Movement in adverbial clauses:
Evidence from Akɔɔse wh-agreement*

Jason Zentz
Yale University
jason.zentz@yale.edu

1 Introduction

(1) Theoretical questions:
   a. Does the derivation of adverbial clauses involve movement? If so,
   b. What moves?
   c. What is the site of extraction for the moved element?
   d. What is the landing site for the moved element?
   e. How should we classify adverbial clauses to account for variation in
      answers to these questions?

(2) Empirical domain:
   a. Wh-agreement in Akɔɔse [bss] (A15C), a Bantu language from south-
      west Cameroon (Hedinger 1985, 2008)
      i. No extraction
         Mw-ǎn ě-pim-ɛɛ́ Ø-mbaangé.1
         1-child 1.NEG-throw.out-PRF.IRR 10-cocoyam2,3
         ‘The child didn’t throw out the cocoyams.’ (Hedinger 2008: 105 (295))
      ii. Wh-subject
         Ø-Nzɛ́ ě-pim-e-Ø Ø-mbaangé?
         1-who 1.NEG-throw.out-PRF-SQE 10-cocoyam
         ‘Who didn’t throw out the cocoyams?’ (Hedinger 2008: 105 (295))
   b. In Akɔɔse, wh-agreement takes place in adverbial clauses as well as the
      canonical wh-movement contexts (Chomsky 1977).
   c. Crucially, Akɔɔse wh-agreement shows a subject/non-subject asymme-
      try, and different types of adverbial clauses pattern differently with
      respect to this asymmetry.

(3) Aims:
   a. Give morphological evidence that central temporal and central condi-
      tional clauses involve movement, but peripheral adverbial clauses do
      not (answering (1a,e))
   b. Provide a novel morphosyntactic analysis for Akɔɔse wh-agreement
   c. Use this analysis to pinpoint the extraction sites for the operators in
      central temporal and central conditional clauses (answering (1c,e))
(4) **Roadmap:**
   a. Background on free relative approaches to the internal syntax of adverbial clauses
   b. Akɔɔse wh-agreement data, showing both canonical wh-movement contexts and central adverbial clauses
   c. Morphosyntactic analysis of Akɔɔse wh-agreement
   d. Sites of extraction in central adverbial clauses

(5) **Classification of adverbial clauses** (Haegeman 2007: 285–286)

<table>
<thead>
<tr>
<th></th>
<th>Central</th>
<th>Peripheral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modify event or state of affairs in main clause</td>
<td>✓</td>
<td>☒</td>
</tr>
<tr>
<td>Provide discourse background for main clause</td>
<td>☒</td>
<td>✓</td>
</tr>
<tr>
<td>Anchored directly to speaker or speech time</td>
<td>☒</td>
<td>✓</td>
</tr>
<tr>
<td>May contain epistemic modality expressions</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

(6) **Central adverbial clauses**
   a. Peter heard the news [when he arrived at the office].
   b. Jayne fell asleep [while she rode the bus home].
   c. [If you find that paper helpful], let me know.

(7) **Peripheral adverbial clauses**
   a. The solution seems straightforward, [although I never would have thought of it].
   b. [While some might question his methods], his claims cannot be ignored.
   c. [If Clara’s caustic remark was provoked], it still was unprofessional.

2 **Internal syntax of adverbial clauses**

(8) Several authors have provided **syntactic, semantic,** and even **etymological** arguments for a derivation of adverbial clauses that involves movement (Geis 1970; Larson 1987, 1990; Dubinsky & Williams 1995; Demirdache & Uribe-Etxebarria 2004; Bhatt & Pancheva 2006; Haegeman 2007, 2009a,b, 2010a,b; Arsenijević 2009; Tomaszewicz 2009).

2.1 **Ambiguity in temporal clauses**

(9) **Ambiguity in temporal clauses** (modeled after Geis 1970; Larson 1987, 1990)
The professor wrote a recommendation letter for Mark [after he said he needed it].

   a. High: The professor wrote the letter after being asked.
      
      \[ PP \text{after CP } OP_1 [IP he said CP [IP he needed it ] } t_1 ] ]^4
   
   b. Low: The professor wrote the letter after the deadline.
      
      \[ PP \text{after CP } OP_1 [IP he said CP [IP he needed it ] } t_1 ] ]]

(10) **However,** the low construal reading is unavailable for conditional clauses, casting doubt on a movement derivation for conditionals (Geis 1970; Iatridou 1991; Citko 2000).

