Looking back and looking forward: Anaphora and cataphora in Italian

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INTRODUCTION: Pronoun interpretation is central for comprehension. Prior work focused mostly on **anaphora**, where pronouns refer to *previously-mentioned* antecedents (ex.1a). There is less research on **cataphora**, where the antecedent *follows* the pronoun (ex.1c). Existing work (van Gompel & Liversedge 2003, Kazanina et al. 2007) suggests that cataphora triggers an active-search mechanism: The parser actively searches for a syntactically-licensed antecedent in the upcoming linguistic input

AIMS: We investigated anaphora and cataphora in Italian, a language with both *null and overt pronouns* (ex.1a,b). This allows us to test how (i) linguistic/form-specific referential biases interact with (ii) psycholinguistic processing biases such as the active-search mechanism. We also strive to clarify what the form-specific biases of overt and null anaphora and cataphora are: Existing findings for Italian are mixed. Generally, it has been observed that, when used in an ***anaphoric configuration***, null pronouns typically refer to preverbal subjects, while overt pronouns typically refer to objects and can signal topic-shifts. Carminati (2002) claims that Italian nulls prefer an antecedent in SpecIP and overts prefer an antecedent in a syntactic position lower in the phrase structure. However, Carminati's finding that nulls prefer subjects goes against Belletti et al. (2007). In a ***cataphoric configuration***, Serratrice (2007) and Belletti et al. (2007) also obtained conflicting results. However, as these studies had different aims, their stimuli are not directly comparable. (E.g. Carminati and Serratrice used a mix of tenses and different connectives, but recent work claims connectives and tense affect pronoun interpretation, e.g. Kehler 2002). Thus, one of our aims is to see whether a clearer picture emerges when we directly compare null vs. overt pronouns in anaphoric vs. cataphoric configurations, while controlling for tense and semantic relations between clauses.

We conducted two **EXPERIMENTS** manipulating (i) clause order (anaphora/cataphora) and (ii) pronoun type (null/overt). Examples are in ex.(1-2). Furthermore, to investigate effects of syntax (Binding), we manipulated pronoun location: In **Exp. 1,** the null/overt pronoun was in the subordinate clause (ex.(1a-d)), and in **Exp. 2**, the null/overt pronoun was in the main clause (ex.(2a-d)). Each study included 16 critical items and 28 fillers. All targets involved a 'while' relation (Italian '*mentre'*), controlling for semantic relations. All targets used the present tense, and were constructed so both referents (e.g. Maria/Rita in ex.1a-b) are plausible referents for the null/overt pronoun. The **method** was the same for both studies: Participants (24 in each exp) read sentences and answered questions probing the pronoun's interpretation (e.g. *Who is talking about the trip? Maria/Rita/Could be either/Someone else).* Participants chose from 4 options: subject name, object name, could-be-either, someone else.

RESULTS/EXP#1: **Nulls** prefer subjects in both configurations, but *this preference is weaker with anaphora* (Anaphora: 78% subject choices, 14.5% object choices; Cataphora: 84% subject-choices, 3.1% object-choices; *more object choices with anaphora*, p's<.05). **Overt pronouns** clearly prefer objects in the anaphora configuration (76% object choices), but in the cataphora configuration, they are split between subject/object/some-else (33.3%/37%/28.1%, no sig diff.). Thus, an *asymmetry* emerges: The ***nulls' subject bias*** is clearer in *cataphora*, the ***overts' object preference*** is clearer in *anaphora*. We attribute this to the processing load associated with holding a (cataphoric) pronoun unresolved in memory: Assuming the 'impatient' parser actively searches (van Gompel & Liversedge 2003) for a potential antecedent to quickly "discharge" an unresolved (null/overt) pronoun, we expect cataphora to show a boost in the rate of subject choices, since *subjects linearly precede objects*, even if this is in conflict with a language specific constraint (e.g. overt's object preference). We found this for both null and overt.

Exp1 suggests the processing bias to minimize unresolved dependencies affects *both* null and overt pronouns, *ignoring* distinctions in referential form. The results show that the linear order in which we encounter a constituent affects reference resolution, even if this going against grammar-specific biases. **Exp2** (pronoun=main clause, ex.(2a-d)) tested whether it also *ignores*/overrides syntactic factors (Binding Theory).

RESULTS/EXP#2: Unlike Exp1, the **nulls' subject bias** (79%) and **overt pronouns' object bias** (61%) are *both* clearer in *anaphora*; these biases disappear in cataphora, where both forms show an equally-strong preference for 'someone else' (null: 92.7% someone-else, overt: 95.8% someone-else), with only 3.1% subject-choices in both. This suggests Binding constraints are powerful enough (cf Kazanina et al. 2007) to prevent effects of the 'impatient' processing bias from surfacing in final interpretations.

IN SUM: The linear order of the encountered pronouns/constituents affects interpretation of Italian null and overt pronouns. We see that reference resolution is guided both by processing constraints and the referential biases of different forms (null/overt). In fact, processing constraints ('impatient parser') can modulate–or even eliminate–form-specific biases: Overts normally prefer objects, but when cataphoric, they are just as likely to refer to the first antecedent the comprehender encounters, the subject. However, in line with related research (e.g. Kazanina, Phillips), we find that strong grammatical principles like Binding can 'block' processing effects from

affecting final interpretations, contributing to our views of how processing biases and linguistic principles interact.

EXPERIMENT#1

(1a)	Maria hugs Rita,	…while… …mentre…	**She** ***lei***	…is talking about the trip. …parla del viaggio.	*[Main+ Subordinate_w/**anaphor**]*
(1b)	*Maria abbraccia Rita*		**NULL**		

(1c)	While… Mentre…	**She** ***lei***	…is talking about the trip, …parla del viaggio.	Maria hugs Rita. *Maria abbraccia Rita.*	*[Subordinate_w/**cataphor** +Main]*
(1d)		**NULL**			

[Shading indicates the main clause]

EXPERIMENT#2

(2a) (2b)	While Maria hugs Rita, *Mentre Rita abbraccia Rita,*	**She** ***lei*** **NULL**	…is talking about the trip. *…parla del viaggio.*	*[Subordinate+ Main_w/**anaphor**]*

(2c) (2d)	**She** ***Lei*** **NULL**	…is talking about the trip, *…parla del viaggio,*	…while Maria hugs Rita. *...mentre Maria abbraccia Rita.*	*[Main_w/**cataphor** +Subordinate]*

REFERNECES

Belletti, A., Bennati, E., and Sorace, A. (2007). Theoretical and developmental issues in the syntax of subjects: Evidence from near-native Italian. *Natural Language and Linguistic Theory, 25,* 657-689.

Carminati, M. (2002). *The Processing of Italian Subject Pronouns*. Ph.D. Dissertation, University of Massachusetts.

Kazanina, N., and Phillips, C. (2010). Differential effects on constraints in the processing of Russian cataphora. *The Quarterly Journal of Experimental Psychology*, 63, 371-400.

Kazanina, N., Lau, E. F., Lieberman, M., Yoshida, M., and Phillips, C. (2007). The effect of syntactic constraints on the processing of backwards anaphora. *Journal of Memory and Language*, 56, 385-409.

Serratrice, L. (2007). Cross-linguistic influence in the interpretation of anaphoric and cataphoric pronouns in English-Italian bilingual children. *Bilingualism: Language and Cognition*, 10, 225-238.

Van Gompel, R. P. G., and Liversedge, S. P. (2003). The influence of morphological information on cataphoric pronoun assignment.