Bantu *Wh*-agreement and the Case against Probe Impoverishment

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1. Introduction

In many languages, A′-movement in the syntax is reflected by alternations in the morphology. This paper will use the term *extraction morphology* to refer to these alternations. For example, in Bemba,[1] the verb in a subject relative clause shows two forms of extraction morphology, illustrated in (1). Instead of the canonical class 1 subject agreement marker *a-*, the anti-agreement marker *u-* appears in its place. An additional prefix *ú-* also agrees with the extracted subject.

(1)   *Bemba extraction morphology*

    a.   *No extraction*

        umulumendo **a**-ka-belenga   ibuku   [Bemba]

        1.boy   **1.SM**-FUT-read 5.book[2]

        'The boy will read the book.'   (Cheng 2006: (1a))

    b.   *Class 1 subject extraction: extraction morphology required*

        umulumendo **ú-u**-ka-belenga   ibuku   [Bemba]

        1.boy   **1.SE-1.AA**-FUT-read 5.book

        'the boy who will read the book'   (Cheng 2006: (1b))

[1]Bantu languages mentioned in this paper include:

Akɔɔse	[bss]	A15c	Cameroon	Kinande	[nnb]	JD42	DRC
Bakweri	[bri]	A22	Cameroon	Kinyarwanda	[kin]	JD61	Rwanda
Duala	[dua]	A24	Cameroon	Luganda	[lug]	JE15	Uganda
Lingala	[lin]	C30A	DRC	Lubukusu	[bxk]	JE31c	Kenya
Dzamba	[bni]	C322	DRC	Kuria	[kuj]	JE43	Tanzania & Kenya
Kilega	[lea]	D51	DRC	Bemba	[bem]	M42	Zambia & DRC
Kikuyu	[kik]	E51	Kenya	Shona	[sna]	S11-15	Zimbabwe
Kîîtharaka	[thk]	E54	Kenya	Ikalanga	[kck]	S16	Botswana & Zimbabwe
Gichuka	[cuh]	E541	Kenya	Sotho	[sot]	S33	Lesotho
Swahili	[swh]	G40	Tanzania & Kenya	Zulu	[zul]	S42	South Africa

[2]I have occasionally adjusted glosses and translations for clarity and consistency, following the Leipzig Glossing Rules wherever possible. Abbreviations used include:

1PL	1st person plural	DEF	definite	NEG	negative	REL	relative
1SG	1st person singular	FOC	focus	NSE	non-subject extraction	REM	remote
2SG	2nd person singular	FUT	future	PPF	pre-prefix	SE	subject extraction
3SG	3rd person singular	FV	final vowel	PRF	perfect	SG	singular
AA	anti-agreement	HAB	habitual	PROG	progressive	SM	subject marker
AG	agent	IPFV	imperfective	PRS	present	UNM	unmarked case
APPL	applicative	IRR	irrealis	PST	past		

Bare numerals in glosses indicate noun class, encoding both number and gender features.

Categorizing these extraction morphology phenomena on the basis of the morphological alternation involved produces three types, all of which are found in Bantu languages. In type 1 (replacement) extraction morphology, a canonically appearing morpheme is replaced by another morpheme in movement contexts. Type 2 (deletion) extraction morphology involves the absence of a morpheme that would ordinarily appear if movement had not occurred. The opposite scenario holds for type 3 (addition) extraction morphology: movement contexts display morphology in a corresponding sentence without movement. This paper discusses how the existence of addition extraction morphology, or wh-*agreement*,[3] proves problematic for an account of extraction morphology that relies on the deletion of features.

The paper is organized as follows. Section 2 consists of an explanation of Lahne's (2008) probe impoverishment approach to extraction morphology. In section 3, I define and illustrate each of the three types of morphological reflexes of A′-movement using examples from Bantu languages. In section 4, I provide examples of addition extraction morphology in Duala, Lubukusu, and Akɔɔse, discussing how extraction morphology of this type cannot be straightforwardly accounted for in Lahne's model but must instead be the realization of a movement-triggering feature. Section 5 concludes.

