### PPI effects with an NPI/FCI in Telugu\*

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#### 1. Introduction

The puzzle that this paper aims to solve is the following. An NPI/FCI item in Telugu, *ee-Nainaa* built from a *wh*-item, *ee-N*, and the particle *-ainaa*, cannot normally occur in a negative episodic context –it is a Bagel Polarity Item (Progovac 1994) that is usually banned in positive episodic and negative episodic contexts but can occur in downward entailing contexts, and in imperative and modal contexts –but there are special conditions under which it can occur under negation, symptomatic of PPIs (Szabolcsi 2004) –scoping under metalinguistic negation; Shielding by an intervening operator; Locality; and, Rescuing/Flip-Flop. Why is an NPI/FCI showing PPI properties?

On the face of it, this looks like ee-N-ainaa can be analysed as a bipolar element (van der Wouden 1997) -a superweak NPI that is licensed in non-veridical contexts and simultaneously a weak PPI, due to which it is anti-licensed in Anti-Morphic contexts. In support, it would seem that its PPI nature comes through in the PPI effects. But how to ground a bipolar item in the meaning/structure is unclear. Can both [+POLARITY] and [-POLARITY] be primitives? This again seems a distributional rather than a grammatical explanation with any depth. We discount this analysis for one with more explanatory adequacy based on a compositional analysis using an exhaustification and alternative based model (Chierchia 2013). An exhaustification based approach to ee-N-ainaa based on its composition, and interaction of the exhaustification operator with other propositional operators, plus competition with another particle based NPI, ee-N-VV, which comes with its own exhaustification pattern owing to its compositional make-up, derives the right distribution. Both the bagel distribution and the PPI behaviour of ee-N-ainaa fall out of these conditioning factors. In the process we also explain how in some contexts where it looks like their complementary distribution is broken, both ee-N-ainaa and ee-N-VV are permitted. We show that the hole (ee-N-VV) and bagel (ee-N-ainaa) pattern of complementary distribution is not just allomorphy (Pereltsvaig 2004) but a more complex division of labour between the two polarity items based on principles of economy of interpretation.

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### 2. Distribution of ee-N-ainaa

The PI *ee-N-ainaa* cannot occur in a positive episodic sentence, or in a 'strongly' negative context with negation. It can occur in other 'weak' DE contexts. It can also occur in non-veridical imperative and modal contexts (including future). We do not illustrate the data with examples for reasons of space. This distribution where an NPI occurs in weak negative contexts but not in strong negative contexts is called the 'bagel' distribution (Pereltsvaig 1998), due to its donut shape when represented as a venn diagram. It is also seen with NPI items in Russian (Pereltsvaig 2004), other Slavic languages like Polish & Serbo-Croation-Bosnian (Progovac 1994), and Dutch (van der Wouden 1997).

# 3. Blocking by *ee-N-VV*

The hole of the bagel distribution where *ee-N-ainaa* cannot occur, with clausal negation or *without*, is exactly where another PI, *ee-N-VV* occurs. This strong NPI *ee-N-VV* decomposes into a wh-word *ee-N*, and a conjunctive/additive/scalar-additive particle *-VV*. This particular combination that forms a PI is a cross-linguistically well known pattern, seen in Malayalam, Tamil, Japanese, Korean, Hungarian, etc.

As a conjunction marker -VV must be suffixed to each conjunct. It is not omissible, as shown in (1). When -VV occurs unarily on a non-wh, non-minimizer, non-quantifier DP, without focal stress, it plays the role of an additive particle, as shown in (2). With focal stress, -VV functions as a scalar additive particle, as shown in (3). With minimal quantity DPs, -VV forms minimizer NPIs, as shown in (4). With wh-words, -VV forms an NPI, only licensed by verbal negation or without.<sup>2</sup>

- (1) John-\*(uu) Bill-\*(uu) Peter-\*(uu) John-vv Bill-vv Peter-vv 'John and Bill and Peter.'
- (2) Bhushan-uu vacceeDu Bhushan-vv came 'Bhushan also/too came.'
- (3)  $[\mathbf{Bhushan}]_F$ -uu vacceeDu (4) Bhush Bhushan-vv came Bhush 'Even Bhushan came.' 'Bhush

Bhushan [**okka pustakam**] $_F$ -uu cadava-leedu Bhushan one book-vv read-not 'Bhushan didn't read even one book.'

