Backward Control without A-movement or φ-agreement[*]

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1. Introduction

This paper reports a case of true Backward Control which involves neither covert A-movement nor φ-agreement – two previously proposed mechanisms for Backward Control. Thus, these findings constitute evidence that Exhaustive Control is a phenomenon independent of A-movement and φ-agreement. I propose to model Exhaustive Control as index agreement whose semantic interpretation gives rise to obligatory argument sharing. On this account, A-movement and φ-agreement are compatible with but orthogonal to Control.

Control constructions in Ndebele (Bantu, S44) allow the shared argument to surface in the matrix or the embedded clause – a fully productive alternation:[1]

(1)   **UZodwa** u-zam-e [uku-pheka].   (2)   Ku-zam-e [uku-pheka **uZodwa**].
       1Zodwa 1-try-PST INF-cook   15-try-PST INF-cook 1Zodwa
       'Zodwa tried to cook.'   'Zodwa tried to cook.'

Section 2 presents evidence that in the Backward Control variant (2), the shared subject is in the embedded in-situ position, showing that we are truly dealing with a backward relation. In section 3, I demonstrate that the Ndebele facts are incompatible with two existing theories of Backward Control: covert A-movement (Polinsky and Potsdam 2002 a.o.) and φ-agreement (Tsakali et al. 2017, Alexiadou and Anagnostopoulou 2019). I then propose an analysis of Exhaustive Control in Ndebele terms of index agreement and argue that A-movement, while compatible with this relation, is orthogonal to it (section 4). Section 5 demonstrates how the proposed analysis derives the properties of BC: obligatoriness, locality and its free alternation with Forward Control. In section 6, I summarize the conclusions.

[1]All Ndebele data come from the author's fieldwork.

2. Evidence for true Backward Control

Backward Control (BC) refers to a relation between the controller and the controllee in which the empty argument position is located in the main, rather than the embedded clause (i.a. Polinsky and Potsdam 2002, Sells 2006, Alboiu 2007, Homer 2009, Potsdam 2009, Alexiadou et al. 2010, Haddad 2011). However, some of the reported cases of apparent BC have been argued to derive from an underlying Forward Control (FC) relation via remnant movement (Ordóñez 2018). This section presents evidence that BC in Ndebele is base-generated and thus an analysis of a backward relation in Control is necessary. Before that, I describe the basic structural properties of the constructions at hand.

A number of verbs participate in Exhaustive Control in Ndebele, both forward and backward. To avoid potential confounds, I use the same verb in all examples, namely *zama* 'try'. The infinitival complement of this verb may express viewpoint aspect, using an auxiliary and a progressive participle. This suggests that its size is at least AspP. Importantly, this is true for both Forward and Backward Control infinitives:

(3)   a.   Umfana u-zam-e [uku-be e-pheka.]
             1boy   1-try-PST INF-AUX 1-cook.PROG
             'The boy tried to be cooking.'

        b.   Ku-zam-e [uku-be ku-pheka   umfana.]
             15-try-PST INF-AUX 15-cook.PROG 1boy
             'The boy tried to be cooking.'

Given this, Exhaustive Control in Ndebele cannot be analyzed as the result of the complement clause being too small to host base-generation of an external argument (as in lexical restructuring (Wurmbrand 2004)). An alternative analysis in which *zama* is a functional verb (Cinque 1999, Grano 2015) is also implausible since this verb passes all diagnostics for lexical verbs in this language (Pietraszko 2017). For these reasons, I assume that *zama* is a lexical verb whose complement is VoiceP or AspP, depending on the aspectual properties of the embedded clause. In the rest of the paper, I treat control infinitives as VoicePs.[2]

The unmarked word order in Ndebele is SV(O), derived as in (4).

(4)   **UZodwa** u-a-pheka.   [TP Zodwa$_i$ T [VoiP Voi+v+V [vP t_i [v′ <v+V> [VP <V>]]]]]
        1Zodwa 1-PST-cook
        'Zodwa cooked.'

