Third readings by semantic scope lowering: Prolepsis in Tiwa[1]

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Abstract. Tiwa (Tibeto-Burman; India) attitude reports allow for proleptic objects, base-generated in the matrix clause but semantically related to a bound pronoun in the embedded clause. Unlike prolepsis in German (Salzmann, 2017b) and Nez Perce (Deal, 2018), which only allow for classic *de re* readings of the proleptic object, Tiwa prolepsis supports both classic *de re* and third readings. We provide an analysis that derives third readings via semantic scope lowering, an analytical relative of semantic reconstruction, and consider cross-linguistic implications.

Keywords: attitude reports, third readings, prolepsis, *de re*, semantic variation, semantic fieldwork, Tiwa, Tibeto-Burman.

1. Introduction

Indefinites in attitude reports are in principle subject to three distinct readings. We can see this for the sentence in (1).

(1) Mary hopes that a friend of mine will win the race. (von Fintel and Heim, 2011:101)

Under the classic *de re* reading of (1), the indefinite embedded subject outscopes the attitude verb *hope*, and its restrictor *friend of mine* is evaluated with respect to the matrix evaluation world. This reading conveys that there is an (actual) friend of mine x such that Mary hopes x will win the race. The sentence is true on this reading when Mary considers a particular individual, who unbeknownst to her happens to be my friend, and hopes that individual will win. In contrast, under its classic *de dicto* reading, the attitude verb outscopes the indefinite, and *friend of mine* is evaluated with respect to Mary's hope-alternatives. This reading conveys that for any world w in which Mary's hopes from the actual world are realized, there is some individual who is a friend of mine in w and who wins the race in w. In contrast to the classic *de re* reading, the *de dicto* reading can be true even if I have no friends in the actual world, so long as Mary believes incorrectly that I do.

The third reading–what von Fintel and Heim (2011) call 'restrictor *de re*'–is intermediate between these two. On this reading, *hope* outscopes the indefinite embedded subject, like in the classic *de dicto* reading: Mary's attitude does not concern any particular actual individual. However, the restrictor *friend of mine* is not interpreted with respect to Mary's hope-alternatives, but is instead interpreted with respect to the evaluation world.[2] More precisely, the third reading of (1) conveys that in any world w in which Mary's hopes from the evaluation world are realized, there is some individual who is a friend of mine in the evaluation world (w_c), and who wins the race in w. A scenario in which the third reading is true, but not the classic *de re* or classic *de dicto* reading, is one in which Mary sees a group of strangers who she doesn't know are my friends, and without singling out any particular individual to pin her hopes on, simply hopes that someone from among that group will win the race.

[1]Thanks to Mary Maslai, Bibiana Maslai, and the rest of the Tiwa community at Umswai for sharing their language with us. Thanks also to audiences at UC Berkeley and Sinn und Bedeutung 23 for feedback and comments.
[2]We abstract away from certain complexities for this characterization raised by Schwager (2010).

 In: M.Teresa Espinal et al. (eds.)
Proceedings of Sinn und Bedeutung 23, vol. 1, pp. 329–346. Universitat Autònoma de Barcelona, Bellaterra (Cerdanyola del Vallès).

The third reading of (1) crucially involves a surface scope configuration for the attitude verb and the embedded indefinite quantifier. Compositional approaches to this reading have therefore tended to leave the quantifier itself *in situ* under the attitude verb while manipulating the modal evaluation of the NP predicate, for instance by composing the NP with a non-locally bound world variable (Percus, 2000) or by replacing the NP outright (Schwager, 2010, cp. Baron, 2016). Von Fintel and Heim (2011) consider an alternative strategy, in which the indefinite quantifier raises to a position above the attitude verb (allowing the predicate to be interpreted outside the scope of the attitude verb), but semantically reconstructs (deriving the narrow-scope reading of the quantifier). This style of analysis for (1) is represented in (2).

(2) λw [a friend$_w$ of mine] $\lambda Q_{\langle et,t\rangle}$ [Mary hopes$_w$ [that $\lambda w'$ t_Q will win$_{w'}$ the race$_{w'}$]]

Here, binding of a high-typed variable results in lowered scope for the quantifier, while the NP restrictor is evaluated independently of the modal quantification.

In this paper, we argue that semantic scope lowering of this general type corresponds to an attested natural language strategy for producing third readings. Specifically, we demonstrate that in Tiwa, a Tibeto-Burman language of India, third readings are possible in **prolepsis constructions**. In such constructions, a notional argument of the embedded predicate is base-generated in the matrix clause (Higgins, 1981; Ingria, 1981; Takano, 2003; Davies, 2005; Salzmann, 2017a, b). We provide a first Tiwa example of this type of structure in (3):

(3) Context: *Mukton payârjíng lína mon cha.* 'Mukton does not want to go outside.'
pro$_j$ [$_{VP}$ [$_{V'}$ **kishá khódo-gô**$_i$ atkhâl lá-ga,] [$_{CP}$ *pro*$_i$ pe-go$_j$ chi-w
3SG [[one mosquito-ACC think-PFV] [3SG 3SG-ACC bite-NEUT
honmandé.]
COMP]
'He thinks a mosquito will bite him.'

We will defend three claims about sentences like (3). First, the bolded accusative argument (here *kishá khódogô* 'a mosquito') is never syntactically embedded; it is base-generated in the matrix clause. Second: despite its syntactic position, the quantifier in the bolded argument may scope under the verb. For this particular example, this means that there need be no particular mosquito that Mukton has a belief about. Third: the restrictor of the bolded argument nevertheless cannot be interpreted only with respect to the worlds quantified over by the attitude verb. That is, (3) cannot receive a classic *de dicto* reading. The truth of this sentence requires that the evaluation world contains mosquitos. Overall, while the high base generation site of the indefinite can explain why the NP restrictor is interpreted independently of the modal quantification, the low scope of the quantifier itself calls for a semantic lowering strategy.

The paper is structured as follows. In §2 we provide some brief background details about the Tiwa language along with an in-depth look at the syntax of Tiwa attitude reports, providing evidence for a prolepsis structure. In §3 and §4, we turn to the meaning of prolepsis sentences and their compositional origins. First, we show that proleptic structures support classic *de re* readings, but not classic *de dicto* readings, and provide a compositional analysis that accounts for this (§3). Then, we show that these structures do allow for third readings of the proleptic object, and propose an account in terms of semantic scope lowering (§4). We conclude in §5.