(11) **No ambiguity in conditional clauses** (modeled after Bhatt & Pancheva 2006)

   I’ll bet on this horse [if you say it will win].

   a. High: In situations $s$, you say that the horse will win (in situations $s'$).
      
      I’ll bet on the horse in those situations $s$.
   
   b. *Low: You say that in situations $s'$, the horse will win.
      
      I’ll bet on the horse in those situations $s'$.

2.2 **Argument fronting in English**

(12) Both central temporal and conditional clauses disallow argument fronting, a main clause phenomenon (Haegeman 2003, 2007, 2009a,b, 2010a,b).

(13) **Argument fronting allowed in main clauses**

   \[ TopP \text{This book [IP you should read this book next summer ]]}

(14) **Argument fronting disallowed in central temporal clauses**

   * \[ CP \text{When [TopP this movie [IP she saw this movie ] ], she hated it.}]

   4The choice to represent the adverbial clause as a PP is not crucial for our purposes.
Argument fronting disallowed in central conditional clauses
* [CP If [TopP that paper [IP you find helpful ]], let me know.]

Argument fronting allowed in peripheral adverbial clauses
[CP While [TopP his methods [IP some might question his methods ]], his claims cannot be ignored.

Haegeman (2007 and following) treats the failure of argument fronting in central adverbial clauses as an intervention effect. The availability of argument fronting in peripheral adverbial clauses suggests that there is no intervention effect in those clauses, so they must not involve movement.

3 Akɔɔse wh-agreement


Akɔɔse marks its verbs with respect to whether an element has been extracted to the left periphery. Crucially, extracted subjects trigger different verbal morphology from extracted non-subjects.

3.1 Wh-questions

No extraction (repeated from (2a.i))
Mw-án ū-pim-ɛɛ́ Ø-mbaaŋé
1-child 1.NEG-throw.out-PRF.IRR 10-cocoyam
‘The child didn’t throw out the cocoyams.’ (Hedinger 2008: 105 (295))

Wh-subject (repeated from (2a.iii))
Ø-Nzɛ́ ū-pim-e-Ø Ø-mbaaŋé?
1-who 1.NEG-throw.out-PRF-SE 10-cocoyam
‘Who didn’t throw out the cocoyams?’ (Hedinger 2008: 105 (295))

3.2 Relative clauses

Subject relative
Mw-án aw-ɛ ū-pim-e-Ø Ø-mbaaŋé
1-child 1-REL 1.NEG-throw.out-PRF-SE 10-cocoyam
‘the child who didn’t throw out the cocoyams’

Object relative
Ø-mbaaŋé ā-pɛ́ɛ́ ū-pim-ɛɛ́
10-cocoyam 10-REL 1-child NSE.1.NEG-throw.out-PRF.IRR
‘the cocoyams that the child didn’t throw out’

Adjunct relative
m-bwɛ́=ɛ́ɛ́ ū-pɛ́ɛ́ ū-m-ɛ́ɛ́ Ø-kul-ɛ
time that 3-day=rel 3-that 3-money to 9-tortoise-PERS
‘the day he took the money to Tortoise’

3.3 Cleft questions

Clefted non-subject
Saá áw-i eʔ-wóŋgé mé-m-bɛ́=ɛ?
is.it.not LOC-3SG.POSS 14-marriage NSE.1SG-PST-be-Q
‘Wasn’t it to him I was married?’ (lit. ‘Isn’t it in his marriage I was?’)

Wh-object (repeated from (2a.iii))
Chɛ́ mw-án ū-pim-ɛɛ́?
what 1-child NSE.1.NEG-throw.out-PRF.IRR
‘What didn’t the child throw out?’ (Hedinger 2008: 106 (297))

Wh-adjunct
Ø-Póndé e-héé á-pɛ́ɛ́ nse
9-time 9-which NSE.1-arrive-PRF here
‘When did she get here?’

Hedinger 2008: 197 (486)

Hedinger 2008: 106 (297)
3.4 Topicalization

(28) *Topicalized subject*

Mw-ǎn m-ð ě-pim-e-Ø Ø-mbaangé.
1-child 1-TOP 1.NEG-throw.out-PRF-SE 10-cocoyam
‘It is the child who didn’t throw out the cocoyams.’
(Hedinger 2008: 105 (295))

(29) *Topicalized non-subject*

Ø-Mbaangé ch-ða mw-ǎn ě-pim-e-ɛ. 10-cocoyam 1-child NSE.1.NEG-throw.out-PRF.IRR
‘It is the cocoyams that the child didn’t throw out.’
(Hedinger 2008: 106 (297))

(30) *Topicalized adjunct*

Bɔɔb d-ð nyábɔɔ-ɗyɛ-ɛ. 5-TOP NSE.2PL.3PL/FUT-eat-NSE
‘Now you and they will eat.’
(Hedinger 2008: 201 (508))

4 Wh-agreement in adverbial clauses

(31) Wh-agreement in adverbial clauses is not unique to Akɔɔse (see McCloskey 2001: 71, 82–87 for Irish), but Akɔɔse’s sensitivity to the height of extraction allows us to probe the question of where the moved elements originate.