Recall that the shared argument in FC precedes both the matrix and the embedded verb (1). In BC, it follows both verbs (2). There are two ways in which the subject may end up following the verb in Ndebele. First, it can remain in-situ (Spec,vP). Due to head movement

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[2]A detail I omit here is that infinitives in Ndebele are nominalizations. This is true of most clause-like complements in this language. In no construction does the DP shell prevent extraction (Pietraszko 2017, 2019).
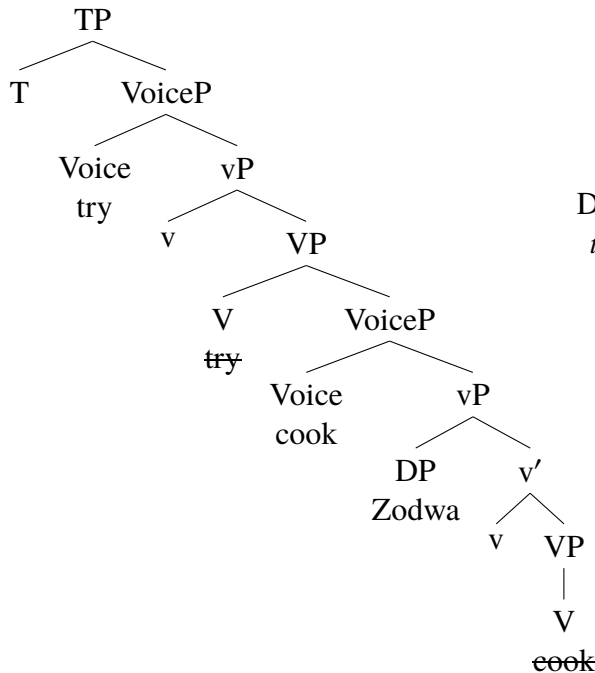
of the verb outside of the vP[3], in-situ subjects follow the verb (5). In-situ subjects are typically interpreted with narrow focus. The other way of deriving a post-verbal subject is via right-dislocation – by assumption, adjunction to TP (6).

(5) Ku-a-pheka [$_{vP}$ **uZodwa**].
   15-PST-cook   1Zodwa
     'Zodwa cooked.'

(6) [$_{TP}$ U-a-pheka] **uZodwa**.
     1-PST-cook 1Zodwa
     'Zodwa cooked.'

Given the availability of the two postverbal subject positions, the BC word order in (2) can be derived in two ways. In one derivation, the shared argument is in the embedded in situ position – a true backward configuration (7a). Alternatively, the shared argument can be linearized to the right of both verbs by virtue of being in a right-dislocated position in the main clause (7b).

(7)   a. A true BC analysis of (2)   b. A right-dislocation analysis of (2)
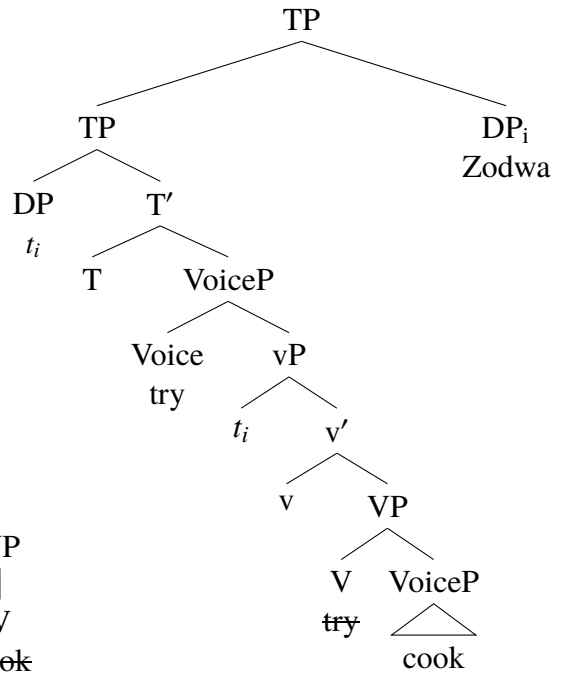
Crucially, the derivation in (7b) does not involve BC: the dislocated subject is base-generated in the matrix clause. Thus, in order to determine whether we are truly dealing with BC, we need evidence that the shared argument is an in-situ, rather than a right-dislocated subject. I present this evidence below.

The two postverbal subject positions are fairy easy to tell apart. One diagnostic is the relative order of the subject and an in-situ object. In situ objects are themselves diagnosed by the lack of object agreement (which is necessary with dislocated objects). In-situ subjects precede in-situ objects (8). In contrast, a right-dislocated subject follows an in-situ object:

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[3]In previous work, I argued that the verb does not move all the way to T, but it moves at least as high as VoiceP (Pietraszko 2017, to appear).

(8) Ku-a-pheka [vP **uZodwa** inyama]. (9) U-a-pheka [vP inyama] **uZodwa**.
     15-PST-cook   1Zodwa 9meat   1-PST-cook   9meat 1Zodwa
     'Zodwa cooked meat.'   'Zodwa cooked meat.'