2. The syntax of Tiwa attitude reports

Tiwa is a Tibeto-Burman language spoken by approximately 27,100 people in Assam state, northeast India.[3] The data here were collected between 2016 and 2018 by the first author. These data are based on work with two speakers, both from Pundurimakhâ village in Umswai, Assam. The crucial data were obtained as felicity judgments in context (see Matthewson, 2004), and were confirmed across the two speakers separately.

Aspects of Tiwa grammar are described in Joseph (2014), Dawson (2017), and Dawson (2018). Tiwa has basic SOV word order, with accusative case alignment. Subjects are bare (nominative), and objects are marked with the accusative case suffix *-gô*. Some scrambling and extraposition are permitted, leading to word order variation (e.g. SVO, OSV). *Pro*-drop is frequent, and both subjects and objects can be omitted.

Tiwa has many attitude verbs that take a finite CP complement. A sample of these verbs is given in (4). In this paper, we will focus on *atkhâl lá* 'think' and *si* 'know', but as far as we know, the generalizations described here hold for all attitude verbs in Tiwa.

(4) *atkhâl lá* 'think', *si* 'know', *nol* 'believe', *hon* 'say', *khosói mán* 'remember', *plaw* 'forget', *sóng* 'ask/tell', *athâma nang* 'be wonderstruck', *akhâ rí* 'hope', ...

Structures including these verbs come in two syntactic varieties. The first is a simple intransitive structure in which CP complement appears post-verbally, as in (5).

(5) Mukton atkhâl lá-ga, [kráng tonga masú payâr-o thái-do honmandé.]
Mukton think-PFV wing having cow outside-LOC stay-IPFV COMP
'Mukton thinks there's a winged cow outside.'

The second structure features an accusative element surfacing in the matrix clause (bolded throughout this paper) along with a bound element in the embedded clause to which this object is semantically related, in a way to be made precise. In this section, we use coindexation as an informal device to indicate this semantic relationship. This kind of construction is illustrated in (6) and (7). Note that the matrix-level object must be marked accusative; the bound element in the embedded clause may be either an overt pronoun or a null one.[4]

(6) Maria **Saldi*(-go)**$_i$ atkhâl lá-ga, [$_{CP}$ pe$_i$ lí-ga honmandé.]
Maria Saldi-ACC think-PFV 3SG go-PFV COMP
'Maria thought that Saldi went.'

(7) Sonali **Mansing-go**$_i$ atkhâl lá-ga, [$_{CP}$ *pro*$_i$ lí-ga honmandé.]
Sonali Mansing-ACC think-PFV 3SG go-PFV COMP
'Sonali thinks that Mansing left.'

The bound pronoun can be in any syntactic position in the embedded clause. In the examples above, it was the subject of the embedded clause. (8) shows the bound pronoun in object position, and (9) shows it as the complement of a postposition in a comparative.

[3]This population estimate is from the 2001 Indian census, as reported in Ethnologue (Simons and Fennig, 2017).
[4]We can generalize that *pro*-drop in this environment behaves exactly as it does elsewhere in the language. For instance, null pronouns are never allowed as the complement of a preposition in Tiwa. This restriction holds in the structures we are looking at as well, e.g. in (9), where the pronoun must be overt.

(8) Maria **John-go**$_i$ atkhâl lá-ga, [Saldi *pro*$_i$ lak mán-ga honmandé.]
Maria John-ACC think-PFV Saldi 3SG meet-PFV COMP
'Maria thinks that Saldi met John.'

(9) Mansing **Mukton-go**$_i$ atkhâl lá-ga, [Lastoi [PP pe-na$_i$ khúli] parâ chu-w
Mansing Mukton-ACC think-PFV Lastoi 3SG-DAT than more tall-NEUT
honmandé.]
COMP
'Mansing thinks that Lastoi is taller than Mukton.'

Crucially, a matrix object is only allowed so long as there is a bindable element in the embedded clause. This is shown in (10) and (11).[5]

(10) *Lastoi **Modi-go** atkhâl lá-ga, [India tes-e economy thángane cha
Lastoi Modi-ACC think-PFV India country-GEN economy good NEG
honmandé.]
COMP
Intended: 'Lastoi thinks regarding Modi that the Indian economy is not doing well.'

(11) *Maria **John-go** atkhâl lá-ga, [Saldi lí-ga honmandé.]
Maria John-ACC think-PFV Saldi go-PFV COMP
Intended: 'Maria thinks regarding John that Saldi left.'

Note that the ungrammaticality of (10) and (11) provides evidence against a parse of (5) as including a silent (*pro*) accusative argument. In the absence of a bindable element in the embedded clause, a matrix accusative (overt or null) will not be permitted. We conclude that attitude reports in Tiwa come in two distinct syntactic forms, one but not the other of which is required to contain an embedded bindable element.

In the remainder of this section, we argue for a prolepsis analysis of the attitude report type featured in (6)-(9). We first argue that the bolded accusative is syntactically in the matrix clause (§2.1), and then that it is base-generated there, not moved (§2.2). This sets the stage for our semantic investigation of prolepsis constructions in sections 3 and 4.

2.1. The proleptic object is syntactically upstairs

The bolded accusative object shows a variety of syntactic behaviors indicative of a position in the matrix clause. We will present five in detail here.[6] The first piece of evidence comes from case marking: the bolded argument must be marked accusative even when the verb in the embedded clause is intransitive. This is shown in (12). (13) shows that the embedded verb *lí* 'go' cannot take an accusative-marked subject ordinarily, suggesting that the accusative case marking on *Mansing* in (12) comes from the matrix verb.

[5]These examples make for a contrast with the type of English 'prolepsis' construction discussed by Davies (2005), e.g. *I believe about Richard that he and Linda are in trouble* (Davies' example), given the well-formedness of the English translations. Tiwa's pattern in this respect is similar to that of Nez Perce, as discussed by Deal (2018).
[6]For space reasons, we omit additional evidence from Condition B, and the double accusative constraint (see Harada, 1973, among many others, on this constraint in Japanese).

(12) Sonali **Mansing*(-go)**$_i$ atkhâl lá-ga, [*pro*$_i$ lí-ga honmandé.]
Sonali Mansing-ACC think-PFV 3SG go-PFV COMP
'Sonali thinks that Mansing left.'

(13) **Mansing(*-go)** lí-ga.
Mansing(*-ACC) go-PFV
'Mansing left.'

The second piece of evidence comes from word order. Typically, the accusative argument appears directly before the matrix verb, as in (14a), in canonical object position. It can also appear after the matrix verb, as in (14b). This pattern is consistent with the behavior of objects in regular clauses, which usually appear pre-verbally, but can also appear post-verbally, as shown in (15).