2. Lahne's Generalization and probe impoverishment

2.1. Presence or absence of a feature?

Within generative syntactic theory, movement is traditionally thought to be triggered by the presence of some feature of the probe (a strong feature, an EPP feature, an edge feature, etc.). Under that view, extraction morphology may be analyzed as the realization of this movement-triggering feature (e.g., Sabel 2000; Reintges et al. 2006).[4]

On the basis of extraction morphology patterns of types 1 (replacement) and 2 (deletion), Lahne (2008) presents an alternative account whereby the movement-triggering feature is obligatorily deleted from the probe once it has done its job. Extraction morphology then reflects the absence of some feature of the probe.

2.2. Lahne's Generalization

In her investigation of morphological reflexes of successive-cyclic A′-movement, Lahne (2008) examines data from Chamorro, Kikuyu, and Irish, but I will focus on her Chamorro case study here because it most clearly illustrates the intuition behind her analysis. Her line of argumentation rests on two properties of the paradigm shown in (2), which reflects what Chung (1998) calls *wh*-agreement (see note 3).

(2) *Chamorro (partial) transitive realis paradigm for* fa'gasi *'washed'*

	No Extraction	Subject Extraction	
1SG	hu-fa'gasi	f\<um>a'gasi	
2SG	un-fa'gasi	f\<um>a'gasi	
3SG	ha-fa'gasi	f\<um>a'gasi	
⋮	⋮	f\<um>a'gasi	(Lahne 2008: 48, from Chung 1998)

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[3] The term wh-*agreement* is often used for Bantu morphology of type 3, particularly when it involves φ-agreement with the extracted element (Carstens 2005, 2011; Kinyalolo 1991; Letsholo 2002, 2006a,b, 2007, 2012; Letsholo & Pires 2003; Schneider-Zioga 2007a, 2009; Wasike 2007); here I follow this precedent but note that the same term is sometimes also used for type 1 morphology (notably, Chamorro *wh*-agreement (Chung & Georgopoulos 1988; Chung 1994, 1998)) and for extraction morphology in general (Reintges et al. 2006). Future work is needed to establish a better terminological system for A′-extraction morphology.

[4] The most recent incarnation of this movement-triggering feature in Minimalism is Chomsky's (2008) edge feature, which is responsible for triggering both Internal Merge (movement) and External Merge. This amounts to a weakening of the concept of feature-driven movement. Addition extraction morphology (see sections 3.3 and 4) may suggest that there still needs to be some kind of feature responsible for driving movement in addition to whatever is responsible for unbounded Merge. Future research should explore the precise nature of the feature(s) being realized by extraction morphology.

The first crucial property is morphological syncretism: the form *-um-* that appears on a transitive realis verb under subject extraction is also used as an infinitive marker, nominal actor marker, and actor focus marker. Its appearance as a subject extraction marker is not dependent on person or number, as shown above. Second, canonical morphology is suppressed: the form *-um-* appears *in place of* canonical agreement with the person and number features of the subject.

These two properties, morphological syncretism and suppression of canonical morphology, form the basis of the empirical generalization that motivates Lahne's analysis:

(3) *Lahne's Generalization*   (Lahne 2008: 60)

When a language shows different exponents in movement and non-movement contexts, then the marker appearing in the context of movement is less specific than the marker appearing in non-movement contexts (=retreat to the general case, emergence of the unmarked).

This can be seen to be true in (2), where the difference between the two columns illustrates that Chamorro shows different exponents in movement and non-movement contexts. The marker appearing in movement contexts is *-um-*. If we assume as Lahne does that morphological syncretism is due to featural underspecification, then *-um-* must be less specific than the *hu-, un-, ha-,* etc. forms that appear in non-movement contexts because it cannot be specified for person or number. Furthermore, it cannot be specified for any feature that might distinguish an infinitive marker, nominal actor maker, and actor focus marker from each other.