Another difference between in-situ and right-dislocated subjects, evident already in (8-9), is that dislocated subjects control φ-agreement on T, while in-situ subjects do not (class 15 agreement prefix on the verb is a default agreement marker). The reverse pattern of agreement leads to ungrammaticality:

(10)   a. ***U**-a-pheka [vP uZodwa inyama].   cf. (8)
             1-PST-cook   1Zodwa 9meat

       b. ***Ku**-a-pheka [vP *t_i* inyama] uZodwa.   cf. (9)
             15-PST-cook   9meat   1Zodwa

In previous work (Pietraszko to appear), I argued that in-situ subject are unable to control agreement on T due phasal VoiceP.

The shared subject in BC shows both properties of situ subjects: it precedes the *embedded* object and it does not control agreement on matrix T:

(11)   **Ku/*u**-a-zama uku-pheka [vP **uZodwa** inyama].
       15/*1-PST-try INF-cook   1Zodwa 9meat
       'Zodwa tried to cook meat.'

If the shared argument were right-dislocated in the main clause, we would expect it to follow the embedded object and to control agreement on the matrix verb. In fact, a construction with these properties is also attested:

(12)   **U/*ku**-a-zama uku-pheka [vP inyama] **uZodwa**.
       1/*15-PST-try INF-cook   9meat 1Zodwa
       'Zodwa tried to cook meat.'

(12) is simply an instance of FC followed by right-dislocation of the subject within the main clause. Thus, both (7a) and (7b) are possible structures in Ndebele, but they gives rise to different word orders and agreement patterns. (7a) is the structure of BC.

Further evidence that the shared subject in BC is in the embedded in-situ position comes from NPI licensing and intervention in object agreement. Unlike dislocated subjects (13), in-situ subjects (14) can be NPIs:

(13)   *A-ka-pheki inyama **muntu**.   (14)   A-ku-pheki **muntu** inyama.
       NEG-1-cook 9meat anybody   NEG-15-cook anybody 9meat
       'Nobody is cooking meat.'   'Nobody is cooking meat.'

The shared subject in BC behaves like an in-situ subject: it can be an NPI and, importantly, it can be licensed by embedded negation:

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(15)   Ku-zama uku-nga pheki **muntu**   inyama.
            15-try   INF-NEG-cook anybody 9meat
            'Nobody is trying to cook meat.'

Finally, in-situ subjects, but not right-dislocated subjects, block object agreement:

(16)   Ku-a-(*yi)-pheka ubaba isuphu.   (17)   U-a-yi-pheka isuphu ubaba.
       15-PST-(*9o)-cook 1father 9soup   1-PST-9o-cook 9soup 1father
       'Father cooked soup.'   'Father cooked the soup.'

The shared subject in Backward Control blocks embedded object agreement, which, again, reveals its embedded in-situ position.

(18)   Ku-a-zama uku-(*yi)-pheka umfana inyama.
       15-PST-try INF-(*9o)-cook 1boy   9meat
       'The boy tried to cook meat.'

As expected, the embedded verb can agree with its object if the subject is in the main clause – either in Spec,TP or right-dislocated:

(19)   {Umfana} u-a-zama uku-yi-pheka [$_{vP}$ inyama] {umfana}.
        1boy   1-PST-try INF-9o-cook   9meat   1boy
       'The boy tried to cook the meat.'

I conclude that Ndebele has true Backward Control, i.e. obligatory argument sharing where the overt DP is base-generated and remains inside the embedded clause.

3.   Backward Control requires neither covert A-movement nor φ-agreement

Since Polinsky and Potsdam's seminal paper (2002), Backward Control has been treated as evidence for the Movement Theory of Control (Hornstein 1999 et seq.). In this theory, A-movement to a theta position is the relation that underlies the shared-argument interpretation of Control. Backward Control emerges when an embedded copy of the A-chain is spelled out. More recently, Tsakali et al. 2017, Alexiadou and Anagnostopoulou 2019 proposed that BC in Greek does not involve covert A-movement, but rather is parasitic on φ-agreement. I argue in this section that the Ndebele facts resists analysis under either approach.
    Tsakali et al. 2017, Alexiadou and Anagnostopoulou 2019 show that in Greek BC, the shared argument located in the embedded clause controls φ-agreement on matrix T. Capitalizing on this fact, they propose that φ-agreement is the relation responsible for the obligatory coreference between the matrix and the embedded subject in Greek BC:

(20)   [$_{TP}$ T$_{φ:\_\_}$ . . .   [$_{TP}$ T$_{φ:\_\_}$ . . .   DP$_φ$]]

