Turkish register manipulation eliminates grammaticality asymmetry in attraction and challenges retrieval based accounts

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Spoiler. This work shows that the grammaticality asymmetry, a strong argument for cue-based retrieval (CBR) accounts of attraction, can be eliminated without between-subject manipulation of bias. In informal context, which never supports plural agreement unlike formal contexts in Turkish, we observe symmetrical attraction effects and challenge CBR accounts.

Background. Recent research shows that people make systematic errors in establishing a number agreement relation between a verb and its agreement controller, when another NP with a different number (the attractor) interferes. As a result, speakers may produce sentences like '**The key to the cabinets are rusty*,' or misclassify them as acceptable [1,11,16]. According to CBR accounts [5,9,16], these illusions, called attraction, arise as a result of a reanalysis of the attractor as the agreement controller at the site of the verb. Alternatively, Marking & Morphing accounts (MM) [4,7] propose that altered number representation of the entire subject phrase gives rise to these illusions. CBR predicts no illusion in grammatical sentences, for the cues provided by the verb can be satisfied. By contrast, MM expects speakers to classify grammatical sentences like '*The key to the cabinets is rusty,*' as unacceptable when the number information is distorted, i.e. nouns have mismatching numbers. It was assumed that this illusion does not arise in grammatical sentences, supporting CBR. However, the true extent of the illusion cannot be correctly measured in grammatical sentences, when the overall accuracy is close to 'ceiling' [15]. Recently, it was shown that when participants' a priori response bias towards 'yes' is manipulated through instructions and ratio of ungrammatical sentences, the symmetrical effects arise in both grammatical and ungrammatical sentences [7,13], thus supporting MM accounts. **The current study** (*N=174*) investigates a more naturalistic approach to this question by utilizing the effects of register on agreement in Turkish, in which attraction was previously attested with sentences like (1) as well [8, 12, 13, 14]. One contributor to these effects, however, can be register effects. Turkish third-person plural marking is licensed in a sentence uttered in a formal register, as in (2). Although the subject is singular and there is no plural NP in the sentence, the plural marking on the verb is licensed by the honorific '*efendim*' (sir). The current study aims to test the predictions of MM by naturally eliminating ceiling effects via informal interjections in a within-subject manipulation. Materials (1) for our speeded acceptability judgment were based on previous experiments and consisted of 40 sets with 8 conditions by crossing three factors: (i) grammaticality (*gram.* x *ungram.*), (ii) attractor number (*plural* x *singular*), (iii) register (*formal* x *informal*). All experimental items had a singular head, which was counterbalanced with 80 filler items. The formal register was induced with a post-verbal interjection such as '*efendim*' (sir) the informal register conditions ended with an interjection like '*lan*' (yo). **Our Results** (Fig1 & Fig2) confirmed the role of formal register as a licensor of the plural morpheme. Participants overall accepted formal sentences with plural verbs, ungrammatical sentences, (*M=.39, SE=.05*) more often than the informal sentences (*M=.20, SE=.04*), which was verified by our maximal Bayesian GLM model fitted to experimental sentences, assuming a Bernoulli distribution (*β=.49, CI=[.13,.84], P(>0)>.99*). In addition to the generic attraction effects seen in both registers, we see a decreased acceptability in grammatical sentences with plural attractors (*M=.77, SE=.01*) compared to those with singular attractors (*M=.81, SE=.01*). This effect is only present in informal registers. This was verified by strong evidence for a negative three-way interaction between the attractor number, the verb number, and the register (*β=-.45, CI=[-1.03,.17], P(>0)=.07*), which clearly lends support to MM accounts. **Taken together,** we provide additional evidence for attraction effects in grammatical sentences. This symmetrical behavior in grammatical and ungrammatical sentences supports the idea that the driving force behind attraction effects are erroneous number representation, instead of cue-based retrieval mechanisms based on the features of the verb. Thus, the grammatical asymmetry is due to task-related factors, such as bias or ceiling effects, rather than process-related factors as previously claimed by cue-based retrieval models.

Linguistic Examples. Experimental sentences (1) used in our experiment. Attractors are underlined and immediately precede the head. The register manipulation is induced with a post-verbal element: *'efendim'* (sir) or *'lan'* (yo).