Thus *ee-N-VV* is restricted in distribution to clausal negation and *without* contexts. Here, all else being equal, *ee-N-VV* blocks the more general lexical item *ee-N-ainaa*, as the complementary distribution hints at. The PI *ee-N-VV* cannot be used as a negative fragment answer, as shown in (5), so it clearly cannot be considered a negative indefinite or a negative concord item, which its distribution might suggest.

(5) A: evaru vacceeru? 'Who came?' B: \*evar-uu 'Intended: Nobody.'

<sup>&</sup>lt;sup>1</sup>With these DPs, another particle kuuDaa 'also/even' is preferred. This does not have a conjunctive function

<sup>&</sup>lt;sup>2</sup>There is no focal stress here, unlike with *one* and other minimal quantities. This item also lacks a negative bias in questions, unlike the minimizers, telling us that exhaustification for this item is not by EVEN.

## 3.1 Prior analysis of wh-word + conjunction marker

Following Szabolcsi (2015), we'll use a generic term for the conjunctive/additive/scalar particles which form quantifiers out of wh-words –MO. Erlewine & Kotek (2016), the first and only compositional analysis of these items, analyse Dharamsala Tibetan wh+MO as wh+EVEN. They split the scalar additive particle into two operators, the additive operator which takes scope below and the scalar operator which takes scope above the polarity licensor. The wh-item is interpreted in a bidimensional semantics (Beck 2006), as a Hamblin set of alternatives in the focus semantic dimension, and an undefined value in the ordinary semantic dimension. Composition with the additive operator ADD then brings in the presupposition that a proposition in the alternative semantic dimension, other than the ordinary semantic value, is true. Since the alternative semantic dimension here contains all the alternatives, by Local Accommodation (Heim 1983), an indefinite is precipitated into the ordinary semantic dimension. This indefinite then interacts with the scalar operator in a way similar to that of minimizers (Lahiri 1998) to make an NPI.

A major problem for this account is that wh+MO also forms universal quantifiers in some languages. For example, In Japanese *mo* forms both universal quantifiers and NPIs (Kobuchi-Philip 2009). Similarly, In Telugu (and Tamil, Malayalam, Kannada), a wh+MO combination also functions as a universal quantifier, when the wh-item is 'when', as shown in (6). If wh+MO forms an indefinite, how can it also be a universal quantifier?

(6) Bhushan eppuDuu KF taageeDu (7) Bhushan when-VV KF drank 'Bhushan always drank KingFisher.' Bhushan eppuDuu KF taaga-leedu Bhushan when-VV KF drink-neg 'Bhushan never drank KingFisher.'

In ellipsis structures, with elision of an NPI antecedent, the interpretation at the ellipsis site is that of an indefinite. This is true for both Japanese (Tanaka & Tsoulas 2006), and Telugu as shown in (8).

(8) Bhushan eemi-VV cadava-leedu kaani ravi cadiveedu Bhushan what-VV read-neg but Ravi read 'Bhushan didn't ready anything but Ravi did.'

That wh+MO forms an indefinite in a DE context but a universal in a non-DE context is our clue to the solution. Interestingly, the coordination particle *manu* in Warlpiri (Bowler 2014) is seen to function as conjunction in positive contexts and as disjunction in negative contexts. This is also seen in American Sign Language (Davidson 2013) and child language (Singh *et al.* 2016). The prominent analysis for this phenomenon is that the particles are underlyingly disjunctions that are strengthened to conjunctions in upward contexts, and come out as disjunction in downward contexts because here strengthening is not possible<sup>3</sup>. Crucially, such disjunctions should lack the scalar alternative, the conjunctive alternative, for recursive strengthening to happen in positive contexts.

<sup>&</sup>lt;sup>3</sup>Szabolcsi (to appear) proposes a similar analysis for the additive morpheme is 'too' in Hungarian.

We extend this analysis to MO particles and Telugu -VV. We propose a compositional analysis along the following lines. The wh-item contributes Hamblin alternatives in the ordinary semantic dimension as originally proposed. The particle MO, which is underlyingly disjunction, in a negative context forms a join of the alternatives and yields an indefinite, an existential quantifier. In a positive context, this disjunction without a scalar alternate is strengthened to conjunction by a process of recursive exhaustification, and this takes the Hamblin alternatives and yields a universal quantifier.

