Minimizing Application of Movement: Evidence from Echo Questions in English*

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Abstract
This paper argues for a syntactic derivation in which movement does not apply in a successive-cyclic fashion but in a one-fell-swoop fashion. I claim that this type of movement is possible when a moved element bears an uninterpretable feature (uF). If an element has a uF, then an appropriate structural relation for the valuation is established in syntax subject to the guiding principles of Minimal Computation (Chomsky (2013, 2015a)). From this minimalist point of view, the number of applications of movement should be minimized. Minimizing the number of applications diminishes the number of obstructive copies of uFs remaining in a derivation. In this paper, I examine an echo question in English as a case study and show that an echoed wh-phrase has uninterpretable Case and φ-features, which forces it to move directly from its original position to sentence-initial position without leaving copies of uFs in a derivation.

Keywords: Minimal Computation, Labeling Algorithm, Spell-Out, TRANSFER, echo questions

1. Introduction
Most works in generative grammar have assumed the framework in which
rules such as *wh*-movement apply cyclically though their application seems as though they were applied in a one-fell-swoop fashion. For example, (1a) is derived as in (1b), wherein the *wh*-phrase *what* has moved from its underlying embedded object position to sentence-initial position via the intermediate specifier position of CP2.

1. a. What did John think that Fred liked?
   b. \([\text{CP}_1 \text{ What, } \text{[CP}_2 \text{ what } \text{[C- that } \text{[TP}_2 \text{ Fred liked whati}]}}\]\\

Since the copies except for the sentence-initial one are deleted, it is not clear that *what* actually lands at the embedded specifier position of CP2. However, the cyclic application of movement is supported by Condition A of the binding theory: an anaphor must be bound by its antecedent in a certain domain.1 The anaphor *himself* in (2a) cannot co-refer to its potential antecedent *John* since it is not bound by *John* in the same TP. However, such a binding relation is possible in (2b).

2. a. John thinks that \([\text{TP} \text{ Fred, likes [these pictures of himselfi]]}]\)?
   b. [Which pictures of himselfi] did John think that \([\text{TP} \text{ Fred, liked}]\)?

   (Barss (1986: 25, 33))

In (2b), the binding relation is possible between *himself* and *John* because *(which pictures of)* *himself* has moved to the sentence-initial position through the specifier position of CP2, as illustrated in (3).

3. \([\text{CP}_1 \text{ Which pictures of himselfi, [C- did } \text{[TP}_1 \text{ John think [CP}_2 \text{ which pictures of himselfi]}}\]\\

The copy of *himself* in the specifier position of CP2 ensures that it is bound by *John* in TP1 (the underlined part).
The cyclic application of movement is theoretically motivated as well. Within the current framework of the Minimalist Program, it is deduced as a consequence of the Phase-Impenetrability Condition (PIC), which is defined in (4).

(4) In a phase $\alpha$ with head $H$, the domain of $H$ is not accessible to operations outside $\alpha$, only $H$ and its edge are accessible to such operations. (Chomsky (2000: 108))

Once a phase is constructed, the complement of the phase head is sent to sensorimotor (SM) and conceptual-intentional (CI) interfaces and becomes invisible to further syntactic operations. Given this background, let us consider the derivation of (1), repeated below.

(5) a. What did John think that Fred liked?
   b. $[\text{CP}_1 \text{What}_1 [C [C_1 \text{did}_1 \text{John}_1 \text{think}_1 [\text{CP}_2 \text{what}_1 [C [C_2 \text{that}_2 \text{TP}_2 \text{Fred}_2 \text{liked}_2 \text{what}_2]]]]]]$

Suppose that the derivation proceeds where the phase $\text{CP}_2$ is constructed. At this stage, $\text{TP}_2$ becomes invisible to further operations due to the PIC. For the $wh$-phrase $\text{what}_1$ to be visible to the matrix $C_1$, it is necessary to move to the edge position of $\text{CP}_2$. If it remains in its base position, it is invisible to $C_1$ and fails to move to the specifier position of $\text{CP}_1$. In fact, the $wh$-phrase must move to a position visible to $C_1$ because $C_1$ has an uninterpretable $wh$-feature. The $wh$-feature must be deleted via an agreement relation with its corresponding interpretable feature of a $wh$-phrase. For this technical reason, linked together with the PIC, the $wh$-phrase is required to move in a successive-cyclic fashion.

