How to sluice in the wh-in-situ language Malagasy

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1 Introduction
Sluicing is the construction illustrated in (1a) in which an interrogative clause is reduced to only a wh-phrase. Sluicing is typically analyzed as wh-movement followed by TP deletion, as shown in (1b) (Ross 1969, Merchant 2001).

(1) a. Somebody left and I know who
    b. Somebody left and I know \( [_{\text{CP}} \text{who}_i \{_{\text{C'}}\text{[wh]} \{_{\text{C''}}\text{left}]\}] \)

If wh-movement is a prerequisite for sluicing, the prediction is that wh-in-situ languages should not have sluicing. For one wh-in-situ language, Malagasy (Western Austronesian, Madagascar), this prediction is apparently incorrect:

(2) nandoko zavatra i Bao fa manadino aho hoe inona paint thing Bao but forget I COMP what ‘Bao painted something but I forget what’

The goal of this paper is to explore how Malagasy can have sluicing without wh-movement. The paper is organized as follows: Section 2 presents some basic facts about Malagasy word order. Section 3 turns to question formation in Malagasy and provides evidence that Malagasy is in fact a wh-in-situ language. This observation is not uncontroversial because Malagasy appears to have wh-movement. We provide evidence that such apparent fronting is in fact a base-generated pseudocleft structure, not wh-movement. Section 4 presents the Malagasy sluicing construction along with two possible analyses. We reject an account in which Malagasy sluicing involves exceptional wh-movement. In section 5 we provide evidence for our own analysis, that Malagasy sluicing is derived via wh-predicate fronting followed by TP deletion. Predicate fronting has been proposed by other researchers as a general mechanism to derive the predicate-initial (VOS) word order of some Austronesian languages so our analysis dovetails well with recent theoretical proposals. Section 6 contains conclusions, typological considerations, and further issues.

2 Basic Malagasy word order
Malagasy is well-known for having fairly rigid VOS word order, (3). More generally, the predicate can be any phrasal category, in addition to VP, so that the
language can be described as predicate initial, (4).\(^1\)\(^2\)

(3) mividy ny akoho i Bao
buy the chicken Bao
‘Bao is buying the chicken’

(4) a. [vorona ratsy feo]\(NP\) ny goaika
bird bad voice the crow
‘The crow is a bird with an ugly voice’
b. [faly amin’ ny zanany]\(AP\) Rasoa
  proud PREP the child.3SG Rasoa
‘Rasoa is proud of her children’
c. [any an-tsena]\(PP\) Rakoto
  PREP ACC-market Rakoto
‘Rakoto is at the market’

One exception to this relatively fixed word order is that complement CPs are extraposed to a clause-final position yielding VSO order, (5a). Immediately post-verbal position for the CP is impossible, (5b).

(5) a. nilaza Rabe [fa mividy ny akoho i Bao]
say Rabe that buy the chicken Bao
‘Rabe said that Bao is buying the chicken.’
b. *nilaza [fa mividy ny akoho i Bao] Rabe
say that buy the chicken Bao Rabe

3 Questions in Malagasy
3.1 Two types of wh-questions
Malagasy has two strategies for forming information questions. When questioning non-subjects, wh-in-situ is possible (see Sabel 2003 for discussion), (6).

\(^1\) We use the following abbreviations in glossing: 1/2/3-person, ACC-accusative, ASP-aspect, COMP-complementizer, LOC-locative, NEG-negative, NOM-nominative, PASS-passive voice, PREP-preposition, PRT-particle, SG/PL-number.

\(^2\) There is considerable debate in literature over the nature of the clause-final DP, whether it is a subject or an Abar topic-like element. We continue to refer to it as a subject for convenience, without taking a stand on the issue. See Pearson, to appear for discussion.
There is no evidence of wh-movement in such examples. Tests for covert movement show that the wh-phrase does not seem to move even at LF: wh-in-situ is not sensitive to islands, (7), and does not trigger weak crossover, (8).