# 3.2 Our compositional analysis of *ee-N-VV*

We adopt the line of thinking that the denotation of a wh-item is a set of alternatives in the ordinary dimension (Kratzer & Shimoyama 2002) not in the alternative dimension (Beck 2006), as shown in (9).

(9) The semantics of evaru 'who': (10) evar-uu navva-leedu 
$$\llbracket \text{evaru } \rrbracket^o = \{a, b, c, ...\}$$
 who-VV laugh-neg 'Nobody laughed.'

We analyse -VV as a disjunctive marker whose conjunctive meaning is a result of strengthening. Strengthening happens by the grammatical mechanism of exhaustification (Chierchia 2013). Exhaustification applies recursively until no further strengthening is possible. In a DE context, as in (10), with the syntax in (11), no strengthening is possible, exhaustification is vacuous, and we derive the existential in (13), via (12). This then combines with further operators, as shown in (14).

- (11) [evaru laughed]<sub>1</sub>-VV]<sub>2</sub>NEG]<sub>3</sub> $O_{ALT}^{S}$ ]<sub>4</sub>
- (12) a.  $[ 1 ]^o = \{ \text{that } a \text{ laughed, that } b \text{ laughed,...} \}$ b.  $[ 1 ]^f = \text{none}$
- (13)  $-VV(1) = \{ \text{that } a \text{ laughed } \lor \text{ that } b \text{ laughed } \lor ... \} = \exists x.x \text{ laughed}$

But how do we explain the polarity sensitivity of ee-N-VV? Following Chierchia (2013), we propose that this -VV which combines with wh-items also activates alternatives in the alternative semantic dimension. These alternatives need to be exhaustified without contradiction, and call for an O operator. The O operator that is at work with ee-N-VV, co-opted via agreement and lexical specification, is  $O_{ALT}^S$ , which takes presuppositions and implicatures into account. In DE contexts, all of the alternatives are entailed, and no strengthening occurs, as shown in (15). We are using a toy model with two alternatives, a and b, here.

(14) a. 
$$[3]^o = \text{NEG}(\exists x.x \text{ laughed}) = \text{Nobody laughed}$$
  
b.  $[3]^f = \{\text{that } a \text{ didn't laugh, that } b \text{ didn't laugh}\}$ 

(15) a. 
$$[4]^o = O_{ALT}^S(\neg \exists x.x \text{ laughed}) = \text{Nobody laughed}$$

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In positive contexts, strengthening happens, and recursive exhaustification leads to maximal strengthening, as shown in (16)-(22), yielding universal quantification.

- (16) eppuD-uu navveeDu (17) [eppuDuu laughed]<sub>1</sub>-vv ]<sub>2</sub>O ]<sub>3</sub>O ]<sub>4</sub> when-vv laughed.3msG '(He) always laughed.'
- (18) a.  $[ 1 ]^o = \{ \text{laughed at time } a, \text{ laughed at time } b, ... \}$ b.  $[ 1 ]^f = \text{none}$
- (19)  $-VV(1) = \{ \text{laughed at time } a \lor \text{laughed at time } b \lor ... \} = \exists x \text{ . He laughed at time } x \}$
- (20) a.  $[2]^o = \exists x$ . He laughed at time x b.  $[2]^f = \{\text{laughed at time } a, \text{ laughed at time } b\}$
- (21) a. Alt( [ 3 ]) = {He laughed at time a, He laughed at time b} b. [ 3 ] o = O(  $\exists x$ .He laughed at time x) = He laughed sometime
- (22) a. Alt( [ 4 ]) = {He laughed at time  $a \land \neg$  He laughed at time  $b \land \neg$  He laughed at time a}
  - b.  $[\![ 4 ]\!]^o = O([\![ 3 ]\!]) = \{$ He laughed at time  $a \land He$  laughed at time  $b \land He$  laughed at time  $c... \} = \forall x$ . He laughed at time x = He laughed everytime

Thus we derive the distribution and semantics of ee-N-VV from three assumptions. The first, that it does not come with a scalar alternative but only subdomain alternatives. The second, that it is alternative activating, and needs to be obligatorily exhaustified. The third, that the exhaustification operator that it agrees with is  $O_{\rm ALT}^S$ . Only the ee-N-VV item with eppuDu 'when' does not have this third lexical requirement. Thus it can be recursively exhaustified in positive contexts leading to a universal quantificational meaning.

