Thematic information and pronominal resolution of inter-sentential subject

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Following work on co-reference in European Portuguese (Costa et al 1998, Costa 2003 and 2010), we report a task of sentence processing to test pronominal co-reference between sentence Subjects. European Portuguese being a null subject language, we tested the preference for covert vs. overt pronoun as a syntactic-semantic strategy, productive in anaphoric chains, now in untested conditions.

Referring to the Theory of Accessibility, (Ariel, 1990, 1994) and the Theory of the Antecedent Position, (Carminati, 2002), we created the conditions in (1) and (2). We used pairs of simple sentences in juxtaposition, where the pronominal Subject in the second sentence is ambiguous: it can either retrieve the Subject or the Direct Object of the previous sentence. Against results obtained in European Portuguese in complex sentences, we wanted to verify if Subject prominence holds out of intra-sentential domain. Moreover, choosing agentive and perceptive verbs and active and passive sentences, we tested semantic properties of the Subject with divergent thematic roles, given the Theory of Thematic Hierarchy (Grimshaw, 1991): in (1a) the Subject of the first sentence is Agent and in (1b) it is Theme; in (2a) it is a perceptive Experiencer, while in (2b) it is Theme.
We intended to verify:

(i) If covert pronouns are preferred to retrieve the Subject of the first sentence;
(ii) If thematic roles influence semantic prominence of the Subject of the first sentence.

Twenty-four informants read a sequential task (*PsyScope* programme) and chose the antecedent of the subject in the second sentence (the two antecedents, Subject and Direct Object appeared on the screen). We registered the time (in milliseconds) in choosing the antecedent and the choice (Subject /Direct Object).
The results show a significant preference for retrieving the Subject (71%), regardless of type of pronoun, and thematic role of the antecedent, and lower decision times for retrieving the Subject (1755ms) than the Direct Object (2055ms.). Moreover, the condition null pronoun for Subject/Agent antecedent had slower decision times than the one with overt pronoun, both in active (1817ms vs 1470ms) and passive sentences (2107ms vs 1918ms), thus contradicting the Avoid Pronoun Principle (Chomsky, 1981; Brito, 1991), as well as results for intra-sentential pronoun resolution, in European Portuguese, Italian and Spanish. It seems that the overt pronoun, and not the covert one, is the preferred option for retrieving a high salient antecedent in a discursive context.
Also, although we didn't find significant differences between retrieving an Agent Subject (1693ms) and a Theme Subject (1909ms), we did find them between retrieving a Theme Object (1856ms.) and a Passive Complement (2375ms.). More importantly, an Agent Passive Complement induces higher decision times (2247ms.) than an Experiencer one (2205ms.), which cannot be attributed to syntactic information but rather to semantic information.
We conclude that semantic information is important in pronoun resolution: a salient semantic constituent, the Agent, induces lower decision times in a prominent syntactic position and higher decision times in a non-prominent syntactic position.

Examples:

(1a) O *Samuel* $_{Agent}$ agrediu *o Bruno* no pavilhão. Horas mais tarde, Ø/ele discutiu o assunto com preocupação.
    Samuel hit Bruno in the pavilion. Hours later, Ø/ he discussed the matter with concern.

(1b) *O Samuel* $_{Theme}$ foi agredido pelo Bruno no pavilhão. Horas mais tarde, Ø/ele discutiu o assunto com preocupação.
Samuel was hit by Bruno in the pavilion. Hours later, Ø/ he discussed the matter with concern.

(2a) O *Júlio* $_{Experiencer}$ ouviu o Tobias na loja. No dia seguinte, Ø/ele arrumou as estantes.
    Júlio heard Tobias at the store. The following day, Ø/he tidied the shelves.

(2b) O *Júlio* $_{Theme}$ foi ouvido pelo Tobias na loja. No dia seguinte, Ø/ele arrumou as estantes.
Júlio was heard by Tobias at the store. The following day, Ø/he tidied the shelves.

Results:

	SN1			SN2	
condition[1]	decision times in ms.	% answers	condition	decision times in ms.	% answers
SU/AG_Cov P	1817	72,5	DO/TE_Cov P	1898	27,5
SU/AG_Ov P	1470	73,3	DO/TE_Ov P	2080	26,7
SU/EX_Cov P	1518	74,2	DO/TP_Cov P	1901	25,8
SU/EX_ Ov P	1655	65,8	DO/TP_Ov P	1736	34,2
SU/TE_Cov P	2107	65,8	CP/AG_Cov P	2380	34,2
SU/TE_Ov P	1918	75,8	CP/AG_Ov P	2059	24,2
SU/TP_Cov P	1778	74,2	CP/EX_Cov P	2108	25,8
SU/TP_Ov P	1780	65,0	CP/EX_Ov P	2277	35,0
Means	1755	70,8	Means	2055	29,2

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[1] Cov P – retrieval by covert pronoun   Ov P – retrieval by overt pronoun
SU/TE – Theme subject   SU/TP – Theme subject of perceptive verb
DO/TE – Theme direct object   DO/TP – Theme direct object of perceptive verb
CP/AG – Agent passive complement   CP/EX – Experiencer passive complement