The second question strategy is that, for non-complements (subjects and adjuncts), the wh-phrase appears at the beginning of the clause followed by the particle no (see Keenan 1976, MacLaughlin 1995, Paul 2001, Sabel 2003, for further description), (9).

While such examples might appear to involve wh-movement with a question complementizer no, we will show in the following subsection that they are actually pseudoclefts (Dahl 1986, Paul 2001, and Potsdam 2004). As schematized in (10), the initial wh-phrase is the predicate of the clause, also called the focus or pivot. The remaining material is a headless relative in subject position. The wh-
phrase has not actually undergone wh-movement; rather, the only A’-movement in
the structure is null operator movement in the relative clause, as shown.

(10) \[
\begin{array}{llll}
\text{subject/headless relative} & \text{no Op_i} & \text{nimorehy t_i} \\
\text{who} & \text{PRT} & \text{laugh}
\end{array}
\]
(lit. “The one who laughed is who?”)
‘Who laughed?’

3.2 Evidence for the pseudocleft structure
In this section we provide evidence supporting the pseudocleft analysis of wh-
questions, repeated in (11a), and against a wh-movement or fronting analysis,
schematized in (11b). Wh-questions are not derived by ordinary wh-movement to
the specifier of CP.

(11) a. \[
\begin{array}{llll}
\text{subject} & \text{no Op_i} & \text{t_i} \\
\text{wh-phrase}
\end{array}
\] \check{\text{PSEUDOCLEFT ANALYSIS}}

b. \[
\begin{array}{llll}
\text{subject/headless relative} & \text{no Op_i} & \text{nimorehy t_i} \\
\text{wh-phrase_i}
\end{array}
\]
\text{FRONTING ANALYSIS}

Our two arguments can be summarized as follows: 1) wh-questions show parallels
with the focus construction, which Paul 2001 analyzes as a pseudocleft. The
parallels are immediately accounted for if both constructions have the same
structure. 2) The initial wh-phrase in wh-questions behaves like a predicate, as is
expected under the pseudocleft analysis but not under the movement analysis.

Malagasy has a focus construction illustrated in (12a) that appears similar
to wh-questions. Paul 2001 advances a pseudocleft analysis of the construction,
assigning (12a) the structure in (12b). The initial focussed element is the predicate
of the clause and the subject is a headless relative clause.

(12) a. Rasoa no nimorehy
   \begin{array}{llll}
   \text{Rasoa} & \text{PRT} & \text{laugh}
   \end{array}
   ‘It was Rasoa who laughed’

b. \[
\begin{array}{llll}
\text{subject/headless relative} & \text{no Op_i} & \text{nimorehy t_i} \\
\text{Rasoa}
\end{array}
\]
\begin{array}{llll}
\text{Rasoa} & \text{PRT} & \text{laughed}
\end{array}
\text{lit. “The one who laughed was Rasoa”}

There are a number of parallels between the focus construction and wh-questions.
First, both are formed by preposing a constituent and following it immediately
with the particle no. Second, the two constructions have a similar focus
interpretation of the initial XP. Wh-phrases indicate a request for new information
in the same way that focused XPs supply new information. The focus construction
is most naturally translated into English with a cleft or pseudocleft. Third, the two
constructions are subject to an identical fronting restriction that we already saw
above for wh-questions: only subjects and adjuncts can be fronted (Keenan 1976
and others). The same restriction holds of the focus construction, (13).

(13) a. *ny vary no nividy Rabe *OBJECT
    the rice PRT buy Rabe
    (‘It’s the rice that Rabe bought’)
b. omaly no nividy ny vary Rabe ADJUNCT
    yesterday PRT buy the rice Rabe
    ‘It’s yesterday that Rabe bought the rice’
c. Rabe no nividy ny vary SUBJECT
    Rabe PRT buy the rice
    ‘It’s Rabe who bought the rice’

Analyzing wh-questions as clefts immediately accounts for these parallels. They
are unexplained or at least accidental under the fronting analysis since the focus
constructions and wh-questions would have very different structures.