φ-agree/coreference over the two T's; *φ-agree* between embedded T and DP$_φ$.
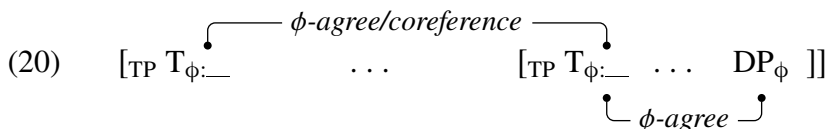
Putting aside the question of how exactly φ-agreement gives rise to coreference, this account is untenable for BC in Ndebele since, as we have seen in the previous section, the embedded subject in those constructions never controls φ-agreement (neither on matrix T (11), nor in the embedded clause, as evident from default agreement on the embedded participle in (3b)). One might wonder if the φ-agreement analysis could be maintained for Ndebele if we hypothesized that the φ-agreement that underlies Control in this language is abstract. This hypothesis would be difficult defend given that φ-agreement in Ndebele is otherwise overt, not only on T but on other functional heads in the clausal spine, as evidenced by multiple agreement markers in monoclausal multi-verb constructions (Pietraszko 2017, 2018).

Under a covert A-movement analysis of the same facts, the shared subject is base-generated in the embedded clause, then undergoes A-movement to a matrix A-position, but is pronounced in the embedded clause. FC would have identical syntax and differ from BC only in that the higher copy is pronounced:

(21)   Covert A-movement analysis of BC in Ndebele

   a.   Forward Control: [$_{TP}$ Zodwa$_i$ [$_{T'}$ try ... [$_{Infinitive}$ cook [$_{vP}$ t_i [$_{v'}$ ...]]]]]

   b.   Backward Control: [$_{TP}$ t_i [$_{T'}$ try ... [$_{Infinitive}$ cook [$_{vP}$ Zodwa$_i$ [$_{v'}$ ...]]]]]

Evidence against a covert A-movement analysis of BC in Ndebele comes from the following differences between A-movement and BC in this language:

(22)

	A-movement	Backward Control
requires φ-agreement	✓	✗
can cross CPs	✓	✗
feeds anaphor binding	✓	✗

We have seen before that the shared subject in BC constructions cannot control agreement on matrix T, in contrast to the shared argument in FC. Under the analysis in (21), agreement on matrix T would correlate with the overtness of the DP in its specifier: in FC, the overt copy controls agreement on T, but the non-pronounced copy in the same position (BC) does not. It is clear, however, that overtness is not required for controlling agreement on T in Ndebele. In fact, A-movement gaps in Spec,TP always control φ-agreement on T. This is evident from raising out of finite CPs (hyperraising). As shown below, the A-movement gap in the embedded Spec,TP controls agreement in the embedded T, and the default agreement prefix (class 15) is impossible:

(23)   UZodwa$_i$ u-fanele [$_{CP}$ ukuthi t_i {**a**/*****ku**}-pheke   inyama].
        1Zodwa 1-must   COMP   {1/*15}-cook.SBJV 9meat
        'Zodwa must cook meat.'

Thus, the covert A-movement analysis of BC is challenged by the fact that the unpronounced copy is predicted to control agreement on matrix T, contrary to fact.

This brings us to the second argument. In Ndebele, A-movement is always optional (with discourse effects). The unraised counterpart of (23) is shown in (24). Note that, in the absence of raising, matrix T cannot agree with the embedded subject.

(24) {**Ku/*u**}-fanele [CP ukuthi uZodwa a-pheke   inyama].   cf. (23)
      {15/*1}-must   COMP 1Zodwa 1-cook.SBJV 9meat
      'Zodwa must cook meat.'

If BC is A-movement plus low copy pronunciation, we predict that BC should be allowed across CPs as A-movement is known to obtain in these configurations. While the verb *zama* 'try' can select CPs, BC is impossible across such a complement:

(25) *No BC across CPs:*[4]

      a. UZodwa u-zama [CP ukuthi a-pheke].
          1Zodwa 1-try   COMP 1-cook.SBJV
          'Zodwa is trying cook.'

      b. *Ku-zama [CP ukuthi uZodwa a-pheke].
          15-try   COMP 1Zodwa 1-cook.SBJV
          'Zodwa is trying to cook.'

Compare (25) with infinitival complements, which allow both BC and FC:

(26) *Both BC and FC are possible across an infinitive:*

      a. UZodwa u-zama [Inf uku-pheka].
          1Zodwa 1-try   INF-cook
          'Zodwa is trying cook.'

      b. Ku-zama [Inf uku-pheka uZodwa].
          15-try   INF-cook   1Zodwa
          'Zodwa is trying to cook.'

Speakers judge (25a) and (26a) as synonymous, typically with the comment that the former is a more wordy version of the latter. While it remains to be explained why FC appears to be less local than BC (see section 5), these facts challenge the view they differ only in copy pronunciation. If what is required for argument sharing in BC is covert A-movement, we incorrectly predict BC across CPs.

