The Differential Representation of Number and Gender in Spanish

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General outline. The goal of this paper is to test the hierarchical organization of phi-features with a special emphasis on number and gender in Spanish. We investigate **(i)** whether number and gender belong to the same category space in the phi-feature hierarchy (as in Harley & Ritter 2002) or one feature dominates the other (e.g., Cowper 2005), and **(ii)** whether number and gender evidence single- or multi-valued systems for their respective features (cf. Harris 1991 for gender). Given the lack of consensus on these issues based on primary data, we approach questions (i) and (ii) experimentally, using the phenomenon of agreement attraction: a situation where ungrammatical sequences are perceived as grammatical when one of the NPs is erroneously identified as determining agreement.

(1) The key to the **cabinets** <u>are</u> on the table.   (Bock et al., 2001)

By comparing agreement effects across number and gender, we address point **(i)**: depending on whether number and gender features are equally active/visible in linguistic representations, we can determine whether these categories have the same cognitive strength. Within a single class of features, we address point **(ii)**: depending on the visibility of specific feature values, we determine whether the category of number (and, separately, gender) is structured as single- or multi-valued. We find that number but not gender features yield attraction effects, evidencing the higher accessibility of number features. This result motivates the dominance of number over gender in the phi-feature hierarchy (cf. Antón-Méndez et al. 2002; Carminati 2005 for similar conclusions based on different data). Turning to (ii), we find that plural drives attraction while singular is functionally inert. We thus confirm the single-valued representation system for number: [PL] vs. unspecified. Within the gender category, masculine and feminine behave on par in agreement, motivating the multi-valued representation system for gender: [M] vs. [F] (pace Harris 1991).

To further evaluate Harris' hypothesized single-value Spanish gender system, we extended the scope of our study beyond monolingual controls to heritage Spanish speakers. Here we do find evidence of a single-valued representation system for gender ([F] vs. unspecified). Thus, heritage Spanish speakers reinterpret gender as a simpler, single-valued system, which is consistent with the simplification feature systems elsewhere outside of L1 (gender in heritage Russian: Polinsky 2008; Sekerina 2012; gender in Spanish-German code-switching: Gonzalez-Vilbazo 2008; gender in Italian L2 learners of Spanish: Dussias et al. 2013; gender in Chinese L2 learners of Spanish: Dowens et al. 2011).

Experiments. Adjectives in Spanish inflect for gender and number and, crucially, can be used predicatively so as to allow for intervening material between the adjective and its subject noun. Consider the sentences in (2). Note the predicative use of the adjective, as well as the intervening noun (in a prepositional phrase) between the subject noun and its predicate. Agreement on the adjective is determined by the features of the head noun (shown in bold).

(2) a. Considero **el libro** en los tableros excelentemente escrito

b. Considero **los libros** en la mesa excelentemente escritos

c. Considero **las cartas** en el tablero excelentemente escritas

d. Considero **la carta** en las mesas excelentemente escrita

Only a handful of verbs in Spanish embed small clauses (Contreras 1987): *considerar* 'consider' in (2), *dejar* 'leave' and *ver* 'see'. Within each item, we manipulated the number (SG vs. PL) and gender (M vs. F) of NP1, NP2, and ADJ; this manipulation yields 64 sentences: $2_{NP1-NUM} \times 2_{NP1-GEN} \times 2_{NP2-NUM} \times 2_{NP2-GEN} \times 2_{ADJ-NUM} \times 2_{ADJ-GEN} = 64$. Given that we are interested in the behavior of grammatical gender, that is, the gender a noun leaves the lexicon specified for, our gender manipulation on nouns required the use of different lexical items for masculine vs. feminine values. Within an item, we matched the meaning of these nouns as closely as possible (as with *tablero* 'table' and *mesa* 'table'). Stimuli were normed to avoid potential ambiguity such that NP2 could agree with ADJ; 60 subjects who did not take part in the experiment consistently rated the likelihood of this unintended parse low (average: 2 out of 5). Stimuli were recorded by