## 4. Semantics of *ee-N-ainaa*

*ee-N-ainaa* is built from the *wh*-item that we have already analysed as an indeterminate pronoun that generate alternatives in the ordinary semantic dimension, *ee-N*, and a disjunctive *either...or* particle, *-ainaa*, <sup>4</sup>. as shown in (23). The disjunction in (23) is exclusive. We can thus conclude that it has the conjunctive alternative as a scalar alternative.

(23) a. Bhushan sambar-ainaa kuura-ainaa tinnaaDu Bhushan sambar-ainaa curry-ainaa ate 'Bhushan ate either sambar or curry.'

<sup>&</sup>lt;sup>4</sup> It is the concessive form of -aw 'to become', and also a concessive scalar additive particle as noted in Balusu et al. 2016.

Bhushan sambar-ainaa tinnaaDu kuura-ainaa tinnaaDu
Bhushan sambar-ainaa ate curry-ainaa ate
'Either Bhushan ate sambar or he ate curry.'

At the same time this *-ainaa* which composes with wh-items is also alternative activating in the focus semantic dimension, and activates subdomain and scalar alternatives. These need to be exhaustified without contradiction.

In DE contexts, all of the alternatives are entailed, and no strengthening occurs, like we saw with *ee-N-VV*. The result is well-formed. In a positive episodic sentence (without covert modality or subtrigging), exhaustification leads to contradiction. Since *ee-N-ainaa* has the conjunctive alternative as a scalar alternative it doesn't get recursively strengthened into conjunction in positive contexts, unlike *ee-N-VV*, because the conjunctive alternative is negated by the exhaustification operator. Modal contexts are also good, through recursive exhaustification, which yields a free choice reading. As *ee-N-ainaa* usually gets a universal FC reading, it must scope over the modal, and for this to occur without contradiction, the implicature must be weakened via Modal Containment (see Chierchia 2013 for details). We abstain from illustrating this for reasons of space.

Finally, the one thing we should explain is the ungrammaticality of ee-N-ainaa under clausemate negation and without. This is a local blocking effect due to the presence of ee-N-VV. As ee-N-VV is necessarily exhaustified by the strong exhaustifier  $O_{\rm ALT}^S$  and ee-N-ainaa by the weak and recursive exhaustifier  $O_{\rm EXH}$ , economy considerations like plain alternatives being simpler than exhaustified alternatives and ambiguity reduction prevent ee-N-ainaa being inserted in those structures where ee-N-VV can be inserted.

## 5. Explaining *ee-N-ainaa*'s PPI effects

We will explain *ee-N-ainaa*'s PPI effects as simply falling out of its interaction with other operators and with *ee-N-VV*, rather than a result of bipolarity, which has been a popular explanation for NPIs which show some PPI behavior.

#### 5.1 Metalinguistic Negation

The PI *ee-N-ainaa* can be inserted in a sentence with metalinguistic/contrastive negation (Szabolcsi 2004) as shown in (24a).

- a. neenu EE-pustakam-ainaa cadava-leedu, AA pustakam-ee cadiveenu I which-book-ainaa read-not that book-only read 'I didn't read just ANY/ANY old book, I read THAT book only.'
  - b. LF:  $\neg O_{Exh-DA}O_{\sigma A}[\Box_A[ainaa_{[+\sigma,+D]}]$  I read which-book]

The reading comes about here by recursive exhaustification below negation along with the insertion of a covert agent-oriented modal, as shown in (24b). Since *ee-N-VV* cannot be inserted in these contexts due to its lexical specification requiring strong exhaustification, *ee-N-ainaa* is free to be inserted here. Even under regular negation, an FC reading can be

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obtained (though not as readily, out of the blue) via the same mechanism, with *ee-N-ainaa* under the covert modal, itself in the scope of negation.

# 5.2 Locality

*ee-N-ainaa* is fine in the scope of extra-clausal negation (25a). A prominent reading is (25b) where *ee-N-ainaa* simply gets its NPI interpretation. This is possible as the competing polarity item *ee-N-VV* cannot occur in contexts of extra-clausal negation, as strong exhaustification is strictly local and clause bound.