One of the advantages in posing the PIC is the reduction of the computational complexity in syntax. The smaller the size of computational workspace is, the lesser is the burden of computation. Once $\text{TP}_2$ is sent to the
interfaces, a subsequent derivation can ignore the domain. If TP₂ is not spelled-out, by contrast, the computation progresses TP₂ in each derivation, which increases the computational complexity. Hence, the reasoning supports the PIC and, by extension, the successive-cyclic application of movement.³

In this paper, I will propose that a certain type of movement applies in a one-fell-swoop fashion. Specifically, I will claim that an echo question is derived by raising an echoed part to sentence-initial position once in a derivation.

The structure of this paper is as follows. In Section 2, I will outline the theoretical assumptions needed to underpin this paper: Labeling Algorithm (Chomsky (2013, 2015a)) and TRANSFER (Chomsky, Gallego and Ott (2017)). Given the assumptions, I will propose in Section 3 that an echo question is derived by applying movement in a one-fell-swoop fashion. In Sections 4 and 5, I will demonstrate that the present proposal is correct. Section 6 concludes this paper.

2. Theoretical Assumptions

2.1. Labeling Algorithm as Minimal Search at the Interfaces

A syntactic object (SO) is constructed in syntax by means of Merge. Merge applies freely as long as SOs are interpretable at the interfaces. The interpretation is achieved by Labeling Algorithm (LA). Chomsky (2013, 2015a) claims that LA is just a minimal search. Under this conception of LA, there is no structure like \([\alpha_X]\), where \(\alpha\) is the label of \(X\). LA simply determines a property of \(X\) for the interfaces. Specifically, Chomsky (2013, 2015a) assumes the following mechanism of LA.

(6) a. In the case of SO = \(\{H, XP\}\), \(H\) a head and XP not a head, LA will select \(H\) as the label.
   b. In the case of SO = \(\{XP, YP\}\), neither a head,
      (A) modify SO so that there is only one visible head, or
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(B) X and Y are identical in a relevant respect, providing the same label, which can be taken as the label of the SO.

(Chomsky (2013, 2015a))

To see how this works in detail, let us consider the derivation of (7).

(7) What did he buy?

The derivation is schematized in (8). First, the category-neutral root element √buy merges with the direct object what to form a set, as in (8a). Next, what moves to the specifier position of √buy, as in (8b). After v* is introduced as in (8c), the √buy inherits uninterpretable φ-features from v* and establishes an agreement relation between what and √buy; and the agreed φ-features are interpreted as the label of β, as in (8d), owing to (6b-B). The resulting set merges with the subject he, as in (8e).

At this stage, the label of γ is undeterminable, since neither SO is a head. To fix the label, he moves out to the specifier of T, as in (8g), by using the strategy of (6b-A). This makes possible the label of γ as v*. Then, the derivation proceeds and reaches the stage of (8h), where C is introduced in the derivation. This C has the feature Q, which forces a wh-phrase to move to its specifier position and guarantees that the label of the set is interpreted as the agreed feature of Q, as in (8j).

(8) a. \{α, √buy, what\}

b. \{β, what, \{α, √buy, what\}\}

c. \{v*, \{β, what, \{α, √buy, what\}\}\}

d. \{v*-√buy, \{v*, what, \{α, √buy, what\}\}\}

e. \{γ, he, \{v*-√buy, \{v*, what, \{α, √buy, what\}\}\}\}

f. \{δ, T, \{γ, he, \{v*-√buy, \{v*, what, \{α, √buy, what\}\}\}\}\}

g. \{ε, he, \{δ, T, \{γ, he, \{v*-√buy, \{v*, what, \{α, √buy, what\}\}\}\}\}\}
h.  
{c C, {<\,\,\,\,φ,φ> he, {s T, {φ he, {φ √buy, {φ what, {α √buy, what} }}}}}}

i.  
{c what, {c C-T, {<\,\,\,\,φ,φ> he, {s T, {φ he, {φ buy, {φ what, {α √buy, what} }}}}}}}

j.  
{<Q, Q> what, {c did, {<\,\,\,\,φ,φ> he, {s T, {φ he, {φ buy, {φ what, {α √buy, what} }}}}}}}