The pseudocleft analysis is also supported by observations that the initial
wh-phrase behaves like a predicate. There are a number of verbal elements that
flank the predicate in Malagasy. For example, the floating quantifiers daholo ‘all’
and avy ‘each’, and the VP-adverb foana ‘always’ immediately follow the
predicate in VOS clauses:

(14) a. namaky ny boky daholo ny ankizy
    read the book all the child
    ‘All the children read the book’
b. any an-tsena foana Rakoto.
    there ACC-market always Rakoto
    ‘Rakoto is always at the market’

These elements likewise immediately follow a wh-phrase in questions:

(15) a. iza daholo no namaky ny boky?
    who all PRT read the book
    ‘Who all read the book?’
b. iza foana no any an-tsena?
    who always PRT there ACC-market
    ‘Who is always at the market?’

Other post-predicate particles that behave the same way include the exclamative
element anie and the parenthetical hono ‘so they say’.

Similarly, the modal elements toa ‘seem’ and tokony ‘should’, and the
emphatic element tena ‘indeed’ immediately precede the predicate in VOS
clauses:
Such elements also immediately precede a wh-phrase:

(17) a. tokony iza no hamangy an-dRakoto?
should who PRT visit ACC-Rakoto
‘Who should visit Rakoto?’

b. tena iza no nanapaka bozaka?
indeed who PRT cut grass
‘Who indeed cut the grass?’

Potsdam 2004 explores such data in more detail but even at this level of presentation the data make sense if wh-questions are pseudoclefts in which the initial wh-phrase is a predicate, not a fronted element. Under the fronting analysis, the placement of the various elements is unexpected because the wh-phrase is not a predicate but is very high in the clause structure. Such elements would have to have special distribution statements for wh-questions, different from ordinary clauses.

We conclude that Malagasy has no wh-movement. Wh-questions use either an in-situ or pseudocleft strategy. This sets up a paradox because, as we show in the next section, Malagasy has sluicing, a construction which depends upon wh-movement.

4 Malagasy sluicing

Before introducing the Malagasy sluicing examples, recall the English example, repeated from (1):

(18) a. Somebody left and I know who

b. Somebody left and I know \( \text{CP who} \{C, C^*[\text{wh}] \{ TP \text{left} \} \} \)

In such examples, we will call the missing material the SLUICED CLAUSE and indicate it with strikethrough. The REMNANT is the wh-phrase that remains (who above) and the CORRELATE is the XP corresponding to the wh-phrase (somebody above) in the ANTECEDENT CLAUSE.

Two examples of Malagasy sluicing are given in (19).
(19) a. nandoko zavatra i Bao fa manadino aho hoe inona
    paint thing Bao but forget I COMP what
    ‘Bao painted something but I forget what’

b. nisy olona nihomehy ka nanontany ianao hoe iza
    exist person laugh and ask you COMP who
    ‘Someone laughed and you asked who’

If such examples truly instantiate sluicing, they are surprising because sluicing as analyzed by Ross 1969, Merchant 2001, and others requires wh-movement prior to the deletion of the remainder of the clause (TP). In what follows, we propose two solutions to this puzzle. The first, in section 4.1, suggests that there actually is wh-movement, despite our earlier conclusions. We reject this analysis and propose instead, in section 4.2, that the input configuration for TP deletion is derived not by wh-movement but by a general predicate fronting operation that exists independently to derive VOS word order. This analysis is compatible with our conclusions about the structure of wh-questions above.

4.1 Deletion repair
One solution to the Malagasy sluicing paradox is to acknowledge, despite appearances, that the sluicing examples do involve the necessary wh-movement. The derivation of (20) would be as in (21), parallel to the English case.