2.3. Probe impoverishment

Lahne (2008) posits that the edge feature property [● ●] may be added to any existing feature on the current head when there is an element needed later on that is not on the edge of the phase. The edge feature property is not a feature itself but rather converts an existing feature into a structure-building feature. She assumes that once the [●F●] has triggered (Internal or External) Merge, it is deleted, thereby impoverishing the probe.[5] Given a late-insertion model of morphology, if the canonical vocabulary item is now overly specified for insertion into the impoverished probe, a more general one may be inserted instead, following the Subset Principle:

(4) *Subset Principle*   (Lahne 2008: 25; see Halle 1997)

A vocabulary item V is inserted into a functional morpheme M iff (a) and (b) hold:

a.   The morpho-syntactic features of V are a subset of the morpho-syntactic features of M.

b.   V is the most specific vocabulary item that satisfies (a).[6]

Thus, the morphological consequences of probe impoverishment are as follows. If the feature that was deleted on the probe was not part of the structural description of the vocabulary insertion rule for the canonically appearing vocabulary item, then the canonical morphology will still appear (see Lahne's (2008: 73–74) analysis of extraction from intransitive predicates in Chamorro for an example). If the feature that was deleted on the probe was part of the structural description of the vocabulary item, a less specific vocabulary item will be inserted if there is one that matches (replacement extraction morphology); if there is no matching vocabulary item, nothing will be inserted (deletion extraction morphology).

2.4. An example from Chamorro

An example from Lahne's (2008) analysis of Chamorro will illustrate this more concretely. In (5), we see that extraction of a *wh*-subject triggers the replacement of the 3sɢ verbal subject agreement prefix *ha-* with the infix *-um-*. As discussed above, *-um-* is underspecified compared to *ha-*.

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[5] See Lahne 2008 for more technical details of the implementation, which builds on Heck & Müller's (2000, 2003) Phase Balance and a view of locality in which every phrase is a phase (Müller 2004). Although Lahne (2008: 58) cites the origins of probe impoverishment in Béjar 2003, her conception of it is quite different, especially with respect to its tight relation to edge features and Merge.

[6] Lahne (2008) assumes a definition of specificity based on the cardinality of the set of features referred to in a vocabulary item's insertion rule.

(5) *Chamorro replacement extraction morphology*

    a.   *No extraction*

       Ha-fa'gasi   si   Juan i   kareta   [Chamorro]

       3SG-washed UNM Juan DEF car

       'Juan washed the car.'   (Lahne 2008: 47 (70a))

    b.   *Subject* wh-*question: extraction morphology required*

       Hayi f<**um**>a'gasi ___ i   kareta   [Chamorro]

       who <**AG**>washed   DEF car

       'Who washed the car?'   (Lahne 2008: 47 (70b))

At the point in the derivation before probe impoverishment takes place, the subject is in Spec*v*P. It has a [+wh] feature, which will allow it to merge with the structure-building C$_{[\bullet wh\bullet]}$ that is still in the Numeration.

(6) *Before probe impoverishment*   (from Lahne 2008: 69 (105))

Because Lahne (2008) assumes that every phrase is a phase, the Phase Impenetrability Condition (Chomsky 2000, 2001) requires that the subject move to the edge of IP in order to be accessible to C once that has merged. Movement to SpecIP is not possible until there is an edge feature on I, so the edge property is inserted on I's number feature according to the following rule.

(7) *Edge property insertion*   (Lahne 2008: 69 (108))

    [num] > [●num●] / transitive realis verb

Once I's number feature is an edge feature, it can trigger movement of the subject to SpecIP. After this movement has taken place, the entire [num] feature deletes, as shown in (8). The subject will now be accessible to the C$_{[\bullet wh\bullet]}$ head, allowing it to raise to SpecCP.

(8) *After probe impoverishment*   (from Lahne 2008: 69 (107))

In the postsyntactic morphological component, vocabulary items compete for insertion into I according to the Subset Principle (see (4)). Given the vocabulary insertion rules in (9), if [num] had not

been deleted, then *ha-* would be the most highly specified matching vocabulary item, and this is why it appears in (5a). However, once [num] is deleted from I, *-um-* is now the only matching vocabulary item, so it appears in (5b).