4.1 Temporal adverbial clauses

(32) Central temporal clauses in Akɔɔse have verbs with non-subject extraction morphology.

(33) Áde ‘when’ with non-subject extraction marking

[Áde mw-ǎn ě-pim-e-ɛ Ø-mbaangé,] …
[when 1-child NSE.1.NEG-throw.out-PRF.IRR 10-cocoyam]
‘When the child didn’t throw out the cocoyams,…’
(Hedinger 2008: 106 (297))

(34) Hɛ́ɛ ‘then’ with non-subject extraction marking

[Hɛ́ɛ an-e mw-ǎn ě-tím-ɛ aṁbǐd ãbwɔ̄g~ãbwɔ̀g.] 1-1 that 1-child NSE.1-return-PRF back immediately
‘Then that child returned immediately.’
(Hedinger 2008: 185 (432))

(35) Ngáne ‘as’ with non-subject extraction marking

[Ngáne Ø-nguu ě-pédɛ hɛ́n,] …
[as 9-pig NSE.9-arrive.PRIF here]
‘As pig arrived here,…’
(Hedinger 2008: 227 (600))

(36) Nɛ́ɛ ‘as, when, after’ with non-subject extraction marking

[Nɛ́ɛ Ø-sánkala n-hāg n-e mw-ǎn ě-húú aṁmɛ́n,]
[as 1-big 3-(fruit) 1-that 1-self NSE.1-return-PRF up]
[a-bɔm-ɛ Ø-kúl-e a Ø-mbǐd te, toöy.
1-knock-PRF 9-tortoise-PERS LOC 9-back in boom
‘As a huge ñheg fruit came down, it knocked Tortoise on the back, boom.’
(Hedinger 2008: 277 (TD054))

(37) The presence of wh-agreement morphology suggests that these clauses are derived via movement.

4.2 Conditional clauses

(38) Central conditional clauses in Akɔɔse have verbs with subject extraction morphology.

(39) Nzé ‘if’ with subject extraction marking

‘Papaya cracks if it is not fully ripe.’
(Hedinger 2008: 237 (657))
(40) Nzé ‘if’ with subject extraction marking
[Nzé  bë-hîd-e-Ø  éch-ê  Ø-mbîndé  á  Ø-mbîd.,]
[if  2.NEG-follow-PRF-SE  10-that  10-law  LOC  9-back]
é-yûk-ê  a-bë  nén  mw-àn  á-kud  Ø-mbîb.
10-always-PRF  INF-be  COMP  1-child  INF-get  9-bad
‘If they don’t follow the laws, bad will always happen to the child.’
(Hedinger 2008: 237 (656))

(41) The presence of wh-agreement morphology suggests that these clauses are derived via movement.

4.3 Peripheral adverbial clauses

(42) Peripheral adverbial clauses in Akɔɔse have verbs with no extraction morphology.

(43) Kénɛɛ ‘although, even though’ with no extraction marking
Aá  á-châg  mâ  m-bâŋ,  [kénɛɛ  Ø-ngâa]
1.QUOT  1-call.HORT  1  3-nickname  [although  9-leopard.PERS
è-hêl-cê  ñêm-ê  m-bâŋ  a-châg.]
1.NEG-can-PRF.IRR  3-that  3-nickname  INF-call]
‘He said that he should call him names, even though Leopard wasn’t able
to do it.’
(Hedinger 2008: 235 (644))

(44) The absence of extraction marking in these clauses supports Haegeman’s
(2007, 2010a) claim that movement is not involved in the derivation of
peripheral adverbial clauses.⁶

5 Morphosyntactic analysis

(45) In order to investigate the operators’ extraction sites, we need to have
a fuller understanding of the morphosyntactic details of Akɔɔse wh-agreement.

(46) There are widely divergent analyses of wh-agreement (Zaenen 1983;
Clements 1984; Watanabe 1996; Chung 1998; Reintges et al. 2006; Lahne
2008).

(47) Here, I propose a novel syntactic account for the distribution of Akɔɔse
wh-agreement morphology.