(14) 'Saldi thinks that it was in the market that Mansing saw Lastoi.'
a. Saldi **Mansing-go**$_i$ atkhâl lá-ga, [*pro*$_i$ hat-o Lastoi-go nú-ga
Saldi Mansing-ACC think-PFV 3SG market-LOC Lastoi-ACC see-PFV
honmandé.]
COMP
b. Saldi atkhâl lá-ga **Mansing-go**$_i$, [*pro*$_i$ hat-o Lastoi-go nú-ga
Saldi think-PFV Mansing-ACC 3SG market-LOC Lastoi-ACC see-PFV
honmandé.]
COMP

(15) 'Saldi saw Mansing.'
a. Saldi **Mansing-go** nú-ga.
Saldi Mansing-ACC see-PFV
b. Saldi nú-ga **Mansing-go**.
Saldi see-PFV Mansing-ACC

The central word order evidence for a matrix clause position comes from examples where the bolded accusative argument appears to the right of embedded clause material, as shown in (16a). Such strings are ungrammatical. They can be rescued if the argument is nominative, as in (16b), as it can then be construed syntactically as the subject of the embedded clause.

(16) 'Saldi thinks that it was in the market that Mansing saw Lastoi.'
a. *Saldi atkhâl lá-ga, [hat-o **Mansing-go**$_i$ *pro*$_i$ Lastoi-go nú-ga
Saldi think-PFV market-LOC Mansing-ACC 3SG Lastoi-ACC see-PFV
honmandé.]
COMP
b. Saldi atkhâl lá-ga, [hat-o Mansing Lastoi-go nú-ga honmandé.]
Saldi think-PFV market-LOC Mansing Lastoi-ACC see-PFV COMP

The third argument for a matrix clause position comes from prosody. There is a distinct prosodic break between the matrix clause and the post-verbal embedded clause, indicated above with a comma. When the bolded accusative argument appears postverbally, it is prosodically grouped with the matrix clause, as in (14b) above. This follows from constituency if prosodic boundaries are by default read off of syntactic ones, especially at the clausal level (Selkirk, 1995).

NPI licensing provides the fourth piece of evidence for a matrix position. Tiwa has a strong NPI *sharbo* 'nobody' that is licensed by clausemate negation, as shown in (17).[7]

(17) a. Maria **shar-go-bo** nú-ya-m.
Maria who-ACC-ADD see-NEG-PST
'Maria didn't see anyone.'
b. *Maria **shar-go-bo** lak mán-ga.
Maria who-ACC-ADD met-PFV

The bolded accusative can be a strong NPI so long as there is negation in the matrix clause, as in (18a). The NPI is not licensed by negation in the embedded clause, as shown in (18b), again suggesting that it is in the matrix clause syntactically.

(18) a. Saldi **shar-go-bo**$_i$ atkhâl lá-ya-m, [*pro*$_i$ hat-jíng lí-ga honmandé.]
Saldi who-ACC-ADD think-NEG-PST 3SG market-ALL go-PFV COMP
'Saldi doesn't think that anyone went to market.'
b. *Saldi **shar-go-bo**$_i$ atkhâl lá-ga, [*pro*$_i$ hat-jíng lí-ya-m honmandé.]
Saldi who-ACC-ADD think-PFV 3SG market-ALL go-NEG-PST COMP
Intended: 'Saldi thinks that nobody went to market.'

The fifth argument for matrix clause position comes from Condition A effects. If the bolded accusative is an anaphor, it must be bound by the matrix subject, as shown in (19a). By contrast, if an anaphor occurs inside the embedded CP, it must be bound by the embedded subject, (19b). This contrast provides strong evidence that the bolded accusative in (19a) is in the matrix clause.

(19) a. Mansing$_i$ **othông-go**$_{i/*j}$ atkhâl lá-ga, [Lastoi$_j$ *pro*$_{i/*j}$ nú-ga honmandé.]
Mansing self-ACC think-PFV Lastoi 3SG see-PFV COMP
'Mansing$_i$ thought Lastoi$_j$ saw him$_{i/*j}$.'
b. Mansing$_i$ atkhâl lá-ga, [Lastoi$_j$ othông-go$_{*i/j}$ nú-ga honmandé.]
Mansing think-PFV Lastoi self-ACC see-PFV COMP
'Mansing$_i$ thought Lastoi$_j$ saw herself$_{*i/j}$.'

These binding facts furnish a first indication that movement is not involved in cases like (19a). Specifically, if there were movement of the bolded argument from the embedded clause to the matrix clause, we might expect possible reconstruction for binding purposes in (19a), making *Lastoi* a possible antecedent. There is language-internal evidence that anaphors can reconstruct for binding purposes in Tiwa in clause-bounded scrambling. This is shown in (20b), in which the object anaphor has scrambled above the subject, but undergoes reconstruction for binding.

(20) 'I saw myself in the mirror.'
a. Ang$_i$ **othông-go**$_{i/*j}$ ainâ-w nú-ga.
1SG self-ACC mirror-LOC see-PFV
b. **Othông-go**$_{i/*j}$ ang$_i$ ___ ainâ-w nú-ga.
self-ACC 1SG mirror-LOC see-PFV

That reconstruction is not available for (19a) suggests that the anaphor was base-generated in the matrix clause. In the next section, we make two further arguments for this analysis.

[7]Note that *sharbo* is clearly bimorphemic: it consists of the *wh*-word *shar* 'who' plus an additive particle *bo* 'also/even'.

2.2. Base-generation, not movement

In general, the surface position of the bolded argument as the object of the matrix clause is compatible with two major classes of hypotheses: either the argument moved to the matrix clause from the embedded clause (e.g., raising to object), or it was base-generated there (prolepsis). In this section, we present two additional pieces of evidence (beyond the Condition A argument just above) that suggest the bolded argument is base-generated in the matrix clause.

The first argument against a movement analysis concerns overt bound pronouns inside the embedded clause. This is shown in (21) and (22), as well as in several examples above.

(21) Maria **Saldi-go**$_i$ atkhâl lá-ga, [**pe**$_i$ lí-ga honmandé.]
Maria Saldi-ACC think-PFV 3SG go-PFV COMP
'Maria thought that Saldi went.'

(22) Maria **ang-go**$_i$ atkhâl lá-ga, [**pe**$_i$ chigál-ya-m-lô honmandé.]
Maria 1SG-ACC think-PFV 3SG get.up-NEG-PST-FOC COMP
'Maria thought that I did not get up.'

