The bilingual lexicon under Distributed Morphology: An investigation of gender agreement in code-switching

An adequate model of the Language Faculty must account for bilingualism, specifically, how two sets of lexical representations and grammatical rules may be represented simultaneously. In this study, we explore the resolution of grammatical gender agreement in Hebrew-English intra-sentential code-switching (ICS) and discuss implications for the nature of lexical representations. We experimentally examine bilinguals' gender agreement preferences when the agreement controller is in English, and thus genderless, and the agreement target is in Hebrew, and must surface as either feminine or masculine (see example 1).

1) Their old apartment *le'at le'at mitparek-∅/**et*** Eng/*Heb*
slowly slowly fall.apart-**M/F**

Previous research suggests that bilinguals may resolve (1) via *default agreement*, which is masculine in Hebrew [1]; or *analogical agreement*, i.e., based on the gender of the controller's equivalent in Hebrew, which is feminine in (1) [2]. These strategies implicate contrasting representations in bilingual grammar: either dissociated language specific lexica, or an inventory of lexical items that share morpho-syntactic features (respectively).

These predictions track a central area of debate in syntactic theory: the nature of the lexicon. Under a lexicalist architecture [3-4], wherein phonological exponence is specified pre-syntactically, items in different languages must be dissociated, such that the features of one should not determine agreement with the other. However, under the Distributed Morphology (DM) architecture [5], language specific exponence is assigned at PF, which permits non-language specific, abstract lexical items which could share gender.

Our study includes three experiments (2 reported here) examining the prevalence of analogical agreement in Hebrew-English ICS, each comparing: post-nominal adjective concord, subject-verb agreement, and co-referential pronoun form selection (discourse anaphora).

Sentence completion task. 52 early Hebrew-English bilinguals read sentence preambles containing an inanimate English noun and selected their completion: either a feminine or a masculine Hebrew agreement target. 24 item sets, crossing: *gender in Hebrew* {*masculine* or *feminine*} and the type of agreement *dependency* {*concord*, *subj-verb* or *pronoun*}.

dependency	*gender in Hebrew* {**masc** | **fem**}		*M target*	*F target*
concord	We're looking for a {**house** | **apartment**}	*yaxasit*	*zol*	*zola*
		relatively	cheap.M	cheap.F
subj-verb	Their old {**house** | **apartment**} *le'at*	*le'at*	*mitparek*	*mitpareket*
	slowly	slowly	fall.apart.M	fall.apart.F
pronoun	We bought an old {**house** | **apartment**}	*ve-šipacnu*	*oto*	*ota*
		and.renovated	it.M	it.F

Results (Figure 1). Participants tended to choose Hebrew-matching agreement, but this tendency was stronger with *masculine-* compared to *feminine-in-Hebrew* nouns (Est. -1.60, Crl 95% [-2.25, -1.00]), reflecting the effect of the masculine default. Default agreement was more prevalent in the *concord* compared to the *pronoun* condition: the *concord* condition displayed less Hebrew-matching agreement with *feminine-in-Hebrew* nouns, and more with *masculine-in-Hebrew* nouns, than the *pronoun* condition (Est. -1.67, Crl 95% [-3.02, -0.38]).

Auditory judgment task. 85 early Hebrew-English bilinguals judged the acceptability of recorded ICS sentences. The sentence completion materials were modified into full sentences in a 3×2×2 design, with the factor *agreement* {*match* or *mismatch* gender in Hebrew}.

Results (Figure 2). Participants prefer Hebrew-matching (analogical) agreement (Est. 0.58, 95% Crl [0.42, 0.74]). This preference is stronger (A) with *masculine-* than *feminine-in-Hebrew* nouns (Est. -0.26, 95% Crl [-0.35, -0.17]); and (B) in *pronoun* and *subj-verb* conditions than the *concord* condition (*concord/pronoun*: Est. 0.19, Crl 95% [-0.01, 0.38]; *concord/subj-verb*: Est. 0.25, Crl 95% [0.00, 0.51]), with *concord* displaying the smallest penalty for masculine agreement with *feminine-in-Hebrew* nouns.

Discussion. Across the three experiments, we find a preference for analogical agreement, supporting an integrated model of the bilingual lexicon within the DM architecture. We propose that the phonological exponents *apartment* and *dira* (apartment in Hebrew) correspond to a single abstract lexical item (2), which is selected by a Feminine marked nominal categoriser, *n*. The derived element triggers feminine agreement, irrespective of whether it is ultimately realized in English or Hebrew.

