

## Pronoun resolution in an ergative language: effects of case and transitivity

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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 is *parallelism*, where listeners prefer an antecedent with the same grammatical function as the pronoun [6-8]. This has been studied in nominative-accusative languages (e.g., English), where all subjects are marked with nominative case, and objects are marked accusative, and so parallelism of grammatical function and case coincide.

Here, we examine Niuean, an ergative Polynesian language, in which transitive subjects are marked ERGative, whereas intransitive subjects and transitive objects are ABSolutive. Niuean also exhibits 'split ergativity': a small number of transitive verbs take ABS subjects and OBLique objects. This allows us to ask whether listeners prefer an antecedent that is parallel in case, or whether parallelism targets only grammatical function. A secondary question is whether the status of the object as obligatory or optional (i.e., transitivity) also affects pronoun resolution choices.

**Method.** Participants heard a discourse (1) and had to 'act out' the events described using pictures (2), revealing their interpretation of the pronoun. We manipulated two factors (3x2, within subjects). The first was the type of the **antecedent** sentence:

- (a) Trans-ERG: a transitive sentence with an ERG subject and an obligatory ABS object (1:1);
- (b) Trans-ABS: a transitive sentence with an ABS subject with an obligatory OBL object (1:2);
- (c) Intr-ABS: an intransitive sentence with an ABS subject with an optional OBL object (1:3).

The second factor manipulated the **position** of the pronoun *ia* ('it', marked ABS), which was either the intransitive subject (1a) or the transitive object (1b) of the 2nd conjunct. The grammatical function and case parallelisms for the six conditions are shown in (4).

**Results** ( $n = 46$ , tested on Niue (3) and in Auckland, NZ). The dependent measure is the proportions of subject antecedents (5): note that a subject antecedent is preferred in all conditions. 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 ( $p = .0098$ ). We thus conducted planned comparisons conducted for each level of **position**, examining the effect of the antecedent. When the pronoun was an intransitive subject (1a), the preference for a subject antecedent did not vary as a function of the antecedent ( $ps > .078$ ), meaning that the preference for a subject antecedent did not differ according to verb type when the pronoun was the *subject*. In contrast, when the pronoun was the *object* of a transitive verb (1b), the preference for a subject antecedent was affected by the case frame of the previous sentence. First, subjects were chosen less (i.e., objects were chosen more) when the previous subject was *not* marked ABS (in Trans-ERG) compared to when the previous subject was marked ABS, like the pronoun (in Trans-ABS:  $z = -2.415$ ,  $p = .0157$ ). This demonstrates an effect of case: a subject antecedent for an object pronoun is less preferred when the subject antecedent is marked with a different case (i.e., ERG, while the pronoun is ABS). Second, subjects were chosen more (i.e., objects were chosen less) when the previous object was optional (in Intr-ABS) than when it was obligatory (in Trans-ABS:  $z = 2.456$ ,  $p = .0141$ ). This demonstrates an effect of transitivity: a subject antecedent for an object pronoun is *more* preferred when the subject antecedent is the sole argument of the verb and the object is optional.

**Conclusion.** The overall preference for subject antecedents observed here is parallel to prior findings in nominative languages. More interestingly, we find novel effects that have not been isolated in nominative languages, for object pronouns. First, an effect of case parallelism: a subject antecedent that bears the same case as the pronoun is preferred over one that does not. Second, an effect of verb transitivity: an obligatory argument is preferred as the antecedent of an obligatory argument over an antecedent that is optional. While these effects are novel, it is notable that, like parallelism effects in English [7-8], they are found with object pronouns only.

(1) (a) Intransitive 2nd conjunct: ABS Pronoun is **subject** in intransitive sentence

Antecedent sentence:	2nd conjunct: Intransitive
1. Transitive- ERG <b>Ne tutuli he kulī e lapiti,</b> PAST chase <b>ERG dog ABS rabbit</b> 'The dog chased the rabbit,	<b>ti tihe a ia.</b> and sneeze <b>ABS it</b> and it sneezed.'
2. Transitive- ABS <b>Ne fakaalofa e kulī ke he lapiti,</b> PAST pity <b>ABS dog OBL rabbit,</b> 'The dog pitied the rabbit,	<b>ti tihe a ia.</b> and sneeze <b>ABS it</b> and it sneezed.'
3. Intransitive- ABS <b>Ne poi e pusi ke he lapiti,</b> PAST run <b>ABS dog OBL rabbit,</b> 'The dog ran to the rabbit,	<b>ti tihe a ia.</b> and sneeze <b>ABS it</b> and it sneezed.'

(1) (b) Transitive 2nd conjunct: ABS Pronoun is **object** in transitive sentence

Antecedent sentence:	2nd conjunct: Transitive
1. Transitive- ERG <b>Ne tutuli he kulī e lapiti,</b> PAST chase <b>ERG dog ABS rabbit</b> 'The dog chased the rabbit,	<b>ti gagau he leona a ia.</b> and bite <b>ERG lion ABS it</b> and the lion bit it.'
2. Transitive- ABS <b>Ne fakaalofa e kulī ke he lapiti,</b> PAST pity <b>ABS dog OBL rabbit,</b> 'The dog pitied the rabbit,	<b>ti gagau he leona a ia.</b> and bite <b>ERG lion ABS it</b> and the lion bit it.'
3. Intransitive- ABS <b>Ne poi e pusi ke he lapiti,</b> PAST run <b>ABS dog OBL rabbit,</b> 'The dog ran to the rabbit,	<b>ti gagau he leona a ia.</b> and bite <b>ERG lion ABS it</b> and the lion bit it.'

(2) Display board



(3) Niue: location



**References:** [1] Grosz et al. (1995). *Assoc. for Computational Linguistics*. [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 Language Proc.* [7] Chambers & Smyth (1998). *JML*. [8] Kehler (2002). *Coherence, reference, and the theory of grammar*.

(4) How the pronoun relates to the **subject** of the previous sentence across conditions:

Antecedent sentence:	ABS Pronoun is subject in intransitive sentence	ABS Pronoun is object in transitive sentence
Transitive-ERG	✓ Grammatical parallelism ✗ Case parallelism	✗ Grammatical parallelism ✗ Case parallelism
Transitive-ABS	✓ Grammatical parallelism ✓ Case parallelism	✗ Grammatical parallelism ✓ Case parallelism
Intransitive-ABS	✓ Grammatical parallelism ✓ Case parallelism	✗ Grammatical parallelism ✓ Case parallelism

(5) Proportion of **subject** antecedent choice

Antecedent sentence:	ABS Pronoun is <b>subject</b> in intransitive sentence	ABS Pronoun is <b>object</b> in transitive sentence	
Transitive-ERG	.86 (74/86)	.74 (63/85)	.81 (137/171)
Transitive-ABS	.90 (77/86)	.81 (68/84)	.85 (145/170)
Intransitive-ABS	.81 (69/85)	.88 (76/86)	.84 (145/171)
	.85 (220/257)	.81 (207/255)	