5.1 Morphological facts

(48) Underlying affixes in the (present) imperfective paradigm (gleaned from
Hedinger 1985: 38–39)

<table>
<thead>
<tr>
<th>NE</th>
<th>SE</th>
<th>NSE</th>
</tr>
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<tbody>
<tr>
<td>Affirmative</td>
<td>SM-  -êʔ</td>
<td>SM-  -êʔ</td>
</tr>
<tr>
<td>Negative</td>
<td>SM-e-  -êʔ  -êʔ</td>
<td>SM-e-  -êʔ</td>
</tr>
</tbody>
</table>

(49) Morphological generalizations

a. The non-subject extraction forms all have H̥- (Hedinger 1985, 2008).
b. In subject extraction forms, the polarity contrast in suffixes is neutralized
in the direction of the affirmative.
c. In non-subject extraction forms, the polarity contrast in suffixes is
neutralized in the direction of the negative.

(50) Extraction morphemes

a. -êʔ: An irrealis suffix. It tends to occur in negative contexts (Hedinger
1985: 15), and there may be a relationship between irrealis morphology
and extraction (Haïk 1990; Georgopoulos 1985, 1991; Schneider-Zioga
2007).
b. H̥-: A wh-agreement prefix. It is licensed via agreement with a wh-
element that is also irrealis.

⁶Another possibility is that peripheral adverbial clauses might have a silent ‘it is the case that’
between the subordinator and the rest of the clause (Haegeman 2010b: 616–617; Richard Kayne
(p.c.)); this unpronounced upper clause could have operator movement (and silent wh-agreement in
Akɔɔse), unifying the analysis of central and peripheral adverbial clauses. As far as I can tell, the
data presented here are consistent with either analysis.
5.2 Syntactic account

(51) *Representational assumptions*
   a. **Cartographic** approach: Each of the three layers of the clause (CP, IP, VP) is articulated (Cinque 1999; Larson 1988; Rizzi 1997).
   b. Following Julien (2002), Bantu verbal suffixes are generated as heads and attach to the root via head movement, so they surface in mirror order of their original positions (Baker 1985). Bantu verbal prefixes are generated as heads but are spelled out in their original positions, so they surface in order.
   c. operators SpecCP
      overt subject DPs SpecFinP
      H̥- Fin
      subject agreement AgrS
      negative prefix Neg
      tense prefixes T
      -ʔɛ́ Moodirrealis
      aspect suffixes Asp
      verb root V

(52) *Principles constraining derivations*
   a. **Locality Condition on Movement:** In a chain created by movement, neighboring links must not be in non-neighboring layers of the clause. The highest projections of the VP, IP, and CP layers are v, AgrS, and C, respectively; these form the boundaries between layers (cf. Subjacency (Chomsky 1973)).
   b. **Wh-agreement Licensing:** H̥- is licensed under upward agreement (Baker 2008) with a DP that is [+wh] and [+irrealis].
   c. **Economy Condition on Operator Movement:** Operator chains must have as few links as possible (cf. Grimshaw’s (1997) STAY), subject to (52a–52b).
   d. **Irrealis Licensing:** -ʔɛ́ is licensed by a specifier that is [+irrealis] (cf. the first clause of the Neg Criterion (Haegeman & Zanuttini 1991)), subject to (52c).

(53) *Affirmative no extraction*
   a. Mw-ān a-pim-ɛʔ Ø-mbaaŋgé. 1-child 1-throw.out-IPFV 10-cocoyam ‘The child is throwing out the cocoyams.’

(54) *Negative no extraction*
   a. Mw-ān ė-pim-ɛ́ 1-child 1-throw.out-IPFV.IRR 10-cocoyam ‘The child isn’t throwing out the cocoyams.’

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*In the trees that follow, arrows with solid lines indicate operator movement, while arrows with dashed lines indicate non-operator movement.*
b. The derivation proceeds as in (53), except that the subject is a [+wh] operator that continues up to SpecCP.

c. Although the subject is a [+wh], it is not [+irrealis], so Wh-agreement Licensing is not met, and H̆- does not appear.

(56) Negative subject extraction

a. Ø-Nzɛ́ Ě-ŒÍ-Ø 0-mbaaŋgé.

b. Structure

```
DP
AgrSP

mwań
FIN'

Ø
Neg

Asp

Mood

v

pim
Ø
```

c. The irrealis suffix is selected by Neg, but Irrealis Licensing requires there to be a specifier of Mood_{irrealis}, so the subject stops in Spec Mood_{irrealis}.P on its way to Spec AgrS. Because the subject is not an operator, it is not subject to the Economy Condition, so this extra stop in the IP layer is licit.

d. Although the subject is [+irrealis] (required in order to license -ʔɛ́), it is not [+wh], so Wh-agreement Licensing is not met, and H̆- does not appear.