A second possible reading with the sentence in (25a), shown in (25c), is due to a covert modifier with a universal modal that occurs in the restriction of the *ee-N-ainaa* phrase –covert subtrigging, giving rise to a FC meaning. This can arise sans negation, of course.

- (25) a. ravi ee-pustakam-ainaa cadiveeDu ani neenu ana-leedu Ravi which-book-csap read that I said-not
  - b.  $O_{DA}O_{\sigma A} \neg [\text{ I said that } [ainaa_{[+\sigma,+D]} [\text{ Ravi read which-book}]]]$  'I didn't say that Ravi read any book.'
  - c.  $O_{Exh-DA}O_{\sigma A}[ainaa_{[+\sigma,+D]}[$  Ravi read which-book that  $\square$  [was there]] 'I didn't say that Ravi read any book (that was there).'

## 5.3 Shielding

An intervening universal quantifier like *every* or *always* shields *ee-N-ainaa* from negation within the same clause, as shown in (26a). In (26a) exhaustification happens above negation in a configuration that *ee-N-VV* could have otherwise been inserted in, but for the presence of the universal quantifier which adds its presuppositions and implicatures to the mix. Since *ee-N-VV* requires strong exhaustification, which takes presuppositions and implicatures of intervening elements into account, it cannot be inserted here, as it is no longer DE with these additions. But *ee-N-ainaa* can occur here, without contradiction, because it is exhaustified without taking presuppositions/implicatures into account, just truth conditions.

- (26) a. neenu eppuD-uu / prati saarii eed-ainaa ana-leedu I when-VV / every time what-AINAA said-not 'I didn't always/every time say anything.'
  - b. LF:  $O_{\sigma A}O_{DA} \neg [always_{[+\sigma,+D]}[ainaa_{[+\sigma,+D]} [ I said what]]]$

Interestingly, the configuration in (26a) is precisely what causes Linebarger (1980)'s intervention effect. Why isn't the universal quantifier taking wide-scope over the NPI *ee-N-ainaa* and occuring between it and the licensor, here negation, an intervener? Note that the universal quantifier is not an intervener for other licensors like the conditional, Y/N questions either, as shown in (27). We do not have an explanation for this surprising failure of intervention in Telugu with *ee-N-ainaa*, but note that it could be a matter of cross-linguistic variation, with implicature derivation being cancelled to repair the sentence as an option.

- (27)nuvvu prati saari ee-di-ainaa konTee mana Dabbulu ayyipootaayi a. every time what-thing-AINAA buy-IF our money finish-will 'If you buy something everytime, our money will finish.'
  - LF:  $O_{\sigma A}O_{DA}$ IF[ $\forall$ -time<sub>[+ $\sigma$ ,+D]</sub>[ $ainaa_{[+\sigma,+D]}$ [ you buy what-thing]]]... b.
  - nuvvu prati saari ee-di-ainaa konnaav-aa? every time what-thing-AINAA buy-Q<sub>prt</sub> 'Did you buy something every time?'

While the universal quantifier is not an intervener for the weak NPI, it is an intervener for the strong NPI ee-N-VV, which cannot occur in this configuration. However in this context, ee-N-VV, can also occur, if the universal quantifier is on top of negation, as shown in (28a). In this configuration, the implicatures and presuppositions associated with the universal are not factored into the computation of the alternatives and strong exhaustification can proceed without contradiction.

- (28)neenu eppuD-uu / prati saarii eed-ii ana-leedu when-VV / every time what-VV said-not 'I always/every time never said anything.'
  - LF:  $always_{[+\sigma,+D]}O^S_{AI,T}\neg [VV_{[+\sigma,+D]} [I \text{ said what}]]$

#### 5.4 Rescuing/Flip-Flop

The fourth and signature PPI-effect is Rescuing or Flip-Flop –a negative clause with a PPI is licit when itself in a DE environment. This is also seen with ee-N-ainaa as shown in (29)a, illustrated here with an if clause, but also possible where the negative clause is in the scope of a Y/N question, the restriction of a universal quantifier, an *only* phrase, etc.