(20) nisy olona nihomehy ka nanontany ianao hoe
    exist person laugh and ask you COMP
    \[ CP \text{iza} \{TP nihomehy t'j\} \]
    who laugh
    ‘Someone laughed and you asked who’

(21)

3 The antecedent clause in this example takes the form of an existential construction because indefinite subjects are impossible in Malagasy (Keenan 1976).
We will call this the Deletion Repair analysis: Malagasy has wh-movement just in case deletion eliminates the TP containing the trace of wh-movement. We might assume that Malagasy does not show wh-movement because it would violate some general movement restriction in the language. The deletion somehow ameliorates the violation. The analysis is based on the observation that sluicing apparently rescues other violations of constraints on movement, notably island constraints (Ross 1969) (data from Chung, Ladusaw, and McCloskey 1995 and Merchant 2001):

(22) a. *complex noun phrase constraint
   They want to hire someone who speaks a Balkan language, but I don’t remember which they want to hire someone who speaks.

b. *wh-island
   Sandy was trying to work out which students would be able to solve a certain problem, but she wouldn’t tell us which one she was trying to work out which students would be able to solve.

c. *COMP-trace effect
   It has been determined that someone will be appointed, but I can’t remember who it has been determined that will be appointed.

Lasnik 2001 and Kennedy and Merchant 2000 propose specific analyses of this genre in which an illicit movement is rendered licit by PF deletion.

Despite the appeal of the analysis, there are four problems. First, if wh-movement is to the specifier of CP, as is usually the case, it is unexpected that the wh-phrase follows rather than precedes the embedded question complementizer hoe:

(23) nandoko zavatra i Bao fa …
   paint thing Bao but
   a. manadino aho hoe inona
      forget I COMP what
   b. *manadino aho inona (hoe)
      forget I what COMP
   ‘Bao painted something but I forget what’

Second, the Deletion Repair analysis predicts that accusative case wh-phrase remnants should be grammatical because wh-movement should be able to target any wh-phrase. This is incorrect, (24).

(24) *nanasa olona Rabe ka nanontany aho hoe an’iza
   invite person Rabe and.so asked I COMP who.ACC
   (‘Rabe invited someone and I asked whom’)
ungrammatical. An example is sluicing with implicit correlates (Chung, Ladusaw, and McCloskey 1995, Romero 1998, Merchant 2001, and others). English sluicing with implicit correlates is illustrated in (25). There is no overt correlate in the antecedent clause to which the wh-remnant corresponds. The correlate is implicit.

(25) a. She’s reading. I can’t imagine what.
    b. They’re baking a cake, but they wouldn’t say for whom.

Implicit correlates are relevant because sluicing with implicit correlates cannot violate constraints on movement. Sluicing is unable to rescue such derivations (contrast these with the grammatical examples in (22)).

(26) a. *complex noun phrase constraint
    *Kim knows the person who was reading but she won’t say what (she knows the person who was reading)
    b. *wh-island
    *Agnes wondered when John would bake a cake but it’s not clear for whom (Agnes wondered when John would bake a cake)

The Deletion Repair analysis predicts that Malagasy sluices with implicit correlates should likewise be ungrammatical; however, this is incorrect:

(27) namaky i Rasoa fa tsy fantatro hoe inona
    read Rasoa but NEG know.1SG COMP what
    ‘Rasoa was reading but I don’t know what’

Finally, it remains mysterious why there would be wh-movement just in this instance. There does not seem to be any language-internal motivation. We conclude that sluicing in Malagasy does not involve otherwise unavailable wh-movement. The question remains how the wh-predicate in a sluice can get outside of TP to allow for deletion. We offer an another answer in the next subsection.