(55) Affirmative subject extraction

a. Ø-Nzɛ́ a-pim-ɛʔ-Ø 0-mbaaŋgé.

b. Structure

```
DP
AgrSP

mwań
FIN'

Ø
Neg

Asp

Mood

v

pim
Ø
```

c. Mood_{irrealis} is selected by Neg, but Irrealis Licensing requires there to
be a specifier of Mood\textsubscript{irrealis}P.

d. However, Irrealis Licensing is subject to the Economy Condition on Operator Movement, so because the subject is a [+wh] operator, it cannot make an extra stop in SpecMood\textsubscript{irrealis}P, so -ʔɛ́ does not appear.

e. Although the subject is [+wh], it is not [+irrealis], so Wh-agreement Licensing is not met, and H̥- does not appear.

(57) Affirmative non-subject extraction

a. Chě mw-ān á-pim-ɛ́ɛ́?
   what 1-child NSE.1-throw.out-ipfv.NSE
   ‘What is the child throwing out?’

b. Structure

c. The [+wh] object cannot skip the IP layer on its way to SpecCP because of the Locality Condition on Movement, so it lands in SpecMood\textsubscript{irrealis}P. This licenses -ʔɛ́ even though it is an affirmative context. The Economy Condition on Operator Movement is subject to the Locality Condition, so this extra link is licit.

d. The object is both [+wh] and [+irrealis], so it licenses H̥- via upward agreement, according to Wh-agreement Licensing.

(58) Negative non-subject extraction

a. Chě mw-ān é-pim-ɛ́ɛ́?
   what 1-child NSE.1-throw.out-ipfv.IRR
   ‘What isn’t the child throwing out?’

b. The derivation proceeds as in (57).

(59) Ultimately, the H̥- prefix is the only instance of true Wh-agreement, where an element agrees with a wh-element. The suffixes effectively mark extraction, not because of an agreement relation between any suffix and the wh-element, but rather due to the interaction of the principles in (52).

6 Extraction sites in central adverbial clauses

(60) The analysis of Akɔɔse Wh-agreement presented above allows us to narrow the field of possible extraction sites for the relativizing operators in central adverbial clauses.

6.1 Central temporal clauses

(61) Extraction site hypotheses:

a. In the IP layer, in SpecAspP (Demirdache & Uribe-Etxebarria 2004)

b. In the IP layer, in a temporal projection (Haegeman 2007: 293)

c. In the VP layer, as a PP-type adjunct (Larson 1987, 1990)

\footnote{We know the object is [+irrealis] because it licenses -ʔɛ́; I will remain agnostic as to whether it must be [+irrealis] in the numeration or whether it becomes [+irrealis] when it lands in SpecMood\textsubscript{irrealis}P.}
6.2 Central conditional clauses

(64) Extraction site hypotheses:

a. In the VP layer (Bhatt & Pancheva 2006, at least implicitly)


c. In the CP layer, in SpecFinP (Haegeman 2010a: 636)

(65) The subject extraction marking in Akɔɔse central conditional clauses suggests that the relevant operator originates \textit{above Mood}_{irrealis}P or \textit{in the IP layer, below Mood}_{irrealis}P. This is compatible with hypothesis (64c).

(66) a. \textbf{Above Mood}_{irrealis}P: Derivation works.

b. In SpecMood_{irrealis}P: Would license -ʔɛ́, but this does not appear.

c. \textbf{In the IP layer below SpecMood}_{irrealis}P: Derivation works.

d. In the VP layer: Would pattern like non-subjects and the temporal operator, stopping in SpecMood_{irrealis}P and triggering non-subject extraction morphology.

7 Conclusion

(67) Wh-agreement provides compelling morphological evidence for a movement-based derivation of adverbial clauses.

(68) Due to its sensitivity to the operator status and structural position of moved elements, Akɔɔse wh-agreement (in the broad sense) lends insight into the question of where the moved elements originate.

(69) **Theoretical questions:**

a. Does the derivation of adverbial clauses involve movement?

   - Yes (central)
   - No (peripheral)

b. What is the site of extraction for the moved element?

   - Somewhere in the VP layer (temporal)
   - Somewhere above Mood_{irrealis}P or below Mood_{irrealis}P within the IP layer (conditional)

c. How should we classify types of adverbial clauses to account for variation in answers to these questions?

   - Central vs. peripheral
   - Temporal vs. conditional

References