The final argument against covert A-movement in Ndebele BC comes from anaphor binding. Polinsky and Potsdam (2002) show that the embedded argument in BC in Tsez

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[4]I will argue in section 5 that *zama*+CP is, in fact, not a control constructional at all, but rather one where the embedded subject is a *pro*.

can bind into the main clause, providing evidence for covert A-movement in this language. The same diagnostic applied to Ndebele produces the opposite outcome. While the shared argument can bind a matrix reciprocal in FC, it cannot do so in BC:

(27)   Abafana ba-zam-el-**an**-a [uku-klina].
         2boy   2-try-APP-**REC**-A INF-clean
         'The boys are trying, for each other's benefit, to clean.'

(28)   *Ku-zam-el-**an**-a [uku-klina abafana].
         15-try-APP-**REC**-A INF-clean 2boy

Note that in-situ subjects are otherwise able to bind anaphors. If the anaphor is in the embedded clause, binding in BC constructions is possible:

(29)   Ku-zama [uku-klin-el-**an**-a   abafana].
         15-try   INF-clean-APP-**REC**-FV 2boy
         'The boys are trying to [clean for each other].'

These facts further strengthen the claim that BC in not a covert counterpart of FC under the Movement Theory of Control. In the next section, I propose an analysis of argument sharing that derives the possibility of both BC and FC and a number of their properties.

4.   Proposal: Exhaustive Control as index-sharing

I propose that Exhaustive Control in Ndebele is a semantic consequence of index agreement (i.a. Rezac 2004, Kratzer 2009, Kennedy 2014, Deal 2017, Arregi and Hanink to appear, Hanink 2021). I assume that all DPs have an IDX feature whose value is a numerical index. I further follow Ershova 2019 (who herself builds on Landau 2000), in assuming that Voice has an IDX-agreement probe which, due to locality, always agrees with the highest DP in its c-command domain. Thus, in a simple transitive sentence, Voice agrees with the Agent DP:

(30)   Index agreement in a transitive VoiceP
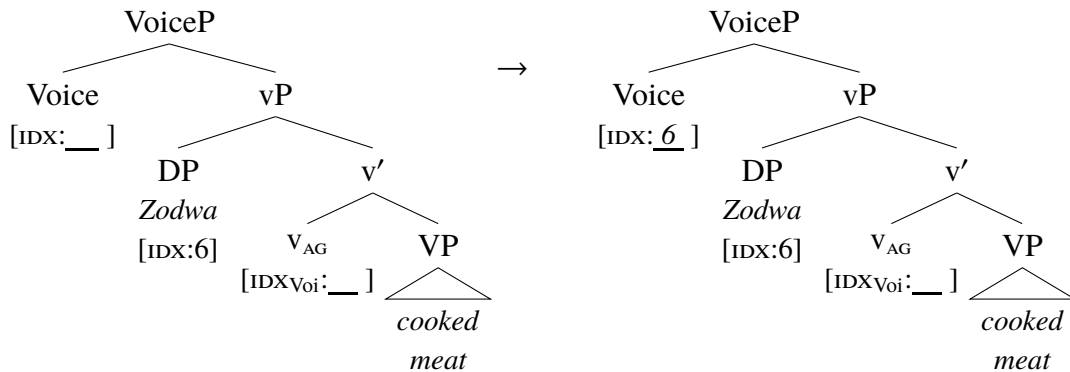
Adding to these assumptions, I propose that agentive little v has an IDX probe, as well, but one that is relativized to Voice (i.e. one that can only be valued by IDX on Voice). In an unembedded clause, such as (30), [IDX_{Voi}:__] on v_{AG} remains unvalued since there is no Voice in its c-command domain. As we will see shortly, this will change in Control constructions. This analysis derives the meaning of the agentive VoiceP in (30) as follows (assuming a Neo-Davidsonian approach to argument structure (Kratzer 1996):[5]

(31)   a. $[\![VP]\!]^g = \lambda e.\ cook(e)$
       b. $[\![v_{AG}]\!]^g = \lambda x.\lambda e.\ Agent(x,e)$
       c. $[\![v']\!]^g = \lambda x.\lambda e.\ Agent(x,e)\ \&\ cook(e)$ *by Event Identification*
       d. $[\![Zodwa_{IDX:6}]\!]^g = z_{[=6]}$ ("=6" means: defined iff g(6) = z)
       e. $[\![vP]\!]^g = \lambda e.\ Agent(z_{[=6]},e)\ \&\ cook(e)$ *by Functional Application*
       f. $[\![Voice_{ACT}]\!]^g = \emptyset$ (the identity function)
       g. $[\![VoiceP]\!]^g = [\![vP]\!]^g$

As we see in (31), the meaning of a regular transitive VoiceP is derived without making reference to the IDX features of Voice and v_{AG}. Their role becomes apparent in Control constructions, to which we now turn.