(9)   *Vocabulary insertion rules*   (Lahne 2008: 64 (96), 66 (99))

/hu-/	↔	[+1 −2 +sg]	/ ___ [cat:V]
/un-/	↔	[−1 +2 +sg]	/ ___ [cat:V]
/ha-/	↔	[−1 −2 +sg −irr]	/ ___ [cat:V]
/-um-/	↔	[voice: +ag]	

The next section explores the range of variation found within Bantu extraction morphology and evaluates Lahne's Generalization and her probe impoverishment proposal with respect to this new dataset.

3. A morphological classification of Bantu extraction morphology
3.1. Type 1: Replacement

In the first type of extraction morphology alternation, a canonically appearing morpheme is replaced with another. The most well-known replacement extraction morphology in Bantu is anti-agreement, where verbs are prevented from showing full agreement with an extracted subject. In place of the canonical verbal subject agreement marker appears a morpheme that is comparatively lacking in features. In Bantu, anti-agreement typically involves [person] leveling (Diercks 2010; Henderson 2009a,b, 2013).[7]

As shown in (10), class 1 subjects in Kilega typically trigger *á-* on the verb, but when they are extracted, *á-* is impossible and *ú-* must appear instead. Kinyalolo (1991) shows that *ú-* is unmarked for person, as it appears when first and second person singular subjects are extracted as well.

(10)   *Anti-agreement in subject* wh-*questions*

  a. *No extraction: canonical subject agreement appears*
     mw-ána   mu-sóga   **á**-ku-kít-ag-a   bú-bo   [Kilega]
     1-child   1-nice   **1.sm**-PROG-do-HAB-FV   14-that
     'A nice child always/usually does that.'   (Kinyalolo 1991: 15 (1a))

  b. *Subject extraction: anti-agreement appears*
     mw-ána   u-a   nází   **ú**-ku-kít-ag-a   bú-bo?   [Kilega]
     1-child   1-of who   **AA.sg**-PROG-do-HAB-FV   14-that
     'Whose child (usually) does that?'   (Kinyalolo 1991: 20 (12b))

  c. *Subject extraction: canonical subject agreement blocked*
    *mw-ána   u-a   nází   **á**-ku-kít-ag-a   bú-bo?   [Kilega]
     1-child   1-of who   **1.sm**-PROG-do-HAB-FV   14-that
     'Whose child (usually) does that?'   (Kinyalolo 1991: 20 (12c))

Anti-agreement has also been studied to varying degrees in Dzamba (Bokamba 1976; Henderson 2009b), Kikuyu (Clements 1984; Lahne 2008), Kinande (Baker 2008; Schneider-Zioga 1995, 1999, 2007a,b, 2009), Luganda (Ashton et al. 1954; Diercks 2010; Henderson 2009b; Walusimbi 1996), Lubukusu (Diercks 2009, 2010; Wasike 2007), and Bemba (Cheng 2006; Henderson 2009a,b, 2013). Anti-agreement could be analyzed straightforwardly in Lahne's (2008) system along the lines of the Chamorro example detailed in section 2. The person feature would be the one targeted by edge property insertion for deletion via probe impoverishment. Then at vocabulary insertion, a morpheme that is unspecified for person would be inserted, as proposed by Diercks (2010).[8]

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  [7]Diercks (2010) chooses to call this *alternative agreement* because it involves partial φ-agreement rather than the total absence of φ-agreement found in other languages such as some Berber varieties (Ouhalla 1993; Ouali 2008).

  [8]While Henderson (2009b, 2013) also argues for an underspecification account of person leveling in Bantu anti-agreement, his proposal is that the anti-agreement morpheme actually does have a value for its person feature, namely [ref]. This would not be predicted by Lahne's (2008) approach, in which the person feature would be deleted entirely.

Other forms of replacement extraction morphology in Bantu include changes in the verbal final vowel (Akɔɔse (Hedinger 1985, 2008; Zentz 2011, 2012) and Bakweri (Gensler 1980; Marlo & Odden 2007)), as well as in the form and distribution of the negative verbal prefix (Lubukusu (Diercks 2010; Wasike 2007), Shona (Fortune 1984; Zentz field notes) and Ikalanga (Letsholo 2002; Letsholo & Pires 2003)).