Notice, here, that what, he, and √buy have moved and left their copies. In general, only the structurally prominent copy is assumed to be pronounced. Chomsky (2013: 41) argues that this assumption follows from the application of a principle of Minimal Computation: pronounce as little as possible, as illustrated in (9).

(9)    [XP … [XP … [XP …]]]
       \____________|____________

As a result, the copies in (8j) are deleted, except for the structurally prominent copy as in (10).

(10)     {<Q, Q> what, {c did, {<\,\,\,\,φ,φ> he, {s T, {φ he, {φ buy, {φ what, {α √buy, what} }}}}}}}

This way, these derivational steps derive the sentence in (7).

The important point is that the motivation for applying syntactic operations is to derive a representation that is interpretable at the interfaces in line with the guiding principles of Minimal Computation, including LA, pronounce as little as possible, and the like. If the subject he in (8) stays at its underlying predicate-internal position, the label of γ is uninterpretable and crashes at the CI interface. If more than one copy of what is undeleted, a principle relating to pronunciation at the SM interface is violated, causing the derivation to crash.

2.2. Elimination of Spell-Out

Let us move on to the discussion about Spell-Out/TRANSFER. Chomsky, Gallego, and Ott (2017) critically review a number of variations on the notion of...
Spell-Out/TRANSFER and conclude that Spell-Out does not exist; only TRNAS-FER does. No SOs are eliminated from syntax as a result of sending them to the interfaces. Rather, they remain in syntax and are just inaccessible to subsequent syntactic operations. An argument for this reasoning concerns the derivation of the following examples:

(11)  a. \[\alpha \text{ the verdict } [\beta \text{ that Tom Jones is guilty}]\]

b. \[\alpha \text{ the verdict } [\beta \text{ that Tom Jones is guilty}] \text{ seems to have been reached } (\alpha) \text{ by the jury} \quad \text{(Chomsky, Gallego, and Ott (2017: 14))}\]

Here, \(\alpha\) consists of a head noun and its content clause \(\beta\), a phase. If a phase is eliminated from syntax and sent to a PF side as an effect of Spell-Out, \(\beta\) must be pronounced at the position where it is introduced in syntax. In (11b), the position is the object position of \textit{reached}, which is shown as (\(\alpha\)). However, this does not hold. The \(\beta\) is raised as a part of \(\alpha\) and is pronounced at the beginning of the sentence. This means that \(\beta\) should be accessible to a raising/passive operation after Spell-Out applies. Given this sort of data, Chomsky, Gallego, and Ott (2017) lead to the conclusion that once a phase is completed and the complement of the phase head is transferred, the transferred part is inaccessible but remains in syntax throughout a derivation.

3. Proposal

I have shown in Section 2.1 that Merge applies freely as long as SOs are interpreted at the interfaces and that this interpretation is calculated by means of LA. When LA interprets the label of a set formed by two SOs, it can utilize a shared feature between them, as given in (6b-B). In its usual case, one of the features is uninterpretable (uF); the other is its corresponding interpretable feature. Between them, a uF triggers Agree. In (12), for example, T has uninterpretable
φ-features and the subject Jones has its corresponding interpretable φ-features. The subject Jones moves to the specifier position of TP to establish an agreement relation with T. This relation makes possible the label as the shared feature <φ,φ>.

(12) a. Jones is guilty.
   b. [<φ,φ> Jones[φ] [T[φ] [VP Jones[φ] is guilty]]]

The key point is that Jones has left its copy in its original position. Similarly, when a wh-phrase originally in object position is triggered to move to the specifier position of CP, it leaves its copy in its original position (and, more specifically, in the specifier position of VP. See (8)).