2) Pre-syntactic lexical roots, merged with a gendered *n* and their phonological exponents at PF:
   [$\sqrt{}\alpha$, *n*[+F]] → {/apartment/, /dira/}
   [$\sqrt{}\beta$, *n*[–F]] → {/house/, /bayit/}

López (2020) [6] discusses analogical noun-class agreement in Swahili-English ICS, and similarly posits that English and Swahili nouns share a single root. However, in his analysis, this shared root may be combined with either an English (genderless) *n*, or with the relevant Swahili *n*, endowing it with a noun class. This account predicts optionality between analogical and default agreement in ICS: the former arise when the gendered categorizer is used, while the latter when the genderless one is.

While the tendency for analogy in our experiments was accompanied by some default agreement, we argue that our results do not reflect optionality, as default agreement is judged as significantly degraded. Accordingly, we suggest that English-Hebrew bilinguals' grammar only represents a gendered *n*. This may be the result of an acquisition process that favors economy, collapsing an underspecified and a marked item into a composite maximal representation. This generates the strong prediction that other functional elements in bilingual grammar should follow suit, yet to be tested.

Instead of optionality in grammar, we propose that default agreement in ICS arises due to a performance issue. The performance of agreement relies on retrieval of gender information via lexical or morphological information [7]. In our case of ICS, the local English exponent is morphologically unmarked, which may interfere with the execution of agreement. This proposal likens agreement in ICS to agreement with irregularly marked Hebrew nouns, which is reportedly error prone [8].

Moreover, we find that default agreement is modulated by the type of agreement configuration: more default agreement was observed in adjectival concord than pronoun form selection (cf. [9]). We suggest that this reflects the likelihood of morphology-based interference given the different routes to gender information in the performance of each agreement type. In particular, concord is controlled by a local antecedent, syntactically defined, while pronouns' phi-features are determined via retrieval of the discourse referent's feature-specification. The latter process, not involving a syntactic relation, may be less affected by the particular local form realizing the discourse referent. This effect may be important in interpreting previously observed ICS agreement patterns, particularly the prevalence of default agreement in Spanish-English determiner-noun concord [10].

This late-insertion architecture situates ICS at PF, implying that it is only after the syntactic derivation, when phonological forms are assigned, that the switch between languages occurs [6, 11-12]. This raises questions about other cases of cross-linguistic variation, such as contrasting word order or certain displacement requirements. The challenge for each case, as before, would be to understand whether it requires contrasting lexical features active in the syntax, or it could be handled at PF. If the model suggested by our study is on the right track, further investigation of ICS patterns could provide valuable insight into the locus of cross-linguistic variation in grammar.

Figure 1

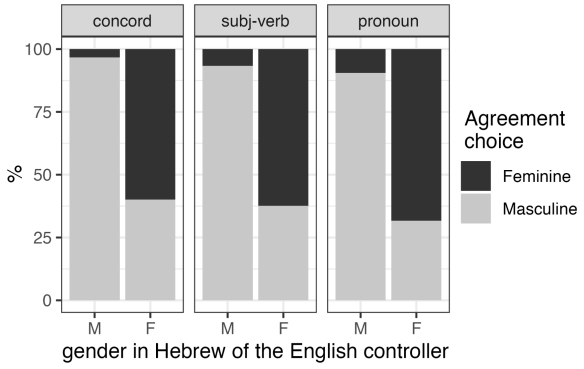
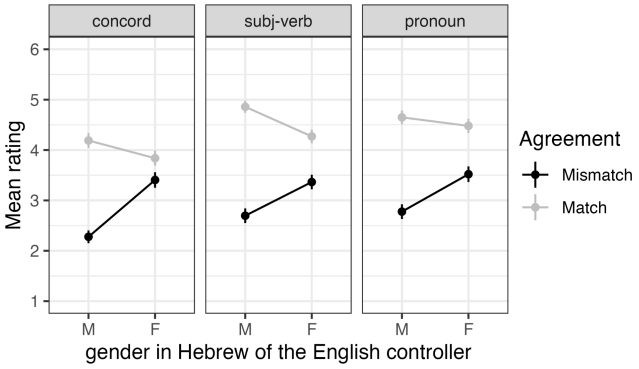


Figure 2



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