Here two locations for exhaustification exist, (29)b & (30)b, one where ee-N-ainaa is inserted, and one where ee-N-VV is inserted. Exhaustification in the higher position (above the DE operator) allows for the insertion of ee-N-ainaa as it cannot be blocked (because ee-N-VV is bad here) (29)c, whereas in the lower position (above negation) ee-N-VV is inserted (30)c, blocking *ee-N-ainaa*. Thus, (29) and (30) are two possible and distinct readings.

- (29)ee-pustakam-ainaa cadav-aka-pootee raamu fail ayyeevaaDu a. which-book-AINAA read-not-if Ramu fail became 'If he had not read any book Ramu would have failed.'
  - $O_{DA}O_{\sigma A}[OP_{DE}[-ainaa_{[+\sigma,+D]}[\neg[...ee-N-...]]]]$ b.
  - LF:  $O_{DA}O_{\sigma A}$ [If which-book-ainaa<sub>[+\sigma,+D]</sub> not read, Ramu would have failed] c.
- (30)ee-pustakam-uu cadav-aka-pootee raamu fail ayyeevaaDu a. which-book-vv read-not-if Ramu fail became 'If he had not read any book Ramu would have failed.'

  - $OP_{DE}[O_{ALT}^S[\neg [... ee-N-VV_{[[+\sigma,+D]]}...]]]$ LF: If  $O_{ALT}^S$  [not read which-book- $VV_{[+\sigma,+D]}$ ], Ramu would have failed

#### 5.5 Configurations that allow both PIs

Some other configurations that allow both PIs include a negative imperative context (31), and a possibility modal scoping over a negated predicate (32). Here again, the reasoning is the same. There are two possible locations for exhaustification. In one location ee-N-VV can be inserted and in the other it cannot, ee-N-ainaa is blocked in the location where ee-N-VV can be inserted and is allowed in the other location.

- (31)ee-pustakam-ainaa / ee-pustakam-uu cadava-vaddu! which-book-csap / which-book-vv read-not 'Don't read any book!'
  - $O_{Exh-DA}O_{\sigma A}[\square! [\neg [... \text{ ee-N-ainaa}_{[+\sigma,+D]}...]]]$ b.
  - $\square! [O_{ALT}^S[\neg [...ee-N-VV_{[[+\sigma,+D]]}...]]]$
- (32)ee-pustakam-ainaa / ee-pustakam-uu cadava-kunDaa unDa-vaccu a. which-book-csap / which-book-vv read-not 'You can be without reading any book.'
  - $O_{Exh-DA}O_{\sigma A}[ee-N-ainaa_{[+\sigma,+D]_i}[\lozenge [\neg [...t_{i}...]]]$   $\lozenge [O_{ALT}^S[\neg [...ee-N-VV_{[[+\sigma,+D]]}...]]]$ b.

#### **6.** Conclusion

This is the first detailed compositional analysis of a wh+MO combination that is capable of explaining the FCI, the NPI, and the universal behavior of this morpheme combination. In doing so, we have made crucial recourse to the disjunction in MO lexically not including the scalar alternative. The rest is a matter of the environment it is embedded in. DE environments render it an NPI, because exhaustification has no effect here. Modal environments deliver an FCI reading, because of the weakening of scalarity. A plain positive environment makes a universal out of this combination, because here strengthening is possible, via recursive exhaustification. The wh+MO combination in fact makes transparent the underlying compositional nature of items which show this chameleon nature like the Hebrew morpheme kol analyzed by Bar-Lev & Margulis (2013). The ideas elaborated and exploited here are already there in seed form in Szabolcsi (2016). The  $\mu$  particle of Mitrovic (2015) also harps on a similar theme.

What is especially interesting about the Telugu pattern is that another combination of a wh-item and disjunction, ee-N-ainaa, but this time with the scalar alternative included in the disjunction's lexical specification leads to a division of labour between the two PI's, with the one without the scalar alternative becoming a strong NPI and universal and the one with the scalar alternative a weak NPI and FCI, a fallout of economy principles.

A novel finding in this paper are the Shielding facts, which show a lack of intervention effect of universal quantifiers between the weak NPI, ee-N-ainaa, and its licensor in Telugu, whereas they do intervene in the case of the strong NPI ee-N-VV. A proper explanation for this phenonemon is left for future work.

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