

Quantifiers and agreement: semantics and morphosyntax at play

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Subject-verb agreement reveals interesting phenomena of interference or attraction in both production and comprehension. A morphological singular NP denoting a collective can trigger plural agreement (Bock et al., 1999). Agreement variability has been documented also for coordinated phrases (Keung & Staub, 2018; Foppolo & Staub, 2020).

To explore the dynamic interplay of semantics and morphosyntax during agreement in coordination, we tested conjunctive subjects containing the Italian quantifiers *qualche*[+sing]/*alcuni*[+plur] (*some*) and *ogni*[+sing]/*tutti*[+plur] (*all*). All quantifiers appearing in the conjunction were semantically plural, but they were morphologically singular (S) in two of the conditions and morphologically plural (P) in the other two. They were followed by either singular (S) or plural (P) verbs, leading to a Latin-square design consisting of 2 (quantifier's morphology - S/P) x 2 (verb number - S/P) conditions, 24 items each (Table 1). Two conjunctive subjects require plural verb agreement in Italian. We present three experiments.

Experiment 1 (42 participants) was an acceptability judgement task (on a 7-point Likert scale). Condition PP was expected to be the most natural and acceptable, while PS was expected to be unacceptable. The critical conditions were SP and SS, in which the quantifiers involved in the conjunction were morphologically singular, thus possibly modulating the acceptance of the singular verb, despite its ungrammaticality.

If notional plurality takes precedence over morphological agreement, we predict higher judgments for SP and PP sentences, in which the verb is plural, compared to SS and PS sentences, in which the verb is singular. If morphosyntax overrides notional plurality, we predict an asymmetry in ratings and no difference in reading times between SP-SS sentences (in which the quantifiers are morphologically singular) compared to PP-PS sentences (in which the quantifiers are morphologically plural). Results (Figure 1) showed an asymmetry between morphologically singular quantifiers (SP-SS) and morphologically plural quantifiers (PP-PS) both with singular and plural verb agreement (Table 2).

Experiment 2 tested the same sentences in a self-paced reading task (word by word) in a different group of participants (N=82). Singular/plural agreement always appeared on the auxiliary of the verb followed by a past participle. Longer reading times were recorded in PS (Figure 2). The interaction between subject morphology and verb agreement significantly predicted reading times ($t=-2.7$, $p=0.008$). Essentially, results confirmed the findings of Experiment 1, except for the difference found in the previous experiment between conditions SP and SS. Remarkably, RTs in condition SP and in condition SS were not significantly different ($t=1.7$, $p=0.08$).

Experiment 3 was a hybrid maze task in which participants (N=52) read sentences presented word by word and were asked to perform a lexical choice between two verb forms (singular or plural). We added two control conditions with the conjunction of either two singular or two plural subjects without the involvement of quantifiers. Results (Figure 3) showed that a conspicuous number of singular verb forms (23%) were chosen after the conjunction of two quantifiers with singular morphology, but not after the conjunction of two singular subjects.

Discussion. In general, results showed that neither singular nor plural verb forms are considered optimal in the case of conjoined morphologically singular quantifiers. In reading times no disruption is revealed when a singular verb follows notionally plural subjects with singular morphology. Moreover, when asked to explicitly choose the preferred verb form, participants chose singular verbs (23% of times) after the conjunction of two quantifiers with singular morphology but plural meaning. These findings show that morphosyntactic features of the quantifiers tend to influence subject-verb agreement more than their semantic features, despite appearing in a conjunction configuration.

Table 1. Experimental conditions.

Cond	Sentence	Quantifiers' semantics	Quantifiers' morphology	Verb number
SP	Per sicurezza, ogni meccanico e qualche ingegnere hanno ispezionato l'aereo.	plural	singular	plural
SS	*Per sicurezza, ogni meccanico e qualche ingegnere ha ispezionato l'aereo.	plural	singular	singular
PP	Per sicurezza, tutti i meccanici e alcuni ingegneri hanno ispezionato l'aereo.	plural	plural	plural
PS	*Per sicurezza, tutti i meccanici e alcuni ingegneri ha ispezionato l'aereo.	plural	plural	singular

Table 2. Output of the Cumulative Link Mixed Model (Experiment 1) with the acceptability ratings as dependent variable, sentence type as predictor and subjects and sentences as random intercepts. Contrasts were set as (-0.5,0,+0.5,0), c(0,-0.5,0,+0.5), c(-0.5,+0.5,0,0). We checked for a possible influence of the word-length of the auxiliary (ha/hanno).

	Estimate	Std. Error	z value	p value	Adding word - length as covariate in the model did not affect the results.
SP compared to PP	4.7	0.1	45.9	<.0001	
SS compared to PS	-4.8	0.1	-45.8	<.0001	
SP compared to SS	-5.8	0.1	-48.8	<.0001	

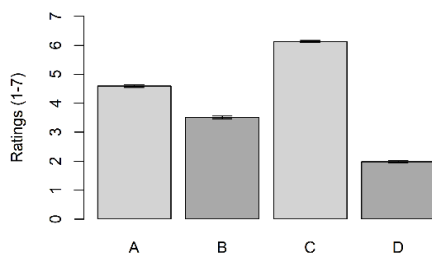


Figure 1. Mean ratings of Experiment 1.

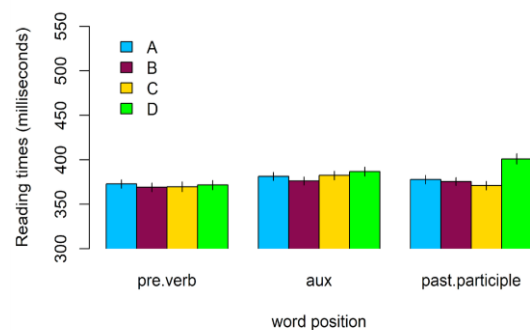


Figure 2. Reading times on pre-verb, auxiliary, and past participle in Experiment 2.

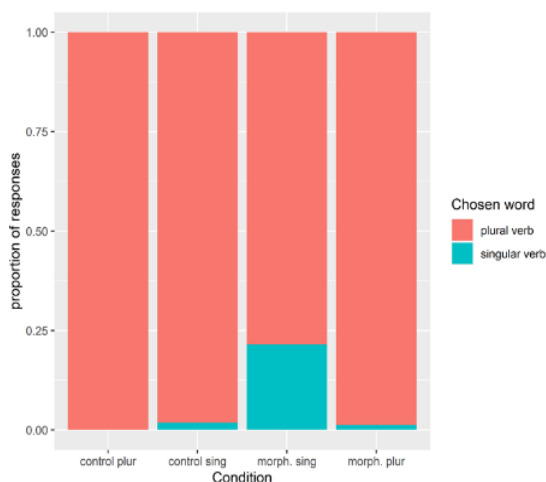


Figure 3. Percentage of singular/plural verb forms in the lexical choice (Experiment 3). Controls were sentences introduced by [NP_{plu} and NP_{plu}] or [NP_{sing} and NP_{sing}].

Selected references:

Bock, K., Nicol, J., Cutting, J. C., & Cutting, J. C. (1999). The Ties That Bind: Creating Number Agreement in Speech. *Journal of Memory and Language*, 44(3), 330–346.

Foppolo, F., & Staub, A. (2020). The puzzle of number agreement with disjunction. *Cognition*, 198, 104161.

Keung, L., & Staub, A. (2018). Variable agreement with coordinate subjects is not a form of agreement attraction. *Journal of Memory and Language*, 103, 1-18.