(13) a. What did John buy?
   b. [<Q,Q> What[Q] [did[Q] [TP John buy what[Q]]]]

Furthermore, as discussed in Section 1, when a wh-phrase in an embedded object position moves across a phase boundary to the matrix specifier of CP, it leaves its copies in its intermediate landing site as well as its base position.

(14) a. What do you think that John bought?
   b. [<Q,Q> What[Q] [do[Q] [TP you think what[Q] [CP that John buy what[Q]]]]]

Note that these copies contain no uF. If a moved element contains a uF, then its copy contains a uF as well. If a moved element with a uF undergoes successive-cyclic movement, it creates more than one copy in a derivation. These are schematically illustrated in (15).

(15) a. [CP SO[uF] [C C [SO[uF] …]]]
   b. [CP SO[uF] [C C [CP SO[uF] [SO[uF] …]]]

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The movements shown in (15) are undesired derivations in terms of Minimal Computation, because a subsequent derivation has to deal with and delete each uF by using an unmotivated mechanism like chain binding (Barss (1986)) or chain composition (Chomsky (1986)) before the derivation reaches the interfaces. This causes a huge computational burden. From this viewpoint, it is preferable for a moved element not to contain a uF.

In this paper, however, I propose a derivation in which a moved element contains a uF and, in this case, movement applies in a one-fell-swoop fashion. The logic of my argument is as follows. Suppose that there is an SO with a uF in a derivation and that there is no SO with its corresponding interpretable feature, as illustrated in (16).

(16) 
\[
[CP \ C ... [ ... SO_{[uF]} ... ]]
\]

If the uF is not valued in syntax, the derivation crashes. As a last resort, let us assume that the value is assigned by an interaction with other interfaces such as discourse. The interface of syntax with discourse has been taken to be performed at a left periphery of a sentence, i.e., at a matrix CP domain. That is, the SO with a uF needs to move to the specifier position of the matrix CP to get its value. As discussed above, if the SO moves successively cyclically, it leaves more than one copy as in (17).

(17) 
\[
[CP \ SO_{[uF]} \ [C \ C ... [ ... SO_{[uF]} \ [ ... SO_{[uF]} \ ... ] ]]]
\]

As noted above, this movement to an intermediate position should be avoidable in terms of Minimal Computation. The problem does not arise if the SO moves in a one-fell-swoop fashion to sentence-initial position directly. Only one copy is left in its underlying position as in (18).
This derivation is preferable to the manner in (17) in that it enables the number of offending copies containing a uF to be minimized. An immediate question arises as to why an embedded element can move directly to sentence-initial position across a phase boundary without violating the PIC. I claim that such movement is available because, as discussed in Section 2.2, any element remains in syntax even after TRANSFER applies. Given the assumption that all of the SOs can be a target for operations (Chomsky, Gallego, and Ott (2017)), an element can move to sentence-initial position across a phase boundary to get its uF valued.

To summarize the point, a moved element is preferable to not containing a uF and its application of movement obeys a successive-cyclic manner. However, if the element bears a uF, its movement to sentence-initial position must apply in a one-fell-swoop fashion from a minimalist point of view. In the next section, I will demonstrate that the latter derivation is attested by an echo question in English.

4. Echo Questions in English

An echo question is a type of sentence that “display[s] a rising intonation and heavy stress on the wh-phrase they contain. Such questions occur in situations where the questioner is requesting a repetition because the previous statement was not completely intelligible” (Authier (1993: 162); see also Postal (1972), Cole (1974)). For example, an echo question is uttered in (19B), where a person requests the missing part by replacing it with a wh-phrase. (Here and in what follows, following McCawley (1988) and Inada and Imanishi (2003), I mark echo questions with double questions marks “??” and put small capitals on echoed wh-parts.)

(19) A: They appointed [mumble, mumble] to the Supreme Court.
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B:  They appointed who to the Supreme Court??

(Authier (1993: 162))

In (19B), the echoed *wh*-phrase *who* is pronounced in its original position. As shown in (20b) below, however, it is not the case that the echoed *wh*-phrase must appear in its original position, but it can move optionally to sentence-initial position.

(20)  a.  They appointed who to the Supreme Court??
    b.  who did they appoint to the Supreme Court??