While the presence of an overt pronoun (rather than a gap) is fully expected on a prolepsis analysis, it is surprising from the perspective of a movement analysis. Pronominal resumption is generally impossible in otherwise clear instances of movement in Tiwa, such as long distance scrambling. This is illustrated in (23). (23a) is the baseline example, with an embedded CP and no long-distance scrambling. (23b) shows that long distance scrambling from the embedded CP is possible; the dative argument *Mukton-a* has scrambled to the front of the matrix clause. (23c) shows that pronominal resumption in the position that *Mukton-a* moved from is ungrammatical.

(23) 'Saldi thinks that Lastoi gave Mukton a flower.'
a. Saldi atkhâl lá-ga, [Lastoi **Mukton-a** khum os-ga honmandé.]
Saldi think-PFV Lastoi Mukton-DAT flower give-PFV COMP
b. **Mukton-a**$_i$, Saldi atkhâl lá-ga, [Lastoi t_i khum os-ga honmandé.]
Mukton-DAT Saldi think-PFV Lastoi flower give-PFV COMP
c. *__Mukton-a__$_i$, Saldi atkhâl lá-ga, [Lastoi **pe-na**$_i$ khum os-ga honmandé.]
Mukton-DAT Saldi think-PFV Lastoi 3SG-DAT flower give-PFV COMP

The second argument for a base-generation approach concerns island effects: the embedded argument that is semantically linked to the matrix accusative can be inside an island. (24) shows this for a coordinate structure; the matrix accusative *Monbor-go* is associated with a pronoun in a coordinated DP.

(24) Lastoi **Monbor-go**$_i$ atkhâl lái-do, [[pe$_i$ arô Milton] Sonali-gô han sha-w
Lastoi Monbor-ACC think-IPFV 3SG and Milton Sonali-ACC love-NEUT
honmandé.]
COMP
'Lastoi thinks that Monbor and Milton love Sonali.'

The same facts hold for conditional islands, as illustrated in (25), and relative clause islands, as illustrated in (26).

(25) Milton **Sonali-go**$_i$ atkhâl lái-do, [*pro*$_i$ phi-gaido, Mansing khâdu-gam
Milton Sonali-ACC think-IPFV 3SG come-COND Mansing happy-CF
honmandé.]
COMP
'Milton thinks that if Sonali comes, Mansing would be happy.'

(26) **Mukton-go**$_i$ Saldi atkhâl lá-ga, [[$_{RC}$ pe-na$_i$ khum os-a] margî lí-ga
Mukton-DAT Saldi think-PFV 3SG-DAT flower give-NMLZ woman go-PFV
honmandé.]
COMP
'Saldi thinks that the woman who gave a flower to Mukton went.'

Note that clear instances of movement, such as long-distance scrambling, are impossible from all these environments in Tiwa. This is illustrated for each environment in (27)-(29) below.

(27) *__Mukton-a__$_i$, Saldi atkhâl lá-ga, [Lastoi pe-na$_i$/t_i arô Tonbor-a khum os-ga
Mukton-DAT Saldi think-PFV Lastoi 3SG-DAT and Tonbor-DAT flower give-PFV
honmandé.]
COMP
Intended: 'Saldi thinks that Lastoi gave Mukton and Tonbor a flower.'

(28) *__Mukton-a__$_i$, ang atkhâl lá-ga, [Saldi t_i khum os-gaido, thang-o honmandé.]
Mukton-DAT, 1SG think-PFV Saldi flower give-COND good-NEUT COMP
Intended: 'I think that if Saldi gives Mukton a flower, it will be good.'

(29) *__Mukton-a__$_i$, Saldi atkhâl lá-ga, [[t_i khum os-a] margî lí-ga honmandé.]
Mukton-DAT Saldi think-PFV flower give-NMLZ woman go-PFV COMP
Intended: 'Saldi thinks that the woman that gave a flower to Mukton left.'

In this section we have shown that the bolded accusative is base generated in the matrix clause: these are proleptic structures. Accordingly, we will refer henceforth to the bolded accusative DP as the *proleptic object*. In the next two sections, we turn to the range of interpretations these objects can receive.

3. Interpreting prolepsis: classic *de re* vs *de dicto*

The choice of a proleptic structure for an attitude report in Tiwa, rather than a simple embedded CP, carries semantic consequences: while classic *de re* readings of the proleptic object are possible, classic *de dicto* readings are impossible. In this section, we will provide evidence for this, and propose a compositional analysis that captures these facts.

3.1. Classic *de re* readings are available

We show in (30)-(32) that prolepsis is felicitous in contexts that support classic *de re* readings. In (30), Mukton holds a belief about a particular baby leopard, and the NP predicate *shônggadi pisá* 'baby leopard' is interpreted with respect to the world of evaluation, not with respect to Mukton's doxastic alternatives (Mukton does not believe the baby leopard is a leopard).

(30) Context: One man in Shiktamakhâ has a baby leopard as a pet. It is very small still, and Mukton thinks it is a cat, not a leopard.

Mukton **pe shônggadi pisá-gô**$_i$ atkhâl lá-ga, [*pro*$_i$ miyâw hóng-do honmandé.]
Mukton that leopard DIM-ACC think-PFV 3SG cat COP-IPFV COMP
'Mukton thinks that baby leopard is a cat.'[8]

In (31), the attitude holder also holds a belief of a particular individual, in this case the dog that he saw approaching his food. In this example, the proleptic object is visibly quantificational, scoping above the attitude verb, and *khúgri* 'dog' is readily interpreted with respect to the actual world (seeing as the context provides for no differences between what is actually a dog and what is a dog in Mukton's doxastic alternatives).

(31) Context: There is a gathering outside with a lot of food on different tables. People are there with their families and many dogs are there. Mukton leaves his rice on one table and then he sees a dog come up to it. He looks away, and when he looks back, the rice is gone.

Mukton$_j$ **kishá khúgri-gô**$_i$ atkhâl lá-ga, [*pro*$_i$ pe-ne$_j$ mai-go chá-ga
Mukton one dog-ACC think-PFV 3SG 3SG-GEN rice-ACC eat-PFV
honmandé.]
COMP
'Mukton thinks a dog ate his rice.'

(32) provides an example of mistaken identity with a referential proleptic object. In this example, the attitude holder Tonbor holds a belief about a particular woman he saw. Unbeknownst to him, the woman he holds the attitude about is in fact the speaker's sister Rachel.

(32) Context: We have been waiting for my sister Rachel to come and visit us in Umswai. Tonbor doesn't know I have a sister, but he saw a foreign woman in Nellie getting in a sumo (=jeep). He thinks that that foreigner must be coming to Umswai, and he told us so.

