Two types of binding: Evidence from Tswefap pronominals[*]

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1   Introduction

- Semantic accounts of binding have traditionally relied on individual variables and operators that bind them (Heim, 1998; Heim and Kratzer, 1998)

- More recent proposals motivated by e-type anaphora have analyzed pronominals as containing situation pronouns which are bound by a class of sigma operators (Büring, 2004; Elbourne, 2001, 2005, 2013)

- There has also been an effort to develop our understanding of the typology of pronouns, especially with respect to their internal structure (Déchaine and Wiltschko, 2002; Patel-Grosz and Grosz, to appear)

- ➤ *Question:* With a diversity of pronouns crosslinguistically and a wide range of binding phenomena even within a single language, can we account for all instances of binding via only one mechanism?

- ➤ *Claim:* Some pronouns require situation binding, while others require individual binding

- I demonstrate this with the Bantoid language Tswefap, where:

    - There are two third person pronouns

    - These pronouns have different internal structures

    - Only one of the pronouns can be a bound variable

    - Only one of the pronouns can bind reflexives

- With both situation binding and individual binding we can account for the distribution of Tswefap pronouns

- *Consequence:* At least for some languages, individual binding must be more restricted at LF than what has been previously claimed

- **Roadmap:**

    - §1: Introduction

    - §2: Tswefap pronouns and binding conditions

    - §3: Two 3SG pronouns: *zhig* vs. *yi*

    - §4: The analysis: Situation binding and individual binding

        * §4.1: Sigma operators and situation binding

        * §4.2: β operators and individual binding

    - §5: Conclusion

2   Tswefap pronouns and binding conditions

- Tswefap is a Narrow Grassfields Bantoid language spoken in Cameroon[1]

- The pronoun inventory of Tswefap includes:

    - Free subject pronouns

    - Object pronouns that surface as enclitics on the verb

    - Free possessive pronouns

    - Enclitics that attach to *ni* 'self' and encode ϕ-features[2]

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[1]Data in this talk come from elicitation conducted with a native speaker over a 14 month period in 2015–2016 in Berkeley, CA.

[2]The following abbreviations are used in this paper: 1=first person, 2=second person, 3=third person, COMP=complementizer, FACT=factative, PL=plural, POSS=possessive, INF=infinitive, SG=singular, TAM=tense/aspect/mood

(1) *Tswefap pronoun inventory*

	Subject	Possessive	Object	Reflexive
1.SG	mɔg	ye	=a	=a
2.SG	wu	yu	=o	=o
3.SG	**zhig/yi**	**zhə**	**=e**	**=e**
1.PL	pɔ	yɔ	=wɔ	=yɔ
2.PL	pig	zhigə[3]	=wəgə	=zhigə
3.PL	wob	zhub	=wub	=zhub

2.1 Condition A

- A reflexive must be locally bound (Chomsky, 1986)

(2) Chimi$_i$ a   kwɔg **ni=e**$_{i/*j}$
     Chimi FACT like self=3.SG
     'Chimi$_i$ likes **himself**$_{i/*j}$.'

(3) zhig$_i$ n-rop   ngə   fɔ$_j$ a   cab **ni=e**$_{*i/j}$
     3.SG TAM-say COMP chief FACT hit self=3.SG
     'He$_i$ said that the chief$_j$ hit **himself**$_{*i/j}$.'

- The locality condition on reflexive binding holds even if there is no animate intervener (Pollard and Sag, 1992)

(4) zhig$_i$ n-kwərɔ   ngə   lɔrɔ nə khɔ' {**=e**$_i$ / ***ni=e**$_i$}
     3.SG TAM-think COMP rock INF cut =3.SG / self=3.SG
     'He$_i$ thinks that the rock cut **him**$_i$.'

2.2 Condition B

- A pronominal must be locally free (Chomsky, 1986)

- A pronominal cannot be bound by a DP within the same clause

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[3]Though this form is segmentally similar to the 3.SG subject pronoun, there is no evidence that it is morphologically decomposable.

(5) Chimi$_i$ n-rob   ngə fɔ$_j$ a   cab=**e**$_{i/*j}$
     Chimi TAM-say COMP chief FACT hit=3.SG
     'Chimi$_i$ said that the chief$_j$ hit **him**$_{i/*j}$.'

- A pronominal can be bound by a DP in a higher clause

(6) Chimi$_i$ n-rop   ngə **zhig**$_{i/j}$ a   khɔ
     Chimi TAM-say COMP 3.SG   FACT cough
     'Chimi$_i$ said that **he**$_{i/j}$ coughed.'