(Authier (1993: 162–163))

In addition, the movement should be regarded as applying in syntax, the reason being that its application triggers subject-auxiliary inversion (SAI), a diagnostic for syntactic movement.

(21)  a.  who did they appoint to the Supreme Court??
    b.  *who they appointed to the Supreme Court??

In this respect, an echo question is similar to a genuine *wh*-question.

However, there is a difference between an echo question and a genuine *wh*-question, which rests with the fact that the former requires much more discourse information to recover the *wh*-part than the latter. The echo question cannot be uttered independently but depends on the previous statement.

In what follows, I will argue that the syntactic derivation of an echo question is also different from that of a genuine *wh*-question. As for the derivation of an echo question, almost all of the previous analyses focus on the property of C, which triggers the echo question. For example, Adger (2003) assumes that the C does not bear the Q-feature of the C in a genuine question. Carnie (2007) puts a
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specific [+intonation] feature on the C. Sobin (2010) also speculates a “specific” type of C (C_EQ) for an echo question. Chernova (2014) provides the C with Q_E (a feature with an unvalued instance of the echo Q-feature). These just describe the same problem in different words; no solution is provided at all.

In this paper, I focus on the property of an echoed wh-phrase, and go on to argue that an echo question involves the one-fell-swoop application of movement. Specifically, the present analysis derives an echo question like (22), as illustrated in (23).

(22) He bought WHAT??

(23) a. \{\alpha \sqrt{\text{buy, WHAT}}\}
b. \{\alpha \sqrt{\text{buy, WHAT}}\}
c. \{\varphi \sqrt{\alpha \sqrt{\text{buy, WHAT}}}\}
d. \{\varphi \sqrt{\alpha \sqrt{\text{buy, WHAT}}}\}
e. \{\gamma \text{he, } \varphi \sqrt{\alpha \sqrt{\text{buy, WHAT}}}\}
f. \{\delta \text{he, } \gamma \text{he, } \varphi \sqrt{\alpha \sqrt{\text{buy, WHAT}}}\}
g. \{\epsilon \text{he, } \delta \text{he, } \gamma \text{he, } \varphi \sqrt{\alpha \sqrt{\text{buy, WHAT}}}\}
h. \{\chi \text{WHAT, } \varphi \sqrt{\alpha \sqrt{\text{buy, WHAT}}}\}
i. \{\varphi \sqrt{\alpha \sqrt{\text{buy, WHAT}}}\}
j. \{\varphi \sqrt{\alpha \sqrt{\text{buy, WHAT}}}\}

The crucial point is that the echoed wh-phrase WHAT stays in its underlying position until the derivation proceeds at the stage of (23h), where the C is introduced. Then, WHAT directly moves to sentence-initial position without leaving any copy at an intermediate position. Then, some pronunciation strategy applies only to the lower copy of WHAT, and (22) is derived.6

This analysis has at least two theoretical advantages. One of them is that the interfaces easily detect a difference between an echo question and a genuine wh-question based on their representations provided by syntax. Recall that SOs must be interpretable at the interfaces. In other words, the interfaces must identify
which type of sentence it is on the basis of the representation made in syntax. If
the genuine \textit{wh}-question is derived in a successive-cyclic fashion, as in (24a), and
the echo question is derived in a one-fell-swoop fashion, as in (24b), the interfaces
easily identify them.

\begin{equation}
\begin{array}{l}
\text{a. [XP … [XP … [XP …]]] (\textit{wh}-questions)}
\end{array}
\end{equation}

\begin{equation}
\begin{array}{l}
\text{b. [XP… [ … [XP…]]] (echo questions)}
\end{array}
\end{equation}

The second advantage is that it is not necessary to posit any \textit{ad hoc} feature
or syntactic operation to account for an echo question as previous researchers did.
The present analysis hypothesizes that an echo question involves an echoed \textit{wh}-
phrase having uninterpretable features. Any other apparently peculiar properties
arise as an interaction with the guiding principles of Minimal Computation. In this
sense, we need to discuss whether or not uFs are actually involved in echo
questions.