3.2. Type 2: Deletion

In deletion extraction morphology, canonical morphophonology simply fails to appear in extraction contexts. A prominent example in Bantu is the deletion of a floating extra-low tone (often called the *downstep morpheme*) that normally follows verbs in affirmative clauses in Kikuyu (Clements 1984; Clements & Ford 1979; Clements et al. 1983; Lahne 2008; Sabel 2000; Zaenen 1983). This is illustrated in (11), where the tonal contrast between *ate* 'that' and *mote* 'tree' in (11a) and (11b) is attributable to the lack of the bolded downstep morphemes in (11b).

(11) *Kikuyu: Deletion of floating extra-low tone under* wh-*movement*

    a. *No extraction: floating extra-low tones affect postverbal tonology*

        Kamaú   ɛːˈr-íré   Kaːnáké **áté** Káriókˈí á-tɛm-íré   **mótěˈ**.   [Kikuyu]
        1.Kamau 1.SM.tell-PST Kanake that 1.Kariūki 1.SM-cut-PST tree
        'Kamau told Kanake that Kariūki cut the tree.'   (Zaenen 1983: 473 (11))

    b. *Subject* wh-*question: floating extra-low tones disappear*

        Nóo   Kámaú   ɛːˈr-íré   Kaːnáké **áte** ___ o-tɛm-íré **mote**.   [Kikuyu]
        FOC.1.who 1.Kamau 1.SM.tell-PST 1.Kanake that   AA-cut-PST tree
        'Who did Kamau tell Kanake cut the tree?'   (Zaenen 1983: 473 (13))

Because the downstep morpheme never appears in negative contexts, Lahne (2008) analyzes it as the realization of an affirmative polarity feature:

(12) *Kikuyu vocabulary insertion rule*   (Lahne 2008: 114 (203))
    /ˈ/   ↔   [pol: +aff]

She proposes that in movement contexts, the edge property is inserted on this affirmative feature, which is then deleted via probe impoverishment when movement occurs. This blocks the insertion of the downstep morpheme because it is specified for the (now deleted) affirmative feature.

Lahne's (2008) treatment of Kikuyu shows that she considers Lahne's Generalization to still apply in cases where only one of the "exponents" in either movement or non-movement contexts is overt. This will become crucial below when considering whether cases of addition extraction morphology are true counterexamples to Lahne's Generalization.

3.3. Type 3: Addition (wh-*agreement)*

In addition extraction morphology or *wh*-agreement, canonical morphology remains intact under extraction, but additional morphophonology appears in extraction contexts. Many languages in central and southern Bantu have *wh*-agreement that agrees in φ-features with the extracted element; this may take the form of a complementizer (Lingala (Bokamba 1979; Demuth & Harford 1999), Swahili (Demuth & Harford 1999; Ngonyani 1999), Kinande (Schneider-Zioga 1995, 1999, 2007a,b, 2009), Lubukusu (Diercks 2009, 2010; Wasike 2007), Bemba (Cheng 2006; Henderson 2009a,b, 2013), and Sotho (Demuth & Harford 1999; Zeller 2004)), or a verbal pre-prefix (Dzamba (Bokamba 1976; Demuth & Harford 1999; Henderson 2009b), Kilega (Carstens 2005; Kinyalolo 1991), Luganda (Ashton et al. 1954; Diercks 2010; Henderson 2009b; Walusimbi 1996), Lubukusu (Diercks 2009, 2010; Wasike 2007), Bemba (Cheng 2006; Henderson 2009a,b, 2013), Shona (Demuth & Harford 1999; Fortune 1984; Zentz field notes), Ikalanga (Letsholo 2002, 2004, 2006a,b, 2007, 2009, 2011, 2012; Letsholo & Pires 2003), and

Zulu (Sabel & Zeller 2006; Zeller 2004)).[9] Both of these φ-agreeing forms are frequently called relative markers in the literature, but they occur in other A′-movement contexts besides relativization.