2.3 Condition C

- An R-expression must be free (Chomsky, 1986)

- R-expressions cannot be bound by other R-expressions

(7) * Chimi$_i$ a   kwɔg **Chimi**$_i$
       Chimi FACT like Chimi
       Intended: 'Chimi$_i$ likes **Chimi**$_i$.'

- R-expressions cannot be bound by pronouns

(8) * {zhig$_i$ / yi$_i$} n-rob   ngə **Chimi**$_i$ a   khɔ
       3.SG   TAM-say COMP Chimi   FACT cough
       Intended: 'He$_i$ said that **Chimi**$_i$ coughed.'

3 Two 3SG pronouns: *zhig* vs. *yi*

- Tswefap has two third person singular subject pronouns, *zhig* and *yi*

- These two pronouns differ in their distribution

- Only *zhig* is acceptable with an NP complement

(9) {**zhig** / ***yi**} fɔ   n-kwɔg mbɛ
     3.SG   chief TAM-like meat
     '**He** chief likes meat.'

(10)   Chimi pu {**zhig / *yi**} fɔ   n-kwɔg mbɛ
        Chimi and 3.SG   chief TAM-like meat

        'Chimi and **he** chief like meat.'

- Neither pronoun can be used without an overt linguistic antecedent when the referent has only been made available by the linguistic context

(11)   mɔg wig tsib,   mə {***zhig / *yi / nwə**} n-ru'
        I   fall pregnant then 3.SG   / 3.SG / child TAM-be.big

        'If I get pregnant, **the child (it)** will be big.'

- *zhig* can be used when a referent has been made salient by the physical context (i.e. can be used deictically), while *yi* cannot

(12)   *Context: A man walks into the room and you point to him and say:*

        {**zhig / *yi**} a   se
        3.SG   FACT be.tall

        'He is tall.'

- *yi* can only be used with topical referents, while *zhig* can be used with topical or anti-topical referents, with a preference for anti-topics

(13)   a.   ta' fɔ$_i$ rə   ta' nwə$_j$ mə **yi**$_{i/?j}$ n-kwɔg=e$_{?i/j}$
            a chief have a child then he   TAM-love=3.SG

            'If a chief$_i$ has a child$_j$, then **he**$_{i/?j}$ loves him$_{?i/j}$.'

    b.   ta' fɔ$_i$ rə   ta' nwə$_j$ mə **zhig**$_{i/j}$ n-kwɔg=e$_{i/j}$
            a chief have a child then **he**   TAM-love=3.SG

            'If a chief$_i$ has a child$_j$, then **he**$_{i/j}$ loves him$_{i/j}$.'

- *yi* can be bound by a quantifier, but *zhig* cannot

(14)   [mbe wəlɔ]$_i$ n-rob   ngə {**zhig**$_{*i/j}$ / **yi**$_{i/*j}$} a   khɔ
        every one   TAM-say COMP 3.SG   FACT cough

        '[Every person]$_i$ said that **he**$_{i/j}$ coughed.'

- *zhig* can bind a reflexive, but *yi* cannot

(15)   {**zhig**$_i$ / ***yi**$_i$} a   kwɔg ni=e$_i$
        3.SG   FACT like   self=3.SG

        '**He**$_i$ likes himself$_i$.'

- The differences between the distributions of the two pronouns are summarized in (16)

(16)   *Distribution of* 3.SG *pronouns*

	yi	*zhig*
Overt NP complement	✗	✓
Deictic uses	✗	✓
Topical referent	✓	✓
Anti-topical referent	✗	✓
Binding by quantifiers	✓	✗
Able to bind a reflexive	✗	✓

4 The analysis: Situation binding and individual binding

➤ *Proposal: zhig* and *yi* have different binding behaviors because they have different internal structures

(17)   a.   *yi* = [[the s$_i$] NP]
        b.   *zhig* = [1 [[the s$_i$] NP]]

- These internal differences affect both their ability to be bound and their ability to bind

    – Both pronouns participate in situation binding

    – Only *zhig* participates in individual binding

- The combination of different internal structures and the availability of two binding mechanisms results in the distributional differences we see

4.1 Sigma operators and situation binding

- Pronouns in Tswefap are definite descriptions consisting of a definite determiner, a situation pronoun, and an NP, following Elbourne (2005, 2013)

- This combination is spelled out as a pronoun

- The NP complement of the determiner is deleted (obligatorily for *yi* but not *zhig*) via ellipsis under identity with the antecedent[4]

- The difference between *zhig* and *yi* is the presence of an index on *zhig* (cf. Patel-Grosz and Grosz, to appear, for German personal and demonstrative pronouns)[5]

(18) a. *yi* = [[the s_i] NP] (cp. German *er*)
      b. *zhig* = [1 [[the s_i] NP]] (cp. German *der*)

4.1.1 Interpretation of *yi*

- *yi*'s referent is established via the binding of its situation pronoun by sigma operators (Schwarz, 2012; Elbourne, 2013)

- A situation pronoun may be bound to combine with a topic situation, as shown in (20) for the sentence in (19)[6]

(19) *Context: 'A man arrived at my house...'*

      yi   a   khɔ
      3.SG FACT cough
      'He coughed.'