4.1. Lacking Values of Case and $\phi$-features

To begin with, let us examine whether an echoed \textit{wh}-phrase has an
uninterpretable Case feature. It has been argued that a genuine \textit{wh}-phrase has a
value of a Case feature. Let us look at (25). In (25a), the \textit{wh}-phrase occurs in
sentence-initial position. Its realization can be either \textit{who} or \textit{whom}. As shown in
(25b), where it moves along with the preposition \textit{to}, the accusative form \textit{whom}
must appear. In the case of covert movement, as shown in (25c), there exist two
types of dialects. One of them is (25c-i), where either \textit{who} or \textit{whom} can be used
even after the preposition \textit{to}. The other dialect is (25c-ii), where only the
accusative form \textit{whom} is used. In short, when a \textit{wh}-phrase appears after a
preposition, as in (25b) and (25c-ii), it needs to be an accusative form at least in
the “conservative” dialect. This indicates that a \textit{wh}-phrase has a value of a Case
feature.

(25) a. Who(m) did you see?
   b. To whom/*who did you speak?
   c. i. Who gave what to who(m)? (= “liberal” dialect)
       ii. Who gave what to whom/*who? (= “conservative” dialect)
           (Janda (1985: 182))

Let us concentrate on those who use the “conservative” dialect and look at a
wh-form in an echo question. Crucially, they accept and use the nominative form
WHO as well as the accusative form WHOM, even after the preposition to.

(26) A: I just spoke to Amelia Erhart.
    B: You just spoke to WHO/WHOM??            (Janda (1985: 182))

This illustrates clearly that an echoed wh-phrase has an uninterpretable Case
feature that remains uninterpretable to syntactic operations and its value is
assigned through the interface with discourse.

Furthermore, the following examples in (27) provide another piece of
evidence that an echoed wh-phrase bears an uninterpretable Case feature. Given
that D is the locus of an uninterpretable Case feature, the overt realization of D in
such examples indicates that the echoed wh-phrase receives its value.

(27) a. John bought a WHAT??
    b. You saw Bill’s WHAT??
    c. She found that WHAT of Bill’s??
    d. You ate all the WHAT??                  (Bowers (1987: 47))

Hence, we can say that an echoed wh-phrase is different from a genuine wh-phrase
and has an uninterpretable Case feature.
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Next, let us move on to consider whether an echoed *wh*-phrase bears uninterpretable $\varphi$-features. An echoed *wh*-phrase actually receives its $\varphi$-features, which is supported by the example in (28).

(28) A: There’s two goobers in each shell.
B: There’s two *WHAT*-s in each shell?
    (vs., for this speaker, *There’s two goobers in each shell.)
    (Janda (1985: 182))

The utterance of the questioner in (28B) includes both the echoed *wh*-phrase *WHAT* and the overt realization of the plural feature *-s*. This overt number feature shows that uninterpretable $\varphi$-features are inherent in an echoed *wh*-phrase.

Therefore, it is clear from these examples that an echo question has uninterpretable features (Case and $\varphi$-features).

4.2. Evidence for Movement: Licensing of Parasitic Gaps

In this section, I show that an echo question is derived by applying syntactic movement, even if the echoed *wh*-phrase is pronounced in its base position (see note 6). It has been acknowledged that a parasitic gap is licensed by syntactic movement but not by LF movement. In (29a), *which paper* moves from the object position of *file* to sentence-initial position in syntax, so that the parasitic gap in the object position of *reading* is licensed. In (29b), on the other hand, the parasitic gap fails to be licensed, since *which paper* moves in LF.

(29) a. Which paper did you file without reading? (wh-questions)
    b. *Who filed which paper without reading? (multiple wh-questions)
       (Kato (2009: 170–171))

If an echo question applies in syntax, a parasitic gap should be licensed. (30)
indicates that the echo question licenses the parasitic gap.  

(30) ? You filed WHICH PAPER without reading?? (Kato (2009: 171))

This example strongly supports the view that an echo question applies in syntax.