For example, in Shona, when a non-subject is extracted for a *wh*-question, relative clause, or cleft, the verb in the clause in which the extracted element is pronounced must agree with it in φ-features (in addition to bearing φ-agreement with the subject). Both full and partial *wh*-movement trigger this *wh*-agreement; *wh*-in-situ does not:

(13) *Shona* wh-*agreement*

    a. Wh-*in-situ does not trigger* wh-*agreement*

        W-ai-fung-a   [kuti t-aka-teng-er-a   Ø-ani Ø-rokwe]?   [Shona]
        2SG.SM-IPFV-think-FV   that 1PL.SM-REM.PST-buy-APPL-FV 1a-who 5-dress
        'Who(m) did you think we bought a dress (for)?'   (Zentz field notes: 2014-07-30-01-TD)

    b. *Full* wh-*movement triggers* wh-*agreement*

        Ndi-Ø-ani ***(wa)**-w-ai-fung-a   [kuti t-aka-teng-er-a   [Shona]
        FOC-1a-who **1a.NSE**-2SG.SM-IPFV-think-FV that 1PL.SM-REM.PST-buy-APPL-FV

        ___ Ø-rokwe]?
            5-dress
        'Who(m) did you think we bought a dress (for)?'   (Zentz field notes: 2014-07-30-01-TD)

    c. *Partial* wh-*movement triggers* wh-*agreement*

        W-ai-fung-a   [kuti ndi-Ø-ani ***(wa)**-t-aka-teng-er-a   [Shona]
        2SG.SM-IPFV-think-FV   that FOC-1a-who **1a.NSE**-1PL.SM-REM.PST-buy-APPL-FV

        ___ Ø-rokwe]?
            5-dress
        'Who(m) did you think we bought a dress (for)?'   (Zentz field notes: 2014-07-30-01-TD)

Other forms of addition extraction morphology in Bantu are invariant; that is, they do not involve φ-agreement. These would include the postverbal particle *nọ* that appears in Duala under non-subject extraction (Epée 1975, 1976a,b; Biloa 1993; Sabel 2000; Zentz 2014), as well as the floating high tone verbal prefix found in Akɔɔse (Hedinger 1985, 2008; Zentz 2011, 2012) and Bakweri (Gensler 1980; Marlo & Odden 2007).

Focus marking, which in Bantu usually involves a nasal morpheme (see the focus-marked *wh*-words in (11b) and (13b–13c)), may also be considered addition extraction morphology, although the relation between focus marking and movement is not always straightforward. Within Bantu, this type of focus marking is found at least in Duala (Epée 1975), Kikuyu (Clements 1984; Bergvall 1987; Schwarz 2007), Kîîtharaka (Muriungi 2005; Abels & Muriungi 2008), Gichuka (Muriungi et al. 2014), Swahili (Muriungi et al. 2014), Kinyarwanda (Sabel & Zeller 2006), Lubukusu (Wasike 2007; Diercks 2010), Kuria (Landman & Ranero 2014), Shona (Fortune 1984, 1985; Zentz field notes), Ikalanga (Letsholo 2002, 2006a,b, 2007, 2011, 2012), and Zulu (Sabel & Zeller 2006).

The next section shows how cases of addition extraction morphology form a set of counterexamples to Lahne's Generalization, which forms the basis of her analysis.

4. Counterexamples to Lahne's Generalization

Lahne (2008) argues that movement to the edge of a phase always involves probe impoverishment. As discussed above, the interaction of probe impoverishment with an underspecification-based model of vocabulary insertion predicts that movement will result in the deletion of a canonically appearing morpheme, the replacement of a canonically appearing morpheme, or no morphological change. Crucially, what is unexpected in the probe impoverishment approach is the fact that extraction morphology may involve the *addition* of new morphology.

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[9]See Nsuka Nkutsi 1982, Demuth & Harford 1999, Zeller 2004, Cheng 2006, and Henderson 2006 for further comparative discussion of Bantu relative markers.