Tonbor **Rachel-go**$_i$ atkhâl lái-do, [táw *pro*$_i$ Umswai-jíng phi-w honmandé.]
Tonbor Rachel-ACC think-IPFV today 3SG Umswai-ALL come-NEUT COMP
'Tonbor thinks that Rachel is coming to Umswai today.'

These data show that prolepsis in Tiwa supports classic *de re* readings.

3.2. Classic *de dicto* readings are not available

In contrast, proleptic objects in Tiwa cannot receive a classic *de dicto* interpretation. This is illustrated in (33)-(35). In (33), the attitude holder mistakenly believes that the speaker has a brother and that he is helping her unload boxes. Because the speaker does not have a brother in the actual world, the proleptic object cannot be interpreted with respect to the actual world, but only the attitude holder's doxastic alternatives. The infelicity of this example shows that this option is unavailable for a proleptic object; opaque interpretation (in the sense of Fodor, 1970) is ruled out. Note that a simple embedded CP without prolepsis is possible in this scenario.

[8]Note: *miyâw* strictly refers to domesticated cats, and does not encompass wild cats such as leopards.

(33) Context: I have to unload a lot of heavy boxes, so my neighbor comes and helps me. Someone who's new to the village sees him helping me, and she thinks he must be my older brother. Actually, though, I don't have an older brother.

#Ái khái cha, thêbo pe margî **ái khái-gô**$_i$ atkhâl lái-do, [*pro*$_i$
my brother exist.NEG but that woman my brother-ACC think-IPFV 3SG
ang-gó ráp os-ga honmandé.]
1SG-ACC help AUX-PFV COMP
'I don't have a brother, but that woman thinks my brother is helping me.'

Example (34) makes a similar point. There are no such things as winged cows, and therefore any felicitous reading must allow for an opaque interpretation of *kráng tonga masú* 'winged cow'. In a proleptic structure, no such reading is possible. Again, note that a plain embedded CP is felicitous in this context.

(34) Context: Mansing is a bit crazy.

#*pro*$_j$ **kráng tonga masú-gô**$_i$ atkhâl lá-ga, [*pro*$_i$ payâr-o thái-do honmandé,]
3SG wing having cow-ACC think-PFV 3SG outside-LOC stay-IPFV COMP
(thêbo kráng tonga masú cha.)
but wing having cow exist.NEG
'He thinks there's a winged cow outside, (but winged cows do not exist.)'
Speaker comment: "Means definitely there is one."

Likewise, the non-existence of actual green dogs makes (35) infelicitous. Proleptic objects cannot be interpreted solely with respect to the attitude holder's doxastic alternatives.

(35) Context: Tonbor is not very smart. He doesn't know that dogs can't be green.

#Tonbor **kishá khódang shór khúgri-gô**$_i$ atkhâl lá-ga, [Lastoi *pro*$_i$ pre-ga
Tonbor one green dog-ACC think-PFV Lastoi 3SG buy-PFV
honmandé.]
COMP
'Tonbor thinks that Lastoi bought a green dog.'

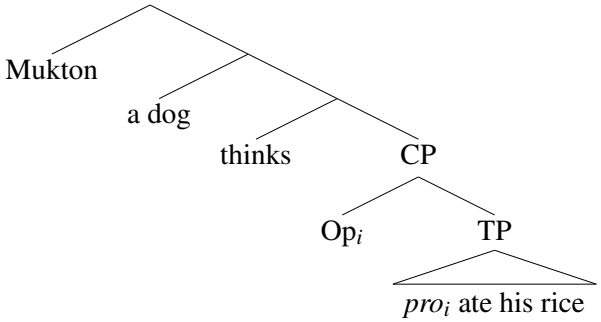
We conclude that proleptic structures require an existential commitment regarding the NP predicate at the world of matrix evaluation.

3.3. Analysis: verb-mediated *de re*

We now turn to a compositional account of these findings. Drawing on Salzmann (2017b) and Deal (2018), we propose the basic structure for prolepsis in (36), illustrated here for example (31) above. In keeping with the results of the previous section, the proleptic object is base-generated in the matrix clause, and the embedded clause contains a pronoun. We assume that this pronoun is semantically bound by a base-generated clause-edge abstractor (cp. Chierchia, 1989), and as such, the embedded CP contributes an intensional property rather than a proposition.[9]

[9]Our assumption of a base-generated clause-edge abstractor can be contrasted with a proposal from Salzmann (2017b), according to which the embedded pronoun itself moves to the edge of the CP and thereby creates an

(36)



The attitude verb mediates the composition of the intensional property argument provided by the CP with the matrix object (i.e., the *res*). Our proposal for the denotation of *atkhâl lá* 'think' in (31) is given in (37).

(37) $[\![\text{atkhâl lá 'think'}]\!] = \lambda P_{\langle e,st\rangle}.\lambda x.\lambda y.\lambda w.\forall w' \in \text{DOX}(y,w)[P(x)(w')=1]$

For (31), starting from the syntactic structure in (36), the quantificational object QRs, yielding the desired truth conditions, shown in (38): there is a particular, evaluation-world dog that Mukton believes ate the rice.

(38) $\lambda w.\exists x[x \text{ is a dog in } w \;\&\; \forall w' \in \text{DOX}(\text{Mukton},w)[x \text{ ate the rice in } w']]$

This analysis of course can be straightforwardly adapted to account for cases of "double vision", as in example (32) above, by making reference to acquaintance relations/modes of presentation, as in (39) (Kaplan, 1968; Lewis, 1979; cp. Heim, 1994; Deal, 2018). We dub this the Kaplan-Lewis variant:

(39) $[\![\text{atkhâl lá 'think'}]\!] = \lambda P_{\langle e,st\rangle}.\lambda x.\lambda y.\lambda w.\ R(w)=x \;\&\; R \text{ is suitable for y in w} \;\&\; \forall w' \in \text{DOX}(y,w)[P(R(w'))(w') = 1]$ (Kaplan-Lewis variant)

Both versions of this denotation retain the same argument structure and the same inability to support *de dicto* readings. In particular, in neither case can the NP restrictor of the proleptic object have its world variable bound by the attitude verb. This explains why the proleptic structure enforces existential commitment regarding this NP description.