4.3. Not Using Intermediate Landing Sites

I have shown in Section 4.1 that an echo question contains a wh-phrase that has uninterpretable Case and φ-features and in Section 4.2 that an echo question is derived by the application of syntactic movement. These properties are necessary and sufficient conditions for confirming the present proposal that there is a derivation where syntactic movement applies in a one-fell-swoop fashion. I will demonstrate that the present proposal is supported by an echo question.

Evidence for a successive-cyclic application of a genuine wh-movement has been provided with respect to a scope property at an intermediate position. For example, the embedded direct object what in (31) can take a scope of the embedded clause as in (31a) or a scope of the matrix clause as in (31b).

(31) Who knows where Mary bought what?
    a. Wx (x knows (Wy (where Mary bought y))
    b. Wx, y (x knows (where Mary bought y))

(Hendrick and Rochemont (1988: 84))

The crucial point to the present discussion is the interpretation of (31a). This interpretation indicates that what moves to sentence-initial position through the embedded specifier position of CP.

If an echo question is derived by the application of movement directly to a sentence-initial position, an embedded scope like (31a) should not be available. This prediction is verified by the following example.
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(32) John remembers who ate WHAT.
   a. *John remembers (Wx, y (x ate y))
   b. Wy (John remembers (Wx (x ate y)))
   (Hendrick and Rochemont (1988: 88))

Here, the echoed wh-phrase can take only a scope of the matrix clause, as in (32b), but cannot take a scope of the embedded scope, as in (32a). Given the assumption that the scope relation is interpreted at the CI interface by using the structural relation, the scope relation of (32) suggests that the echoed wh-phrase does not move through the specifier position of the embedded CP but moves directly to the specifier of the matrix CP.10

Therefore, we conclude that if a moved element bears a uF, its movement to sentence-initial position must apply in a one-fell-swoop fashion.

5. Interpretation at the Interfaces

In this section, I will discuss the effect an echo question has on the interfaces. If an echo question is derived by the application of syntactic movement, a certain derivational effect is reflected on both the SM interface (Section 5.1) and the CI interface (Section 5.2), respectively.

5.1. Interpretation at the SM Interface: Intonation Patterns

To begin with, let us consider the interpretation at the PF interface. An echo question displays a characteristic property of intonation patterns: the echoed wh-phrase manifests a rising pitch accent (L+H*) and a high-rising boundary (HH%) appears at the end of the sentence. This intonation pattern is assigned when the echoed wh-phrase stays in its original position as in (33B) and when it moves to sentence-initial position as in (34B).
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(33) A: I gave flowers to George.
L+H* HH%
B: You gave WHAT to George?? (Artstein (2002: 83))

(34) A: I gave flowers to George.
L+H* HH%
B: WHAT did you give to George?? (Artstein (2002: 83))

Such assignment of intonation patterns is easily done at the SM interface because
the SM interface can identify the echo question on the basis of its representation
made in syntax, which involves no intermediate movement, as discussed in (24b).

(35) [XP … [ … [XP…]]] (echo questions) (=24b)

The point is that an echo question does not leave any copy in a derivation except
for its original position and its landing site. In the case of a genuine wh-movement,
the wh-phrase leaves at least three copies in a derivation: its original position,
[Spec, VP] for an agreement relation with V, and its landing site. This difference
of the number of copies enables the SM interface to assign different intonation
patterns to an echo question and a genuine wh-question.

5.2. Interpretation at the CI Interface: Selectional Restriction

Next, let us consider the interpretation at the CI interface. Chomsky (2015b: 80) argues that “selection isn’t a syntactic property… So probably the whole
selection problem is something that happens at the conceptual interface.” It has
been pointed out that there is a dependency between the wh-feature of the
embedded C and the matrix verb that selects the embedded C as its complement.
For example, the verb believe selects non-wh-element as its complement, as
shown in (36).
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(36)  
   a. I believe that John saw Mary.
   b. *I believe that John saw who.
   c. *I believe who John saw.

On the other hand, the verb wonder selects a wh-element as its complement, as shown in (37).

(37)  
   a. *I wonder that John saw Mary.
   b. *I wonder John saw who.
   c. I wonder who John saw.

