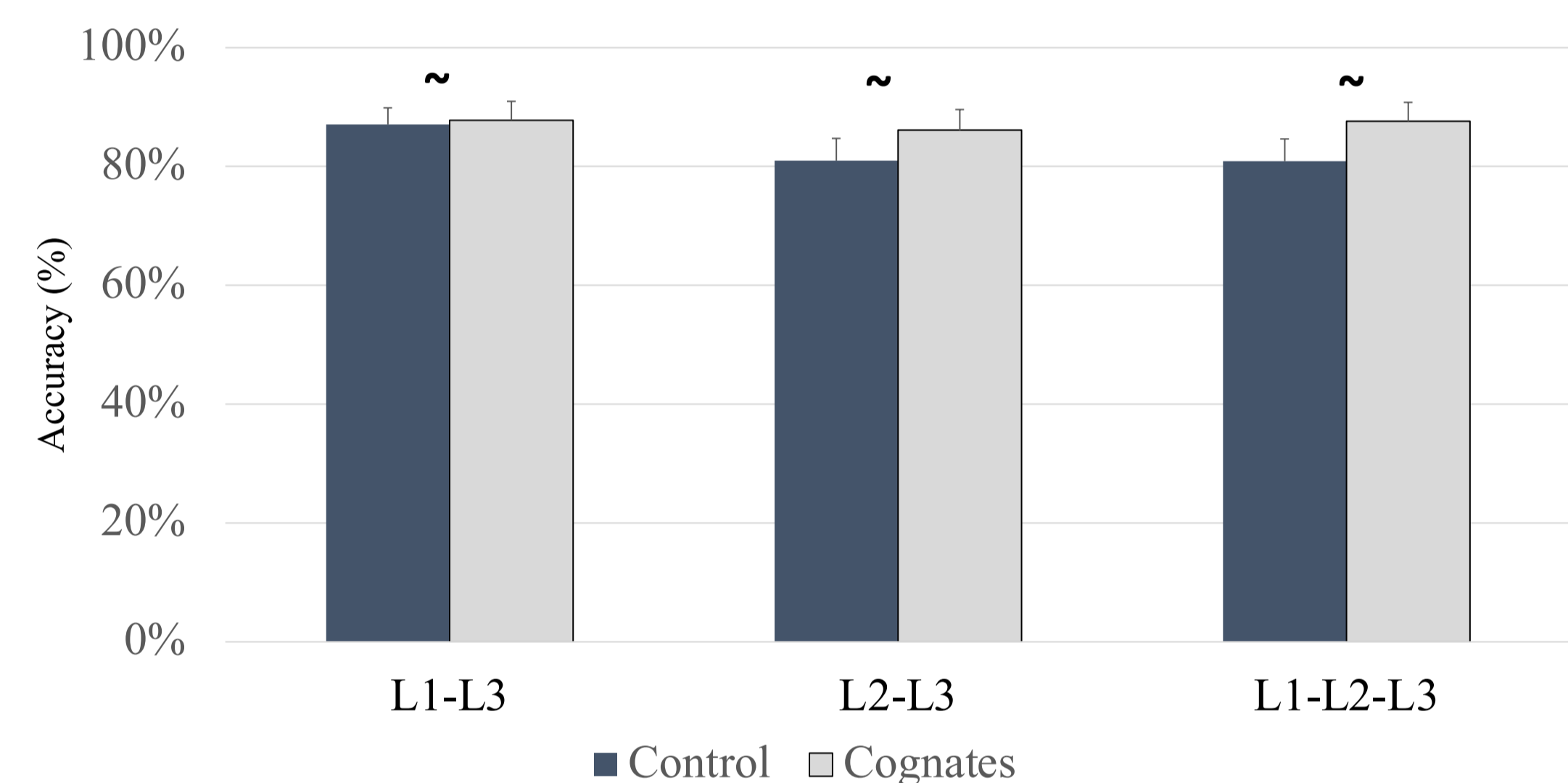| Condition	L1 (Arabic)	L2 (Hebrew)	L3 (English)
L1-L3 double cognates	/blu:zi/ بلوزة	/xultsa/ חולצה	/blaʊz/ blouse
L2-L3 double cognates	/batri:q/ بطريق	/pingwin/ פינגווין	/pɛŋgwɪn/ penguin
L1-L2-L3 triple cognates	/dolfi:n/ دولفين	/dolfi:n/ דולפין	/dɒlfɪn/ dolphin

Results:

- Analyses using lme4 (Baayen, Davidson, & Bates, 2008) in R.
  - glmer(TargetAcc ~ 1 + Condition + PrimeType + Condition:PrimeType + (1 + PrimeType | Target)) + (1 | Subject), data=trilexSD, family=binomial)
  - lmer(log(TargetRT) ~ 1 + Condition + PrimeType + Condition:PrimeType + (1 | Subject) + (1 + PrimeType | Target), data=trilexSD_CorrectResponsesSubset)

The effect of Prime Type on Reaction Times (RT)

The effect of Prime Type on Accuracy

A main effect of prime type was observed in RT and Accuracy, but no interaction with the Condition.

Discussion and Conclusions:

- Our results show facilitation in all three cognate conditions, with no difference among the different cognate primes.

- The lack of a difference across the cognate conditions is consistent with the proposal of the Unified Competition Model (MacWhinney, 2005, p. 55) that "whatever can transfer, will".

- Evidence for independent transfer from either L1 or L2 in L3 processing. In the current data, no evidence for additive facilitation from both languages.

- Lexical CLI is not limited to either script overlap or to typological similarity across languages.

- Future studies will examine how L1/L2/L3 proficiencies modulate these effects.

References:

Bardel, C., & Falk, Y. (2007). The role of the second language in third language acquisition: The case of Germanic syntax. *Second Language Research, 23,* 459–484.

Degani, T., Prior, A., & Hajajra, W. (2018). Cross-language semantic influences in different script bilinguals. *Bilingualism: Language and Cognition, 21*(4), 782-804.

De Deyne, S., & Storms, G. (2017). Small world of words, www.smallworldofwords.org.

Lemhöfer, K., Dijkstra, T., & Michel, M. (2004). Three languages, one ECHO: Cognate effects in trilingual word recognition. *Language and Cognitive Processes, 19*(5), 585-611.

MacWhinney, B. (2005). A unified model of language acquisition. In J. F. Kroll & A. M. B. De Groot (Eds.), *Handbook of Bilingualism: Psycholinguistic Approaches* (pp. 49-67). Oxford: Oxford University Press.

Sanz, C., Park, H. I., & Lado, B. (2015). A functional approach to cross-linguistic influence in ab initio L3 acquisition. *Bilingualism: Language and Cognition, 18,* 236–251.

Szubko-Sitarek, W. (2011). Cognate facilitation effects in trilingual word recognition. *Studies in Second Language Learning and Teaching, 1*(2), 189-208