4. Third readings

We turn now to the question of third readings. Prolepsis in German and in Nez Perce does not allow third readings (Salzmann, 2017b:307; Deal, 2018); only classic *de re* readings are permitted. We show in this section that the Tiwa facts are different: proleptic structures support third readings in this language.[10]

abstraction. Salzmann motivates this movement on the basis of the island behavior of proleptic CP complements in German. In Tiwa, however, (like in Nez Perce; see Deal, 2018) the proleptic CP is not an island environment, as shown in (i) for long-distance scrambling.

(i) 'Saldi thinks that Lastoi gave flowers to Mukton.'

a. Saldi **Lastoi-go**$_i$ atkhâl lá-ga, [*pro*$_i$ Mukton-a khum os-ga honmandé.]
Saldi Lastoi-ACC think-PFV 3SG Mukton-DAT flower give-PFV COMP

b. Mukton-a$_j$, Saldi **Lastoi-go**$_i$ atkhâl lá-ga, [*pro*$_i$ *t*$_j$ khum os-ga honmandé.]
Mukton-DAT Saldi Lastoi-ACC think-PFV 3SG flower give-PFV COMP

[10]We find these results particularly striking in view of the fact that the very same types of scenarios used in investigating third readings in Nez Perce yielded different results in Tiwa. Compare example (40) to example (26)

First consider (40), partially repeated from the introduction. (40a) sets up the context: the attitude holder Mukton is afraid to go outside. (40b) contains the crucial proleptic example. Mukton does not want to go outside because he believes he will be bitten by a mosquito if he does.

(40) a. Mukton$_j$ payâr-jíng lí-na mon cha.
Mukton outside-ALL go-INF desire NEG
'Mukton does not want to go outside.'

b. *pro*$_j$ **kishá khódo-gô**$_i$ atkhâl lá-ga, [*pro*$_i$ pe-go$_j$ chi-w honmandé.]
3SG one mosquito-ACC think-PFV 3SG 3SG-ACC bite-NEUT COMP
'He thinks a mosquito will bite him.'

Given our world knowledge of how people relate to mosquitos, this is a third reading: there is no particular, individual mosquito that Mukton thinks will bite him. The quantificational force of *kishá khódo* 'a mosquito' scopes beneath the attitude verb. At the same time, however, an utterance of (40b) does make a commitment to the existence of mosquitos in the actual world. Tiwa speakers report that this example becomes infelicitous in a scenario in which the government has devised a way to eradicate all mosquitos.

(41) provides another example. Here, the attitude holder Lastoi is scared because one of the twins (Sonali and Saldi) she is babysitting is missing. Lastoi does not know which twin it is. That is, she does not hold a belief about any particular individual: she does not believe Sonali is missing, and she does not believe Saldi is missing. Thus the quantificational force of the proleptic object *sáninge majo sája korkhyágô* 'one of the two children' is scoping beneath the attitude verb. Note that here again, just like in the mosquito example, there is existential commitment regarding the NP predicate.

(41) Context: Lastoi looks after a pair of identical twins, Sonali and Saldi, for her friend. They look the same and they dress the same and Lastoi can't tell them apart. One day, one of the twins decides to play a mean trick on Lastoi and hides under the bed instead of playing in the garden. Lastoi gets frightened because she thinks one of the twins is missing, but she can't tell which one.

Lastoi$_j$ khén-do. Pe$_j$ **sáning-e majo sája korkhyá-gô**$_i$ atkhâl lái-do, [*pro*$_i$
Lastoi fear-IPFV 3SG two-GEN midst one child-ACC think-IPFV 3SG
kumái lí-ga honmandé]
disappear AUX-PFV COMP
'Lastoi is scared. She thinks that from among the two a child has disappeared.'

Example (42) makes a similar point. Here, the speaker and Lastoi were speculating how some jackfruits disappeared. Lastoi thinks that a monkey might have stolen them, but does not think this of any monkey in particular.

in Deal (2018) and example (41) to example (24) in Deal (2018).

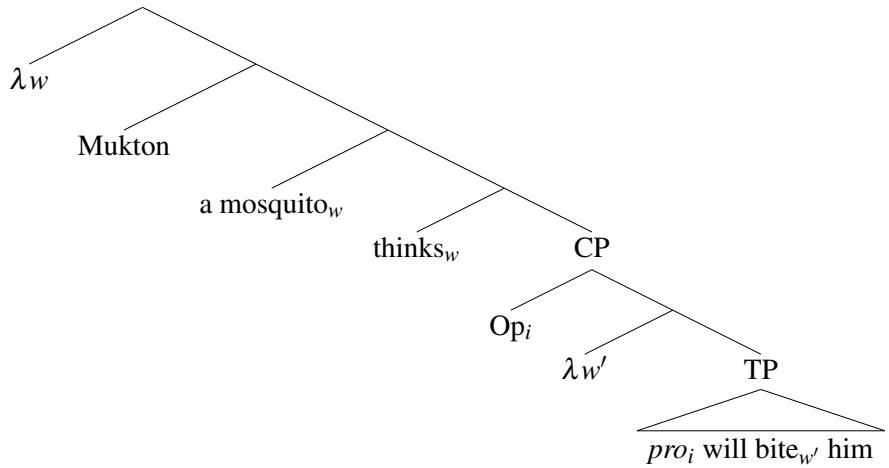
(42) I left some jackfruits outside my house and the next morning they were gone. We're guessing about what happened to them.
Lastoi **kishá makhrí-gô**$_i$ atkhâl lá-ga, [*pro*$_i$ khândal-go chá-ga honmandé.]
Lastoi one monkey-ACC think-PFV 3SG jackfruit-ACC eat-PFV COMP
'Lastoi thinks a monkey ate the jackfruits.'
Confirmed: Lastoi thinks it could be any monkey.

These examples show that third readings of proleptic objects are possible in Tiwa: the quantificational force of the DP can scope beneath the attitude verb, but the NP description must be interpreted with respect to the matrix evaluation world (ruling out the classic *de dicto* scenarios in §3.2).