4.1. Duala

In Duala, non-subject extraction (focalization, relativization, *wh*-ex-situ) is marked by a postverbal particle *no* in the clause in which the A′-operator is pronounced,[10] regardless of the noun class of the extracted element (Epée 1975, 1976a,b; Biloa 1993; Sabel 2000):

(14) *Duala* wh-*agreement*

    a. *No focus movement*
       Kuo   a-bod-i   **(*no)** nu   moto   kalati kiele   [Duala]
       1.Kuo 1.SM-give-PST NSE   1.that 1.man 9.book yesterday
       'Kuo gave that man a book yesterday.'   (Epée 1976b: 194 (1a))

    b. *Focus movement of indirect object*
       nu   moto nde Kuo a-bod-i   ***(no)** ___ kalati kiele   [Duala]
       1.that 1.man FOC 1.Kuo 1.SM-give-PST NSE   9.book yesterday
       'It's that man that Kuo gave a book to yesterday.'   (Epée 1976b: 194 (1c))

    c. *Focus movement of direct object*
       kalati nde Kuo a-bod-i   ***(no)** nu   moto   ___ kiele   [Duala]
       9.book FOC 1.Kuo 1.SM-give-PST NSE   1.that 1.man   yesterday
       'It's a book that Kuo gave that man yesterday.'   (Epée 1976b: 194 (1d))

    d. *Focus movement of temporal adjunct*
       kiele   nde Kuo a-bod-i   ***(no)** nu   moto   kalati   ___   [Duala]
       yesterday FOC 1.Kuo 1.SM-give-PST NSE   1.that 1.man 9.book
       'It was yesterday that Kuo gave that man a book.'   (Epée 1976b: 194 (1e))

    e. *Relativization of an embedded object*
       moto [ń-e   na na-m-ongele   ***(no)** [na o-kwa-di   **(*no)**   [Duala]
       1.man 1.REL-be that 1SG.SM-PRS-think NSE   that 2SG.SM-say-PST NSE

         [na o-wen   **(*no)** ___]]]
          that 2SG.SM-see.PST NSE
       'the man who I think that you said that you saw'   (Biloa 1993: 70 (6))

Recall that the two requisite properties of extraction morphology as predicted by Lahne's Generalization are morphological syncretism and suppression of canonical morphology. This pattern in Duala is not a case of the emergence of the unmarked because it has neither of these properties. There is no morphological syncretism, as *no* is not found in any other context within the language, to my knowledge, and all agreement that is potentially available in non-movement contexts still is realized when *no* is present. *No* does not block the insertion of any canonically appearing vocabulary item; it is simply *additional* morphology (cf. (14a) vs. (14b–14d)).

The only way to make a probe impoverishment account work for this phenomenon would be to say that *no* alternates with a null morpheme. This null morpheme would have to be specified for a feature [F] that is present in ordinary declaratives. Then [F] would be deleted in extraction contexts, forcing the insertion of *no* instead of the null morpheme (assuming that *no* lacks [F] but is otherwise compatible with insertion into the probe).

A much simpler approach would be to say that the marker *no* is not the result of deleting a feature but is the realization of a feature responsible for triggering movement, as suggested for Duala by Sabel (2000). See Zentz 2014 for a more detailed analysis of this phenomenon.

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[10]Because Duala does not allow partial movement, it is impossible to tell whether the correct generalization is that *no* appears in the clause where the moved element is pronounced or where it takes scope. However, partial *wh*-movement in Kîîtharaka (Abels & Muriungi 2008), Gichuka (Muriungi et al. 2014), Shona (see (13)), Ikalanga (Letsholo 2002), and Zulu (Sabel & Zeller 2006) clearly shows that in those languages the distribution of *wh*-agreement is sensitive to the pronunciation site and not the scopal position of the A′-operator.

4.2. Lubukusu

In Lubukusu, local A′-extraction of a subject (for relative clauses, clefts, and *wh*-questions) requires the addition of a verbal pre-prefix that agrees in noun class with the extracted subject. For each noun class, the verbal pre-prefix is identical to the nominal pre-prefix (Wasike 2007; Diercks 2009, 2010). This phenomenon is shown in (15).

