

Two novel effects in pronoun interpretation: case parallelism and verb transitivity

Rebecca Tollan and Daphna Heller, *University of Toronto*

The interpretation of pronouns has received much attention in the literature because pronouns are underspecified and thus depend on prior context for interpretation. One important factor in pronoun interpretation is the *grammatical function* of the antecedent, with a strong preference for subjects over objects [1-5]. A second factor known to affect pronoun interpretation is *parallelism*, where listeners prefer an antecedent with the same grammatical function as the pronoun [6-8].

Here, we examine Niuean, an ergative Polynesian language (spoken on Niue island and in New Zealand), where verb transitivity affects case marking: transitive subjects are marked ERGative, whereas intransitive subjects are marked ABSolute; transitive objects are also marked ABSolute. Niuean is a ‘split ergative’ language: it also has (a small number of) verbs which are transitive (i.e., have an obligatory object) and yet take ABS-OBLique case marking. First, because not all subjects bear the same case marking (some are ERG, others are ABS), this language allows us to separate parallelism in case from parallelism in grammatical function, which are always co-occurring in nominative-accusative languages (e.g., English, German) where these effects have been studied. Second, the existence of transitive and intransitive verbs allows us to ask whether the status of the object as obligatory or optional (i.e., transitivity) in the antecedent affects subsequent pronoun resolution.

Method. Participants heard a discourse (see Table) and had to ‘act out’ the events described using cards with pictures of animals (e.g., dog, rabbit, lion), revealing their interpretation of the pronoun. We manipulated two factors (3x2, within subjects):

(i) The antecedent sentence was:

- (a) Trans-ERG: a transitive sentence with an **ERG subject** and an obligatory **ABS object**;
- (b) Trans-ABS: a transitive sentence with an **ABS subject** with an obligatory **OBL object**;
- (c) Intr-ABS: an intransitive sentence with an **ABS subject** with an optional **OBL object**.

(ii) The critical pronoun *ia* (‘it’; **ABS**), was either the subject or object of the second sentence.

The table summarizes whether the pronoun is parallel with the previous SUBJECT in grammatical role and case.

Transitive-ERG	<i>Ne tutuli he kulī e lapiti,</i> PAST chase ERG dog ABS rabbit ‘The dog chased the rabbit,	<i>SUBJECT pronoun</i> <i>ti tihe a ia.</i> and sneeze ABS it and it sneezed.’	Parallelism: ✓grammatical * case
Transitive-ABS	<i>Ne fakaalofa e kulī ke he lapiti,</i> PAST pity ABS dog OBL rabbit, ‘The dog pitied the rabbit,		✓grammatical ✓case
Intransitive-ABS	<i>Ne poi e pusi ke he lapiti,</i> PAST run ABS dog OBL rabbit, ‘The dog ran to the rabbit,		✓grammatical ✓ case
Transitive-ERG	<i>Ne tutuli he kulī e lapiti,</i> PAST chase ERG dog ABS rabbit ‘The dog chased the rabbit,	<i>OBJECT pronoun</i> <i>ti gagau he leona a ia.</i> and bite ERG lion ABS it and the lion bit it.’	*grammatical * case
Transitive-ABS	<i>Ne fakaalofa e kulī ke he lapiti,</i> PAST pity ABS dog OBL rabbit, ‘The dog pitied the rabbit,		*grammatical ✓case
Intransitive-ABS	<i>Ne poi e pusi ke he lapiti,</i> PAST run ABS dog OBL rabbit, ‘The dog ran to the rabbit,		*grammatical ✓ case

Results (n = 46, tested on Niue and in Auckland, NZ). The dependent measure is the proportions of subject antecedents (which was the preferred antecedent in all conditions).

Antecedent	SUBJECT pronoun (intransitive sentence)	OBJECT pronoun (transitive sentence)	
Transitive-ERG	✓ grammatical ✗ case .86 (74/86)	✗ grammatical ✗ case .74 (63/85)	.81 (137/171)
Transitive-ABS	✓ grammatical ✓ case .90 (77/86)	✗ grammatical ✓ case .81 (68/84)	.85 (145/170)
Intransitive-ABS	✓ grammatical ✓ case .81 (69/85)	✗ grammatical ✓ case .88 (76/86)	.84 (145/171)
	.85 (220/257)	.81 (207/255)	

We used a mixed-effects logistic regression model, with antecedent and position as predictors (centred Helmert contrasts). Neither main effects were significant ($ps > .13$), but the overall antecedent X position interaction was significant ($p = .0098$). We thus conducted planned comparisons conducted for each level of position, examining the effect of the antecedent. When the pronoun was an SUBJECT (of an intransitive verb), the preference for a subject antecedent did not change as a function of the antecedent ($ps > .078$). In contrast, when the pronoun was the OBJECT (of a transitive verb), the case frame of the previous sentence had an effect on interpretation.

First, subject antecedents were chosen more for the ABS object pronoun when the previous subject was also marked with ABS case (in Transitive-ABS) compared to when the previous subject was marked with ERG case (in Transitive-ERG: $z = -2.415$, $p = .0157$). This is an effect of *case parallelism*: a subject antecedent for an object pronoun is preferred when that subject antecedent bears the same case as the pronoun; this is independent from parallelism in grammatical role, which is not available here.

Second, subject antecedents were chosen more - that is, objects were chosen *less* - when the previous object was optional (in Intransitive-ABS) than when the object was obligatory (in Transitive-ABS: $z = 2.456$, $p = .0141$). This is an effect of *transitivity*: an object antecedent is preferred when the previous object is an obligatory one rather than optional; this effect is independent of case, as the case frame of both antecedent sentences in this comparison is ABS-OBL.

Conclusion. We find two novel effects in pronoun interpretation. First, an **effect of case parallelism**, whereby an antecedent that bears the *same* case as the pronoun is preferred over an antecedent that bears a *different* case (note that this effect is observed when there is no parallelism in grammatical role). Interestingly, this effect is observed with objects pronouns but not with subject pronouns. Second, an **effect of verb transitivity**: an obligatory argument is preferred as the antecedent of the pronoun over an antecedent that is optional; we do not know of related effects in prior work. Note that the overall preference for subjects over objects as the antecedent for pronouns is nevertheless observed, indicating that subjecthood is, overall, the most influential factor.

References: [1] Grosz et al. (1995). *Assoc. for Computational Ling.* [2] Sheldon (1974). *J. of Verbal Learning and Behaviour.* [3] Brennan (1995). *LCP* [4] Almor (1999). *Psychological Review* [5] Arnold et al. (2000). *Cognition.* [6] Smyth (1992). *Spoken Lang. Proc.* [7] Chambers & Smyth (1998). *JML.* [8] Kehler (2002). *Coherence, reference, and the theory of grammar.*