an adult male native speaker. We recruited 126 participants through Amazon's Mechanical Turk crowdsourcing service. Subjects listened to one version of each item and rated its acceptability on a scale from 1 (*completamente inaceptable* 'completely unacceptable') to 5 (*completamente aceptable* 'completely acceptable'). The results were split by the number/gender value for NP1. There was a strong main effect of grammaticality, which means that all the subjects recognize agreement violations in both number and gender. **NUMBER:** Native speakers showed pronounced agreement attraction with a NP1 in the SG and NP2 (attractor) in the PL ($p=0.05$). The effect in heritage speakers was similar however weaker. **GENDER:** Neither group showed attraction effects. The two groups differed in their rating of grammatical structures; the native speakers' ratings were comparable for grammatical agreement in M and in F while the heritage speakers rated agreement in F significantly higher than agreement in M ($p=0.001$).

Discussion. Number and gender thus reveal different patterns with respect to agreement attraction, which suggests that they are not equal in the phi-feature hierarchy, with number outranking gender on the phi-feature hierarchy.

 The difference between number and gender can be accounted for with two independently motivated assumptions: (3) the φ-probe only searches for a goal with certain features (relativized probing); (4) agreement in XP occurs with the highest phi-feature (Matushansky 2013; Preminger 2014). In addition to these assumptions, we adopt the Distributed Gender Hypothesis (Kramer 2013; Steriopolo & Wiltschko 2008): there are at least two gender features, natural gender, projected at the periphery of a DP, and grammatical gender, projected below N-level (either as a property of *n* or as property of roots). Since all the nouns in this study were inanimate, none of them were specified for natural gender and all had grammatical gender. The structure of the DPs is therefore as follows: (5) $[_{DP} ...[_{NumP} ...[_{NP} ... [\sqrt{P}_{\{Gender\}}]$. The absence of attraction is explained by the observation that grammatical gender is inaccessible from the nominal periphery. Since natural gender is projected at the DP periphery we predict that it could cause attraction effects and leave this for a future study.

  With respect to feature representation, we find that for both native and heritage speakers, number is structured as a single-valued opposition where PL is specified and SG is inert (underspecified). The explanation for such a contrast between SG and PL may reside in the morphological visibility of the plural. The featural representation of gender is different across native and heritage speakers. For native speakers, gender is a multi-valued feature, with both M and F equally specified; native speakers rate grammatical agreement with gender at a distance equally high for M and F. The multi-valued opposition in Spanish gender casts doubt on Harris' (1991) analysis of Spanish gender. However, heritage speakers' representation of gender is consistent with Harris' analysis because in this group only F is specified. We consider and reject the explanation that the change from multi-valued to single-valued representation of gender in heritage speakers is due to the influence of English, which lacks gender altogether. Single-valued F-based gender is also found in L1-Italian/L2- Spanish speakers (Dussias et al. 2013) and in Spanish-German code-switching (Gonzalez-Vilbazo 2008). Thus, non-native speakers of Spanish reanalyze the multi-valued representation of gender as a single-valued opposition because it offers a more constrained set of options.

Selected references. Antón-Méndez, I. et al. 2002. The relation between gender and number agreement processing. *Syntax* 5. **Bock, K. et al.** 2001. Some attractions of verb agreement. *Cognitive Psychology* 43. **Carminati, M.N**. 2005. Processing reflexes of the feature hierarchy. *Lingua* 115. **Contreras, H.** 1987. Small clauses in Spanish and English. *NLLT* 5. **Cowper, E.** 2005. A note on number. *LI* 36. **Dussias, P. et al.** 2013. When gender and looking go hand in hand, *SSLA* 35. **Harley, H. & E. Ritter**. 2002. Person and number in pronouns: A feature-geometric analysis *Language* 78. **Harris, J.** 1991. The exponence of gender in Spanish. *LI* 22. **Kramer, R.** 2013. Gender in Amharic: A morphosyntactic approach to natural and grammatical gender. *Language Sciences*, **Preminger, O.** 2014. Agreement and its failures. MIT Press. **Steriopolo, O., & M. Wiltschko**, 2008. Distributed Gender Hypothesis. *FDSL 7.5.*