(20) a. [$ς_1$ [[[the s_1] man] coughed]]

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[4]See Elbourne (2005) for discussion of why this account of NP-deletion must be further developed to account for the full range of English data. Some of the issues he raises must be addressed for Tswefap as well.

[5]I assume that the denotation of the definite article differs in these two structures, following the denotations for the unique and anaphoric definites of Schwarz (2009):

(i) a. $\llbracket the_{unique} \rrbracket^g = \lambda s_r.\lambda P : \exists! x P(x)(s_r).\iota x[P(x)(s_r)]$
     b. $\llbracket the_{anaphoric} \rrbracket^g = \lambda s_r.\lambda P.\lambda y : \exists! x P(x)(s_r) \wedge x = y.\iota x[P(x)(s_r) \wedge x = y]$

[6]I assume the three rules of Situation Binding assumed in Elbourne (2013).

(ii) a. Situation Binding I:
          For all indices i and assignments g, $\llbracket ς_i\ a \rrbracket^g = \lambda s.\llbracket a \rrbracket^{g^{s/i}}(s)$
      b. Situation Binding II:
          For all indices i and assignments g, $\llbracket \Sigma_i\ a \rrbracket^g = \lambda s.\lambda s'.\llbracket a \rrbracket^{g^{s'/i}}(s)(s')$
      c. Situation Binding III:
          For all indices i and assignments g, $\llbracket \sigma_i\ a \rrbracket^g = \lambda x.\lambda s.\lambda s'.\llbracket a \rrbracket^{g^{s'/i}}(x)(s)(s')$

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b. $\lambda s : s \in D_s$ & $\exists! x$ x is a man in s. ιx x is a man in s coughed in s

- The sentence in (19) requires there to be a unique man in the topic situation to be interpretable

- A situation pronoun may also be bound by a sigma operator to achieve a covarying interpretation with a higher situation pronoun

  - Quantifiers introduce situation pronouns, thus quantifying over situations (Elbourne, 2005, 2013)

  - Under the scope of a quantifier phrase, a situation pronoun can be bound to achieve a covarying interpretation, as in (21) and the simplified LF representation in (22)

(21) [mbe wəlɔ]$_i$ n-rob   ngə yi$_i$ a   khɔ
      every one   TAM-say COMP 3.SG FACT cough

      '[Every person]$_i$ said that he$_i$ coughed.'

(22) [[[every s_1] person] [σ_3 [Q [said [[[the s_3] person] coughed]]]]]

- The binding of the situation pronoun achieves a reading where every individual who is a person in s′ (the set of situations introduced by s_1) said that he coughed in s″ (the set of situations introduced by s_3)

4.1.2 Interpretation of *zhig*

- *zhig*'s referent is established through the binding of its situation pronoun and the mapping of its index to an individual via an assignment function

- *zhig* picks out the unique individual in the situation (s_i) that:

  - Meets the descriptive content of the NP contained within the pronominal (either overt or deleted), and

  - Is the same individual denoted by the assignment function applied to its index

- The presence of an index rules out covarying interpretations of *zhig* since the index is mapped to only one individual in the world

(23) [mbe wəlɔ]$_i$ n-rob   ngə **zhig**$_{*i/j}$ a   khɔ
      every one   TAM-say COMP 3.SG   FACT cough

'[Every person]$_i$ said that **he**$_{*i/j}$ coughed.'

(24)   [[[every s$_1$] person] [σ_3 [Q [said [[2 [[the s$_3$] person]] coughed]]]]]

- The LF in (24) does not result in a bound reading for *zhig* due to its index

- Instead it picks out every individual who is a person in s' (the set of situations introduced by s$_1$) and who said that he coughed in s'' (the set of situations introduced by s$_3$) only if that individual is also equal to the individual denoted by the assignment function applied to the index 2

- If our assignment function includes the mapping [2 → Chimi], *zhig* in (23) will only refer to Chimi rather than covarying

- The index on *zhig* and lack of index on *yi* also accounts for the topic/anti-topic asymmetry between the pronouns

  - If there is not another sigma operator in the sentence, *yi* will be bound by the topic situation

  - *zhig* can pick out any antecedent, either a topic or anti-topic, due to its index, and the preference for anti-topics will arise due to pragmatic competition with *yi*

4.2 β operators and individual binding

- The lack of an index does not yet account for the inability of *yi* to bind a reflexive

- If binding by quantifiers is achieved through situation binding, we can use quantifiers to test whether reflexives are sigma bound

- Quantifiers cannot bind reflexives, suggesting that reflexives are not bound via situation binding

(25)   ? **[mbe wələ]**$_i$ a   yɔ **ni=e**$_i$
       every one   FACT see self=3.SG
       '**[Every person]**$_i$ saw **himself**$_i$.'