4.1. Analysis: Semantic scope lowering

A compositional analysis of third readings in proleptic structures begins with the basic fact that there is no evidence of any syntactic difference vis-à-vis the classic *de re* interpretation. Therefore, we work with the null hypothesis that the structures are the same: the proleptic object is base-generated in the matrix clause, and the embedded clause contains an operator that binds a pronoun. (Recall that the Condition A data from §2.1 provide evidence that there is **no** movement derivation, only prolepsis.) However, for a clear picture of third readings it will prove especially useful to graphically represent information about the world-interpretation of particular predicates, and as such we augment our previous type of structures with world arguments and binders thereof. An example structure is given in (43) for example (40).[11]

(43)



To derive third readings, we need to get the quantificational force of the object to scope beneath the attitude verb, without causing the NP restrictor to be evaluated only with respect to the attitude holder's doxastic alternatives. This, we note, is closely parallel to the semantic reconstruction suggestion from von Fintel and Heim (2011) shown in (2). The difference is that the quantifier in (43), unlike (2), is base-generated in a high position. Thus our analysis will appeal not to reconstruction *sensu stricto* (understood as a phenomenon applying only in

[11] Note that our representation of syntactic world variables and binders is for exposition only. Our overall proposal involves only locally bound world pronouns, and as such is easily translated to a more traditional system without world variables in the syntax.

contexts of movement) but rather to a more general strategy of *semantic scope lowering*. To accomplish this, we propose an additional denotation for the attitude verb, as in (44), which exists alongside the classic *de re* version in (37) above. Here the CP again contributes an intensional property as the first argument to the predicate.[12] The second argument, however, is not an individual, but a quantifier:

(44) ⟦atkhâl lá 'think'⟧ (version 2)
$=\lambda P_{\langle e,st\rangle}.\lambda Q_{\langle et,t\rangle}.\lambda y.\lambda w.\forall w' \in DOX(y,w)[Q(\lambda x.P(x)(w'))=1]$

Given the GQ type argument position provided by the predicate, the quantificational proleptic object composes *in situ* with the verb. A partial computation of the semantic value of (43) is given in (45).

(45) Computation for (43)
a. $\llbracket CP \rrbracket = \lambda x.\lambda w.$ x will bite M in w
b. $\llbracket$thinks CP$\rrbracket = \lambda Q_{\langle et,t\rangle}.\lambda y.\lambda w.\forall w' \in DOX(y,w)[Q(\lambda x.$x will bite M in w')=1]
c. $\llbracket$a mosquito$_w$ [thinks CP]$\rrbracket = \lambda y.\lambda w.\forall w' \in DOX(y,w)[\exists x[$x is a mosquito in w & x will bite M in w']]

Note that this higher type version of 'think' still (correctly) does not allow for classic *de dicto* readings of the matrix object: because the NP restrictor is interpreted in the matrix clause, it is evaluated with respect to the matrix world of evaluation. Only the quantificational force of the matrix object is lowered.

This analysis makes a prediction regarding the scopal possibilities of the proleptic object inside the embedded CP. Namely, the verb denotation in (44) predicts that the proleptic object should scope immediately under the attitude verb, but above any operators internal to the embedded CP. At present we do not have Tiwa data to test this prediction. However, we observe that the general strategy of semantic scope lowering can be slightly modified to alternatively capture a system in which the proleptic object shows variable scope in the embedded clause (should this be the pattern borne out by the facts). On this alternative, the bound pronoun in the embedded clause (and its binding operator on the clause edge) is of generalized quantifier type, as in (46):

(46) ⟦atkhâl lá 'think'⟧ (version 2 alternative: variable scope)
$=\lambda P_{\langle\langle et,t\rangle,st\rangle}.\lambda Q_{\langle et,t\rangle}.\lambda y.\lambda w.\forall w' \in DOX(y,w)[P(Q)(w')=1]$

Given that it is a generalized quantifier, the bound pronoun should be able to show the full range of scope possibilities available clause-internally to GQ items in Tiwa.

One potential upshot of this second approach to third readings in prolepsis contexts is a deepened connection between prolepsis and semantic reconstruction. After all, the treatment of the bound pronoun as a quantifier in (46) is exactly parallel to the treatment of the trace in the semantic reconstruction example in (2). Could we then draw a link between the possibility of third readings in prolepsis and the possibility of semantic reconstruction? Not perfectly: German, for instance, does not allow third readings in prolepsis (Salzmann, 2017b), and yet does allow semantic reconstruction (Lechner, 1998). It may still be that the implication works in one direction: if a language generally allows GQ type pronouns, then that language must also allow semantic reconstruction. The testing of this hypothesis of course depends on the

[12] Thanks to Ezra Keshet for encouraging us to think along these lines.

identification of further languages with evidence for GQ type pronouns, as well as languages without semantic reconstruction.

As a final note, just as our initial verb denotation in (37) can be straightforwardly updated to accommodate acquaintance relations/modes of presentation, so too these two higher-typed verb denotations can be modified to yield Kaplan/Lewis variants. To do so we require acquaintance/modes of presentation of quantifiers (cp. Cresswell and von Stechow, 1982, Schwager, 2010 on *res* expressions that are not individuals).

(47) $[\![\text{atkhâl lá 'think'}]\!] = \lambda P_{\langle e,st\rangle}.\lambda Q_{\langle et,t\rangle}.\lambda y.\lambda w.R(w)=Q$ & R is suitable for y in w &
$\forall w' \in DOX(y,w)[R(w')(\lambda x.P(x)(w'))=1]$ (Kaplan-Lewis variant, fixed scope)

(48) $[\![\text{atkhâl lá 'think'}]\!] = \lambda P_{\langle\langle et,t\rangle,st\rangle}.\lambda Q_{\langle et,t\rangle}.\lambda y.\lambda w.$ R(w)=Q & R is suitable for y in w &
$\forall w' \in DOX(y,w)[P(R(w'))(w')=1]$ (Kaplan-Lewis variant, variable scope)

4.2. Remarks on ambiguity

Our proposal for the meaning of attitude reports in Tiwa has explicitly featured two distinct denotations for the verb 'think', one which produces classic *de re* readings (viz. (37), with Kaplan/Lewis variant (39)) and one which produces third readings (viz. (44) or (46),with Kaplan/Lewis variants (47) and (48) respectively). In addition, we also note the necessity of postulating a third denotation for 'think' in Tiwa – perhaps the crosslingustically least marked such denotation – in virtue of purely *de dicto* reports with no prolepsis structure (compare with (34) above):

(49) Context: Mansing is a bit crazy.

Mansing atkhâl lá-ga, [kráng tonga masú payâr-o thái-do honmandé.]
Mansing think-PFV wing having cow outside-LOC stay-IPFV COMP
'Mansing thinks there's a winged cow outside.'

We close this section with a remark about the nature of this ambiguity.

Salzmann (2017a) notes that one point of cross-linguistic variation in prolepsis concerns the productivity of the construction across a range of verbs. It is available for a range of verbs in German, as he shows; however, it is quite limited in Nez Perce (where it is possible only with verbs meaning 'think' and 'know'; Deal, 2018). Given the absence of productivity in Nez Perce, Deal (2018) declines to postulate any sort of semantic rule that might map between a *de dicto* denotation for 'think' (used in non-proleptic structures) and a *de re* version that is used in prolepsis. The two lexical entries for 'think' and 'know' simply are listed side-by-side in the Nez Perce lexicon.