(1) a. Singular Attractor, Grammatical (Singular Verb)

Yönetici-nin	aşçı-sı	mutfak-ta	sürekli	zıpl[a]-ıyor.
manager.SG-GEN	cook-POSS	kitchen-LOC	non-stop	jump-IMPF.SG

b. Singular Attractor, Ungrammatical (Plural Verb)

*Yönetici-nin	aşçı-sı	mutfak-ta	sürekli	zıpl[a]-ıyor-lar.
manager.SG-GEN	cook-POSS	kitchen-LOC	non-stop	jump-IMPF-PL

c. Plural Attractor, Grammatical (Singular Verb)

Yönetici-ler-in	aşçı-sı	mutfak-ta	sürekli	zıpl[a]-ıyor.
manager-PL-GEN	cook-POSS	kitchen-LOC	non-stop	jump-IMPF.SG

d. Plural Attractor, Ungrammatical (Plural Verb)

*Yönetici-ler-in	aşçı-sı	mutfak-ta	sürekli	zıpl[a]-ıyor-lar.
manager-PL-GEN	cook-POSS	kitchen-LOC	non-stop	jump-IMPF-PL

'*The cook of the manager(s) (is/are) jumping in the kitchen non-stop.

(2) *Okul-un müdire-si gel-di-ler, efendim.*
school-GEN principal.F-POSS come-PST-PL sir
'Sir, the school's principal has arrived.'

Figures. Data preprocessed and visualized using R and the tidyverse packages, and analyzed with the packages brms and cmdstan to fit maximal Bayesian GLMs [6].

Fig1. Mean Percentage of yes responses and standard errors by condition [2].

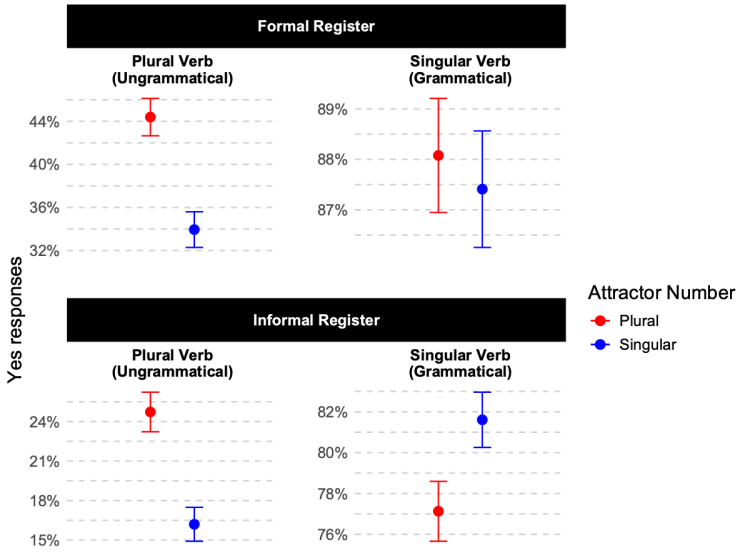
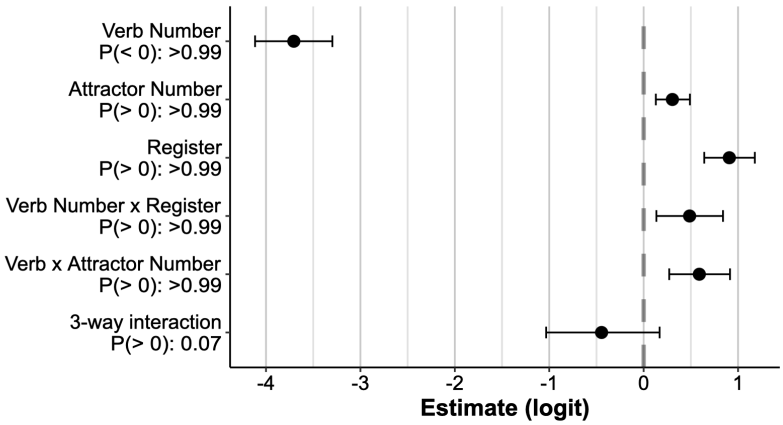


Fig2. Estimates and 95% CrIs for the regression coefs along with degree of belief for an effect.



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