- Reflexives must participate in local A-binding

- Following Büring (2004), I argue that binding through a-command can be achieved via a β operator

- A β operator is adjoined at LF directly below a DP in an A-position and serves to bind any individual variables that DP a-commands

- Reflexives contain an index (an individual variable) that must be locally bound by a β operator

- I depart from Büring (2004) in arguing that the LF adjunction of β operators is not freely licensed by all DPs in A-positions

- I argue that Tswefap *zhig* and bare definites can license β operators, allowing them to bind reflexives

(26)   **zhig**$_i$ a   kwɔg **ni=e**$_i$
       3.SG FACT like   self=3.SG
       '**He**$_i$ likes **himself**$_i$.'

(27)   **fɔ**$_i$ a   yɔ **ni=e**$_i$
       chief FACT see self=3.SG
       '**[The chief]**$_i$ saw **himself**$_i$.'

- Tswefap *yi* cannot license β operator adjunction, accounting for its inability to bind reflexives

(28)   * **yi**$_i$ a   kwɔg **ni=e**$_i$
       3.SG FACT like   self=3.SG
       '**He**$_i$ likes **himself**$_i$.'

- Tswefap quantificational DPs (QDPs) cannot license β operators

  - They cannot bind reflexives

  - They cannot bind the index on *zhig* to achieve a covarying interpretation

- To express reflexive meaning with a QDP, an intensifer *zhə ntswə ni* 'he himself' is used instead of a true reflexive

(29)   **[ta' fɔ]**$_i$ a   yɔ {**?ni=e**$_i$ / **zhə**$_i$ **n-tswə ni**}
       a   chief FACT see {self=3.SG / 3.SG.POSS PL-head body}
       '**[A chief]**$_i$ saw **himself**$_i$.'

(30)   **[mbe wələ]**$_i$ a   yɔ {**?ni=e**$_i$ / **zhə**$_i$ **n-tswə ni**}
       every one   FACT see {self=3.SG / 3.SG.POSS PL-head body}
       '**[Every person]**$_i$ saw **himself**$_i$.'

– In the intensifier, the possessive pronoun *zhə* introduces a situation pronoun which can be bound by a sigma operator

• When a pronoun occurs with a quantifier and a reflexive, this intensifier is used instead of a true reflexive

(31) **[mbe wələ]**$_i$ n-rop ngə **yi**$_i$ a kwɔg {***ni**=**e**$_i$ /
every person TAM-say COMP 3.SG FACT likes {self=3.SG /
zhə$_i$ **n-tswə ni**}
3.SG.POSS PL-head body}
'[**Every person**]$_i$ said **he**$_i$ likes **himself**$_i$.'

(32) [[[every s$_1$] person] [σ_3 [Q [said [[[the s$_3$] person] [σ_4 [likes [[his s$_4$] self]]]]]]]]]

– This situation pronoun introduced by *zhə* 'his' can be bound by a sigma operator to covary along with *yi*

• QDPs and *yi* do not contain individual variables and cannot license β operators

• *zhig* and definites, which can both be argued to contain indices (Schwarz, 2009), can license β operators

• This raises the prospect that, crosslinguistically, the presence of an individual variable within a DP may allow it to license an individual binding operator (a β)

5 Conclusion

• Tswefap contains two 3SG subject pronouns that differ in their distribution, internal structure, and binding behavior

(33) *Summary of* 3.SG *pronouns*

	yi	*zhig*
Contains a situation pronoun	✓	✓
Contains an index	✗	✓
Licenses β operators	✗	✓
Can be bound by quantifiers	✓	✗
Can bind reflexives	✗	✓

• Both pronouns consists of a definite determiner, a covert NP, and a situation pronoun

• *zhig* contains an index and can license β operators to bind reflexives, but cannot act as a bound variable under a quantifier

• *yi* does not contain an index and cannot license β operators to bind reflexives, but it can behave as a bound variable under the scope of a quantifier

• These data provide evidence for two distinct types of binding in Tswefap

– Individual binding is achieved through β operators, which are only licensed by *zhig* and bare definites

– Situation binding is achieved through a class of sigma operators, which are optionally licensed at specific positions in the structure

• We need both types of binding to account for the distribution of Tswefap pronominals and reflexives, suggesting that crosslinguistically both binding mechanisms are available

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