Recall that control infinitives in Ndebele are VoicePs selected by a lexical verb like *zama* 'try', which itself is selected by agentive v. Thus, the basic syntax of the matrix and the embedded VoiceP is the same except that the matrix vP lacks a specifier:

(32)   Ku-zama uku-pheka uZodwa inyama.
       15-try   INF-cook   1Zodwa 9meat
       'Zodwa is trying to cook meat.'

(33)
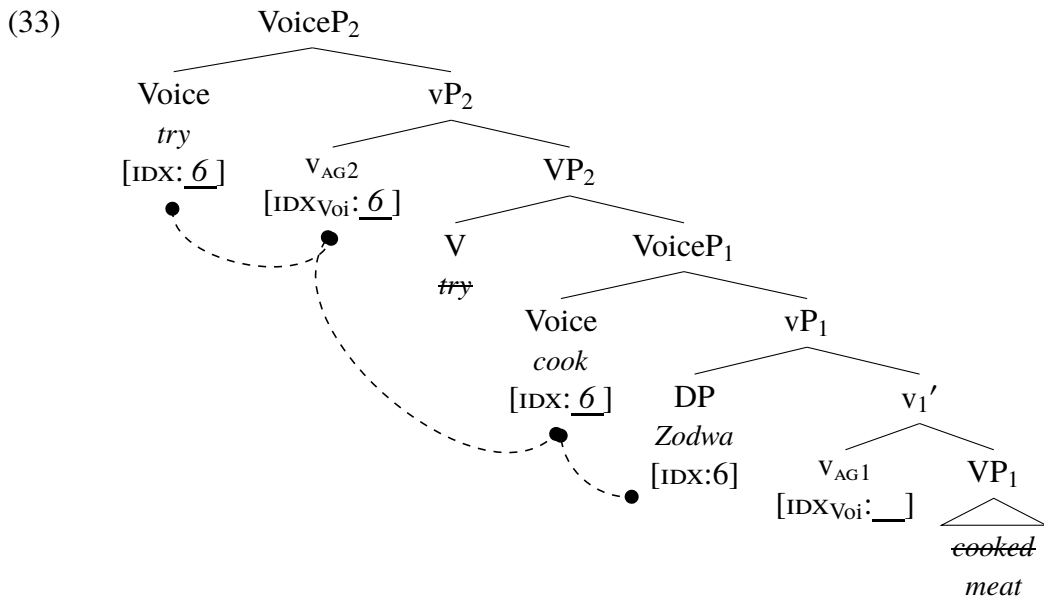
[5]Active Voice is assumed to be semantically vacuous, which is presumably not true of passive Voice. The analysis of passives of Control constructions is beyond the scope of this paper.

As before, embedded v_{AG} finds no IDX-goal and remains unvalued, while embedded Voice IDX-agrees with the embedded Agent *Zodwa*. In the matrix clause, both IDX-probes find their goals: v_{AG} agrees with embedded Voice and then serves as an IDX-goal for matrix Voice.

Moving on to the semantics, I propose that v_{AG} with a valued IDX-feature is parsed at LF as a constituent consisting of v_{AG} and a numerical index corresponding to the value of IDX:

(34) $[v_{AG,IDX:6}]$ is parsed as $[[v_{AG}] [6]]$ at LF

In other words, the valued index feature on v_{AG} is interpreted at LF as a minimal pronoun in the sense of Kratzer 2009.[6] The embedded VoiceP, derived already in (30), denotes a property of events of cooking meat in which Zodwa is the Agent (35a). The verb *try* takes a property of events as its argument (35b) and returns another property of events (35c). Matrix v_{AG} and its valued IDX feature are parsed as $[[v_{AG}] [6]]$, and the index saturates the individual variable of v_{AG} (35d). Thus, the denotation of matrix v_{AG} is a property of events whose Agent is $g(6)$. v_{AG} then combines with VP_2 via Predication Conjunction (35e). As before, Voice is vacuous (35f).
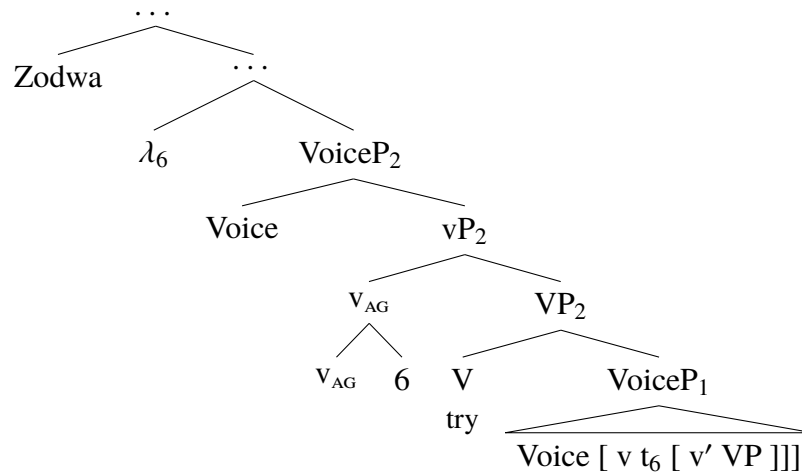
(35) a. $[\![\text{VoiceP}_1]\!]^g = \lambda e.\ \text{Agent}(z_{[=6]},e)\ \&\ \text{cook}(e)$
      b. $[\![V_{try}]\!]^g = \lambda P_{vt}.\lambda e.\text{try}(P)(e)$
      c. $[\![\text{VP}_2]\!]^g = \lambda e'.\ \text{try}(\lambda e.\ \text{Agent}(z_{[=6]},e)\ \&\ \text{cook}(e))(e')$
      d. $[\![[[v_{AG}][6]]]\!]^g = \lambda x.[\lambda e.\ \text{Agent}(x,e)](g(6)) = \lambda e.\ \text{Agent}(g(6),e)$
      e. $[\![\text{vP}_2]\!]^g = \lambda e'.\ \text{Agent}(g(6),e')\ \&\ \text{try}(\lambda e.\ \text{Agent}(z_{[=6]},e)\ \&\ \text{cook}(e))(e')$
      f. $[\![\text{VoiceP}_2]\!]^g = [\![\text{vP}_2]\!]^g$

Note that, on this account, v_{AG} need not select a specifier. I implement this is as an optional EPP feature on v_{AG}. Its presence is required iff IDX on v_{AG} remains unvalued – otherwise, the derivation cannot be completed at LF.

The coreferential interpretation of the matrix and the embedded Agent in (32) is derived by IDX-agreement between matrix v_{AG} and the embedded Voice and by interpreting the resulting minimal pronoun by the assignment function. Another way to interpret the minimal pronoun is via binding (as in Kratzer 2009). This, I propose, is the case in Forward Control, whose syntax is the same as that of BC except that the shared argument undergoes A-movement to matrix Spec,TP. For the derivation above, this movement leaves a trace with index 6 in the embedded clause and creates lambda abstraction over this index. The moved DP then binds both t_6 and the minimal pronoun with the same index, resulting again in obligatory coreference (37). The structure in (36) is the LF of the Forward Control counterpart of (32), omitting the denotations of Asp and T.

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[6]Unlike in Kratzer 2009, however, the minimal pronoun does not correspond to a DP in narrow syntax. Its presence at LF is the result a particular LF parsing of syntactic structure. This "LF fission" is likely an independently needed mechanism and is used in the specific context of argument structure in Legate's (2014) analysis of passive Voice.

(36)

(37) a. $[\![\text{VoiceP}_2]\!] = \lambda e'.\text{Agent}(g(6),e') \ \& \ \text{try}(\lambda e.\text{Agent}(g(6),e) \ \& \ \text{cook}(e))(e')$
      b. $[\![[\lambda_6 \ \text{VoiceP}_2]]\!] = \lambda x.\lambda e'.\text{Agent}(x,e') \ \& \ \text{try}(\lambda e.\text{Agent}(x,e) \ \& \ \text{cook}(e))(e')$
      c. $[\![\text{Zodwa} \ [\lambda_6 \ \text{VoiceP}_2]]\!] = \lambda e'. \ \text{Agent}(z_{[=6]},e') \ \& \ \text{try}(\lambda e. \ \text{Agent}(z_{[=6]},e) \ \& \ \text{cook}(e))(e')$

Binding is presumably also involved in BC cases in which the shared argument is a quantified DP undergoing QR. I leave the analysis of BC with quantified DPs for future work.