This sort of approach is clearly less attractive for a language in which prolepsis is highly productive, and Tiwa turns out to be a language of this type. Prolepsis in Tiwa is very productive across a range of verbs, including those listed in (4) above. For instance, a proleptic structure (in addition to a simple embedded CP) is available for the verb *hon* 'say', as shown in (50)-(51).

(50) Saldi Tonbor-a **Mansing-go**$_i$ hon-ga, [*pro*$_i$ Lastoi-go nú-ga honmandé.]
Saldi Tonbor-DAT Mansing-ACC say-PFV 3SG Lastoi-ACC see-PFV COMP
'Saldi said to Tonbor that Mansing saw Lastoi.'

(51) Context: Sonali is talking with Saldi about Mansing. She told Saldi that Mansing left.

Sonali **Mansing-go**$_i$ hon-ga, [*pro*$_i$ lí-ga honmandé.]
Sonali Mansing-ACC say-PFV 3SG go-PFV COMP
'Sonali said that Mansing went.'

As far as we are aware, the range of possible interpretations for proleptic structures remains the same regardless of the particular verb chosen. For example, both third readings and classic *de re* readings (but not opaque, *de dicto* readings) are available for *si-* 'know'.

(52) Context: You, me, and Sonali are playing a game with Mukton. We each tell him a funny story, but only one of the stories is true and the other two are made up. Mukton has to guess which person is telling the truth. We tell Mukton the stories, but he has no idea who is telling the truth and who is lying.

Mukton$_j$ **ching-e majo sáning-gô**$_i$ si-ga, [*pro*$_i$ thâdok rí-ga honmandé,]
Mukton 1PL-GEN midst two-ACC know-PFV 3PL lie do-PFV COMP
thêbo shar pe$_j$ si-ya.
but who 3SG know-NEG
'Mukton knows that two of us are lying, but he doesn't know who.'

(53) Context (after (52)): We tell Mukton the stories again, to give him another chance. This time Sonali and me can't stop laughing as we tell our stories, so he knows that it is us who are lying, and you are telling the truth.

Mukton$_j$ **ching-e majo sáning-gô**$_i$ si-ga, [*pro*$_i$ thâdok rí-ga honmandé.]
Mukton 1PL-GEN midst two-ACC know-PFV 3PL lie do-PFV COMP
'Mukton knows that two of us are lying.'

Accordingly, we propose that the three-way ambiguity of attitude verbs in Tiwa arises via lexical rules which lift basic attitude predicate denotations as in (54) (where ACC is a modal accessibility/alternativeness relation, determined by the individual verb) to the denotations found in cases of prolepsis. A first such lifting rule produces the classic *de re* reading discussed in section 3:

(54) Basic (non-proleptic) denotation
$\lambda p_{\langle st\rangle}.\lambda y.\lambda w.\forall w' \in ACC(y,w)\ [p(w')=1]$

(55) LIFT_α (to proleptic classic *de re* version)
$\lambda \mathcal{P}_{\langle st,\langle e,st\rangle\rangle}.\lambda R_{\langle e,st\rangle}.\lambda x.\lambda y.\lambda w.\mathcal{P}(\lambda w'.R(x)(w')=1)(y)(w)=1$

For the third reading, the particular rule required depends on the scopal possibilities of the quantifier with respect to embedded material. We take as a null hypothesis the more restricted version (44), associated with the lift in (56a). Evidence for the less restricted version, (46), would lead us instead to postulate lift (56b).

(56) a. LIFT_{β_1} (to proleptic third reading version (44))
$\lambda \mathcal{P}_{\langle st,\langle e,st\rangle\rangle}.\lambda R_{\langle e,st\rangle}.\lambda Z_{\langle et,t\rangle}.\lambda y.\lambda w.\mathcal{P}(\lambda w'.Z(\lambda x.R(x)(w')=1))(y)(w)=1$

b. LIFT_{β_2} (to proleptic third reading version (46))
$\lambda \mathcal{P}_{\langle st,\langle e,st\rangle\rangle}.\lambda \mathcal{R}_{\langle\langle et,t\rangle,st\rangle}.\lambda Z_{\langle et,t\rangle}.\lambda y.\lambda w.\mathcal{P}(\lambda w'.\mathcal{R}(Z)(w')=1)(y)(w)=1$

A plausible hypothesis is that the existence of such rules, and choice among them, constitutes a semantic parameter. German, for instance, makes use of LIFT_α but not LIFT_β, resulting in productive classic *de re* readings in prolepsis, but no third readings. Tiwa's use of both LIFT_α and LIFT_β makes both types of readings productively available. In Nez Perce, where prolepsis is not productive across verbs, it may be that no such rules at all are in force. It remains to be seen whether prolepsis in any language calls for LIFT_β but not LIFT_α, the reverse of the German pattern; in such a language we would expect prolepsis to be productive across verbs but to allow only third readings, not classic *de re*.

5. Conclusion

One overall conclusion from this study is that semantic scope lowering is a possible route to third readings, required in at least some cases (e.g. Tiwa prolepsis). Third readings, that is, arise not only due to manipulations of the NP restrictor of an embedded quantifier. A potentially important observation about the Tiwa data is that while quantifiers can be interpreted lower than their surface position, world arguments cannot. This restriction is reflected in our analyses in (44) and (46). In particular, on analysis (46), the world argument cannot be bound by the attitude verb because the pronoun is not intensional. If this analysis is on the right track, it may ultimately lend support to a generalization that semantic scope lowering is universally restricted to binding of $\langle et,t\rangle$ traces/pronouns, rather than intensionalized versions thereof.

Several parts of this analysis lead to new prospects for semantic universals and variation in the interpretation of proleptic structures. For instance, it may be that third readings under prolepsis correlate with semantic reconstruction possibilities across languages, as might be expected on analysis (46). An alternative possibility is that the availability of third readings under prolepsis simply reflects choices about lexical lifting rules of the type in (55) and (56). Our formulation of these rules reflects a suspicion that classic *de re* and third reading options in prolepsis may be independent of one another; that is, it may be that there are languages which have either one but not the other. Given the range of languages for which prolepsis analyses have been proposed (Higgins, 1981; Ingria, 1981; Saito, 1983; Takano, 2003; Davies, 2005; Salzmann, 2017a, b), we are hopeful that future work will be able to more fully ascertain which of these possibilities is correct.

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