4.2 Predicate fronting

Our proposal is that sluicing makes use of mechanisms independently available in the grammar. First, sluicing involves embedded questions which are pseudocLEFTs, just as root questions are pseudocLEFTs. (28) illustrates an embedded question. They take the form of a matrix wh-question introduced by the complementizer hoe.4

4 In this paper, we do not fully address the licensing conditions for sluicing (see Merchant 2001). We suggest here that it is the question complementizer hoe that licenses the deletion.
Second, the wh-predicate of the pseudocleft moves out of TP via predicate fronting. Recently, there have been a number of proposals in the literature that VOS word order in Austronesian languages is derived from an underlying SVO order via predicate fronting (Massam and Smallwood 1997, Rackowski and Travis 2000, Massam 2000, Pearson 2001, Aldridge 2002, Travis 2004; see Chung, to appear for discussion). The derivation of a basic VOS is clause is as in (29) in which an underlying SVO structure is transformed into VOS by fronting the predicate phrase, vP, to the specifier of a projection FP above TP.

(29) a. mividy ny akoho i Bao
    buy the chicken Bao
    ‘Bao is buying the chicken’

b. 

The simplest assumption is that such predicate fronting also occurs in (embedded) wh-questions and as part of the derivation of sluicing examples, (30).

(30) a. nisy olona nihomehy ka
    exist person laugh and
    nanontany ianao hoe iza *(no) nihomehy
    ask you COMP who PRT laugh
    ‘Someone laughed and you asked who (laughed)’
If predicate fronting is independently part of Malagasy grammar, then it provides the necessary movement to feed TP deletion. In the next section we provide some evidence that the above derivation is on the right track.

5 Evidence for the Predicate Fronting Analysis

Our evidence in favor of predicate fronting plus TP deletion as the source of Malagasy sluicing consists in showing that the wh-phrase remnant in sluicing is actually a predicate, as is expected under the proposed derivation.

First, the same elements that can flank predicates in matrix clauses (see section 3.2) also co-occur with wh-phrase remnants in sluicing. Pre-predicate elements such as the modal tokony ‘should’ and the emphatic element tena ‘indeed’ can precede a sluiced wh-phrase, (31), and post-predicate elements such as the floating quantifier daholo ‘all’ and the VP adverb foana ‘always’ can follow the wh-remnant, (32).

\[(31) \quad \text{a. misy olona tokony hamangy an-dRasoa fa} \]
\[
\text{exist person should visit ACC-Rasoa but} \\
\text{tsy fantatro hoe \quad } [\text{pred tokony} \quad \text{iza}] \\
\text{NEG know.1SG COMP should who} \\
\text{‘Someone should visit Rasoa but I don’t know who should’}
\]

\[ \text{b. nisy olona nanapaka bozaka fa} \]
\[
\text{exist person cut grass but} \\
\text{tsy taididiko hoe tena iza} \\
\text{NEG remember.1SG COMP indeed who} \\
\text{‘Someone cut the grass but I don’t remember who indeed did’} \]
(32) a. nahandro zavatra maro Rasoa fa cook thing several Rasoa but 
  tsy fantatro hoe inona daholo NEG know.1SG COMP what all 
  ‘Rasoa cooked several things but I don’t know what all’

b. any an-tsena matetika ny mpivarotra sasany fa there ACC-market often the seller some but 
  tsy fantatro hoe iza foana NEG know.1SG COMP who always 
  ‘Some sellers are often at the market but I don’t know who always is’

Second, all and only the wh-phrases that can be predicates can be sluicing remnants.\(^5\) We have already seen that accusative wh-phrases cannot be sluicing remnants, (33). They also can not be questioned in a pseudocleft, (34), because only subjects and some adjuncts can be questioned with this strategy as discussed in section 3.1.

(33) *nanasa olona Rabe ka nanontany aho hoe an’iza invite someone Rabe and ask I COMP who.ACC 
  (‘Rabe invited someone and I asked whom’)

(34) *an’iza no nanasa Rabe? who.ACC PRT invite Rabe 
  (‘Whom did Rasoa invite?’)