(15)   *Lubukusu* wh-*agreement*

    a.   *No extraction*
       ba-ba-ana   ba-a-tim-a   [Lubukusu]
       2.PPF-2-child 2.SM-PST-run-FV
       'Children ran.'   (Wasike 2007: 236)

    b.   *Class 2 subject extraction*[11]
       naanu ___ ***(ba)**-ba-a-tim-a   [Lubukusu]
       2.who   **2.SE**-2.SM-PST-run-FV
       'Who ran?'   (Wasike 2007: 236)

While Lubukusu *wh*-agreement could be considered to involve morphological syncretism because the same forms are used as nominal pre-prefixes, it is quite clear that canonical morphology is not being suppressed here: the verb still shows its full agreement potential (cf. (15a) vs. (15b)).

4.3. Akɔɔse

In Akɔɔse non-subject extraction (focalization, relativization, *wh*-ex-situ, temporal adverbials) is marked by a floating high tone prefix on the verb (H̗-) (Hedinger 1985, 2008; Zentz 2011, 2012).

(16)   *Akɔɔse* wh-*agreement*

    a.   *No extraction*
       Mw-ǎn **ě**-pim-ɛɛ́   Ø-mbaaŋgé.   [Akɔɔse]
       1-child 1.NEG-throw.out-PRF.IRR 10-cocoyam
       'The child didn't throw out the cocoyams.'   (Hedinger 2008: 105 (295))

    b.   Wh-*object*
       Chě mw-ǎn **é**-pim-ɛɛ́   ___?   [Akɔɔse]
       what 1-child **NSE**.1.NEG-throw.out-PRF.IRR
       'What didn't the child throw out?'   (Hedinger 2008: 106 (297))

The appearance of the floating high tone prefix under non-subject extraction is not a case of the emergence of the unmarked for the same reasons mentioned for Duala *nǒ*. The contexts where H̗- occurs can all be analyzed as involving A′-movement, so morphological syncretism is not present. Furthermore, H̗- does not block the insertion of any canonically appearing vocabulary item; it is simply *additional* morphology (cf. (16a) vs. (16b)).

4.4. Does Lahne's Generalization apply in these cases?

Given that Lahne's Generalization (see (3)) applies "when a language shows different exponents in movement and non-movement contexts," it is worth considering whether it might be inapplicable (or, viewed another way, trivially upheld) in cases of addition extraction morphology because there is only one overt exponent.[12] It might be tempting to say this, but as mentioned in section 3.2, this interpretation

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[11] The placement of the gap in (15b) is preverbal to show that the subject has been extracted. Note, however, that Diercks (2009, 2010) argues that the subject does not move through the canonical subject position but instead moves directly from its thematic position to the left periphery. The notation used here is for expository purposes only and should not be interpreted as a claim that extracted subjects move through their canonical surface position.

[12] Thanks to Mike Diercks (pers. comm.) for pointing this out to me.

of Lahne's Generalization is incompatible with her analysis of Kikuyu. Lahne (2008) presents deletion extraction morphology in Kikuyu as a case where her generalization applies, despite the fact that there is only one overt[13] exponent, the downstep morpheme that only appears in non-movement contexts. She does not even propose that a null vocabulary item competes with the downstep vocabulary item for insertion; rather, once the affirmative feature is deleted, there is no feature left to be realized. Therefore, we can safely assume that if Lahne's Generalization applies in deletion cases, it should apply in addition extraction morphology cases as well.

5. Conclusion

Lahne's Generalization represents the intuition behind her analysis, namely that extraction morphology is less specific in its featural content than canonical morphology. This empirical observation may well be valid for type 1 (replacement) and type 2 (deletion) extraction morphology, but cases of type 3 (addition) extraction morphology such as those detailed in section 4 run counter to the spirit of the generalization. While it may be possible to extend Lahne's (2008) implementation of this intuition (i.e., probe impoverishment) to addition extraction morphology, it seems rather stipulative to posit featurally rich but phonologically null vocabulary items that must be inserted in non-movement contexts exactly where *wh*-agreement appears in movement contexts. Furthermore, if the intuition underlying the analysis is falsified, this calls into question the implementation as well. A more promising way forward in the analysis of addition extraction morphology is the more traditional approach in which this morphology is the realization of the movement-triggering feature.

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[13]Of course, there is a sense in which even the floating downstep morpheme is an abstraction, but it has phonological effects in a way that a null morpheme would not.

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