   This proposal bears resemblance to Voice Restructuring (Wurmbrand and Shimamura 2017, Berger 2019), in which coreference is established via φ-agreement between matrix and embedded Voice. Wurmbrand and Shimamura (2017) suggest that φ-agreement could result in coreference if φ-features are linked to a semantic index (ft. 13). The present account incorporates indices more directly, i.e. as syntactic features. As I argued is section 3, φ-agreement is absent is Ndebele BC. An additional difference between Voice Restructuring and the index-agreement account is that the latter derives FC and BC in a uniform way, the only difference being A-movement of the shared argument. Finally, the present account does not require positing a special kind of Voice for Control constructions. As discussed in the next section, argument sharing is exclusively due to the reduced size of the complement clause. On a more general level, however, the present account and Voice Restructuring share the insight that thematic argument sharing should be dissociated from A-movement.

5.   Deriving the properties of BC

In this section, I demonstrate how the proposed analysis derives the following properties of BC in Ndebele: i) obligatoriness, ii) CP-boundedness and iii) its free alternation with FC.

   First, control across infinitives in Ndebele is obligatory. The infinitive and the matrix clause cannot have independent subjects:

(38)   *UZodwa u-zam-e [$_{\text{VoiceP}}$ {abafana} uku-pheka {abafana}].
       1Zodwa 1-try-PST   2boy   INF-cook   2boy

On the present account, obligatoriness of Control is a consequence of the assumed obligatoriness of syntactic operations (Preminger 2014), in this case agreement. Since the embedded Voice is accessible to the IDX-probe to matrix v_{AG} (no phasal category intervenes), agreement must obtain, inescapably leading to argument sharing.

Second, recall from section 3 that BC is impossible across CPs, even though the verb *zama* 'try' can take a CP complement. If BC requires IDX-agreement, it is expected to be clause bound, as agreement in Ndebele otherwise is. Thus, matrix v_{AG} cannot be valued by embedded Voice when *try* takes a CP complement. In the absence of agreement, IDX on matrix v_{AG} remains unvalued, just as it does in monoclausal contructions (30). We predict, therefore, that the agent of *try* is externally merged in the main clause just in case the complement is impermeable to agreement, i.e. a CP. Note that, on this account, the complement clause is a regular (subjunctive) CP, i.e. one with its own subject. The complete prediction, then, is that *zama* + CP is not a control construction at all. Indeed, the CP complement of *zama* may have a subject distinct from the matrix subject (39). Since Ndebele is a pro-drop language, the embedded subject can be a *pro* coreferential with the matrix subject, giving the appearance of a control construction:

(39) UZodwa$_i$ u-zam-e [$_{CP}$ ukuthi abafana/*pro*$_i$ a-pheke].
      1Zodwa 1-try-PST   COMP 2boy   1-cook.SBJV
      'Zodwa tried (for the boys) to cook.'

In sum, we correctly predict that *try* in Ndebele is an obligatory control verb when it selects a VoiceP, and a non-control verb when it selects a CP. This also rules out BC across CPs, with pronominal coreference being the only way to establish argument sharing in those constructions.

Finally, BC in Ndebele freely alternates with FC. This is predicted by the proposed analysis of FC as BC plus A-movement of the shared argument into the main clause. A-movement in Ndebele can independently be shown to be optional. Thus, the optionality of BC/FC reduces to the optionality of A-movement in the language.

6.   Conclusions and outlook

I argued that Backward Control in Ndebele does not provide evidence for the Movement Theory of Control despite the fact that the shared argument is in the embedded clause. Nor do the facts lend support to the idea that the coreferential interpretation of the matrix and embedded subject is due to a ϕ-agreement relation. Instead, I proposed to encode argument sharing as an independent relation, namely index-agreement, whose interpretation leads to the observed coreference. The proposal has a number of advantages. It derives obligatoriness of Control from obligatoriness of agreement. It predicts when *try* is a control verb and when it is not from locality of agreement: if the selected complement is small enough to allow agreement, control is obligatory; when the complement is opaque to agreement (CP), control is impossible. No additional properties of control verbs or control infinitives need to be posited.

Extending this analysis of Exhaustive Control to other languages faces the challenge of the typological rarity of BC. It is worth noting, however, that the present account predicts BC to be less common than FC. In a control construction, Control, A-movement, and φ-agreement are all relations between an embedded DP and a matrix probe:

(40) $\quad$ [EPP] [φ:__] [IDX:__] try [$_{XP}$ DP$_{φ,IDX}$ ...]

If the embedded subject is accessible to one matrix probe, it is likely to be accessible to others, predicting a typological tendency for Exhaustive Control to cooccur with A-movement and φ-agreement. BC requires the specific scenario in which XP is transparent to the IDX-probe but not to EPP. This is achieved in Ndebele by positing i) that the embedded subject is inaccessible to matrix probes and ii) that its IDX feature is present on XP, exposing it to the matrix IDX-probe. If one or both of these components are absent in a language, BC cannot obtain. I leave a cross-linguistic extension of this account for future research.

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