An echo question displays a property different from the one that the genuine wh-question does. The echoed wh-phrase can appear in the complement of the verb believe, as in (38), but cannot appear in the complement of the verb wonder, as in (39).

(38)     John thinks that Bill saw WHO??
(39)  
   a. *John wondered Bill saw WHO??
   b. *John wondered WHO Bill saw??

(Hendrick and Rochemont (1988: 95, fn. 9))

That is, the echo question shows a peculiar selectional relation at the CI interface. This can also be possible since the CI interface easily identifies the echo question on the basis of its representation provided by syntax, which involves no intermediate movement.

(40)     [XP … [ … [XP …]]] (echo questions) (=24b)
6. Conclusion

In this paper, I have argued for a syntactic derivation in which movement applies in a one-fell-swoop fashion on the basis of the derivation of an echo question. I have claimed that this type of movement is possible when a moved element bears a uF. If a moved element has a uF, obstructive copies of the uF are left in a derivation. Minimizing the number of applications diminishes the number of uFs, which is desirable in terms of Minimal Computation. In this paper, I have shown that an echoed wh-phrase actually has uninterpretable Case and φ-features, which forces it to move at one time from its original position to sentence-initial position.

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Notes

1) For the ease of exposition, I assume the domain to be a TP.

2) Abstracting away from details that are irrelevant here, this paper focuses on a CP phase and ignores a phase status of v*P.
3) See Georgi (2014) for extensive discussion about cyclicity in generative grammar.

4) See Dobashi (2017) for the mechanism of how interfaces interpret (un)labeled SOs.


6) Of course, the echoed wh-phrase can be pronounced in a sentence-initial position as in (i).

   (i) WHAT did he buy??

I speculate that the difference in pronunciation between (22) and (i) is relevant to the mechanism of which copy is pronounced. Following Bobaljik (1995), Groat and O’Neil (1996), and Pesetsky (1998), I assume that either copy can be pronounced as in (ii).

   (ii) a. \[[X P \ldots [\ldots [X P \ldots]]]\]

   b. \[[X P \ldots [\ldots [X P \ldots]]]\]

Cases like (iia) emerge when the lower copy is pronounced; cases like (iib) emerge when the upper copy is pronounced. This is consistent with Chomsky’s (2013) principle of Minimal Computation: pronounce as little as possible, though (iia) is deviant from the condition that only the structurally prominent copy is pronounced. I will leave this question unresolved in the present paper.

7) See Nissenbaum (2000) for the argument that “in-situ” wh-phrases license
parasitic gap in a certain syntactic environment.

8) Michael S. Rochemont (personal communication) judges example (30) to be unacceptable (see also Engdahl (1983)), but he has said that the example becomes acceptable once the echoed part overtly moves to sentence-initial position as in (i).

(i) WHICH PAPER did you file without reading??

I will leave this variation for further research.

9) An anonymous reviewer asks me how the present analysis differentiates the derivation of (29b) from that of (30) if (29b) is derived by the application of overt movement from its original position to [Spec, CP] and the deletion of the copy of [Spec, CP] (see note 6). The crucial difference is that the wh-phrase in (29b) moves to [Spec, CP] through [Spec, VP] to enter into an agreement relation with V, while that in (30) moves directly to [Spec, CP] without landing at [Spec, VP]. See the derivation of (8) for (29b) and that of (23) for (30).

10) An anonymous reviewer raises the question of whether or not an echoed wh-phrase can appear in an island. It is said that the wh-phrase can appear in an island when it stays at its original position, as in (iB), but it cannot when it occurs in the matrix [Spec, CP] position, as in (iC).

(i) A: I was surprised at the rumor that he bought [mumble, mumble].
B: You were surprised at the rumor that he bought WHAT??
C:* WHAT were you surprised at the rumor that he bought??

(Inada and Imanishi (2003: 233–234))
I will leave this for further research.

References

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Cornelia Hamann, Simona Matteini, 3–16, John Benjamins, Amsterdam.


Minimizing Application of Movement: Evidence from Echo Questions in English

and Parasession on Negation, Berkeley Linguistics Society, University of California, 168–177.


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