In the same vein, prepositional phrases can be pseudoclefted and sluiced:

\(^5\) The one exception that we know of to this claim is \textit{wh-the-hell} phrases, which are ungrammatical in sluices (as in English) but acceptable as predicates.

(i) *nanasa olona Rasoa fa tsy fantatro hoe mpamosavy iza invite person Rasoa but NEG know.1SG COMP witch who 
  *’Rasoa invited someone but I don’t know who the hell’

(ii) mpamosavy iza no nasain-dRasoa? witch who PRT invite.PASS-Rasoa 
  (‘Who the hell did Rasoa invite?’)

We follow den Dikken and Giannakidou 2002 and attribute the ungrammaticality of (i) to the impossibility of linking the \textit{wh-the-hell} phrase to a discourse familiar entity (\textit{olona} ‘someone’).
In summary, wh-phrase remnants in sluicing are predicates. This observation supports our claim that sluicing examples are derived by predicate fronting and subsequent TP deletion. The derivation is similar to that assumed for English except that the wh-phrase is fronted by predicate fronting, not wh-movement.

6 Conclusion
In this paper we have provided an analysis of sluicing in the wh-in-situ language Malagasy. Our analysis of Malagasy sluicing contributes to the typology of ways in which wh-in-situ languages create a sluicing-like surface structure. We review several strategies here. In Malagasy, we have argued, sluicing is wh-predicate fronting followed by TP deletion:

(37) nisy olona nihomehy ka
exist person laugh and
nanontany iaoa hoe 
[FP [{vP iza}i {TP no nihomehy t}]
ask you COMP who PRTlaugh
‘Someone laughed and you asked who (the one who laughed was)’

Japanese derives sluicing examples using a reduced cleft (Merchant 1998 and references therein):

(38) dareka-ga sono hon-o yon-da ga
someone-NOM that book-ACC read-PAST but
watashi-wa [CP [TP pro_expl dare da/de aru] ka] wakaranai
I-TOP who be-PRES Q know.NEG
‘Someone read the book but I don’t know who (it is).’

Chinese creates sluicing-like examples via a copula construction with a null anaphoric pronoun. The structure does not involve any deletion (Adams 2002):

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6 The verb in this example is in what is called the circumstantial voice. It is roughly equivalent to the passive of an applicative.
(39) Xiaomei mai le yi-jian liwu, danshi ta bu gaosu wo [\(\text{TP} \quad \text{pro}_i\) shi sheme]

‘Xiaomei bought a present, but she didn’t tell me what (that was)’

Finally, Javanese has a strategy in which there is focus movement of a wh-phrase to a clause-initial position followed by TP deletion (Adams 2003):

(40) umpamane Tika lunga
if Tika go
ibune kudu ngerti \([\text{FocP} \quad \text{neng ngendi}]_i \quad \text{TP} \quad \text{dheweke lunga} \quad \text{t}_3\)]
mother must know LOC where 3SG go

‘If Tika goes somewhere, her mother must know where (she goes)’

A consequence of our analysis is that Malagasy is not a counterexample to movement analyses of sluicing. On the contrary, we have provided another kind of movement, predicate fronting, which can feed the deletion operation. Our proposal and the above languages highlight the fact that sluicing is not a construction *per se*. A sentence that superficially looks like English sluicing need not have an English-like derivation. Different languages arrive at the same surface form via different syntactic means. We hypothesize that which strategy (or strategies) a language uses depends upon the syntactic mechanisms independently available in the language.

One consequence of our analysis is that it provides evidence for predicate fronting in Malagasy. While there is much recent work espousing predicate fronting as the mechanism by which verb-initial word order in Austronesian languages is derived, there is thus far little empirical evidence for this fronting operation (see Chung, to appear for important discussion) and it is usually adopted based on theory-internal consideration. Our analysis thus has potentially important consequences for theories of Austronesian clause structure.

**References**


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