Swiping without sluicing: A kind of swiping?

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Abstract: According to Merchant (2002), a defining property of swiping is that it involves sluicing. In contrast, Tyler (2017) argues that there is another kind of swiping, which he dubs swiping without sluicing (SWS). Instead of the application of sluicing, SWS involves coordination of two *wh*-expressions. We make a critical review of Tyler's (2017) prosodic analysis of SWS and point out some empirical problems. As an alternative to his prosody-based analysis, we take the syntactic approach and propose that in the syntactic derivation of SWS, the backward sluicing analysis of conjoined *wh*-questions should be incorporated into Nakao's (2009) derivation of swiping. The proposed derivation successfully solves the problems that Tyler's analysis of SWS has, but at the same time, it gives rise to a paradoxical consequence: SWS cannot be derived syntactically. To account for the existence of SWS in English, we claim that it is an ungrammatical but acceptable construction and that the acceptable status of SWS is attributed to a property of coordination. This constitutes an answer for the question of why SWS is possible in the context of coordination, and leads to the conclusion that SWS is not genuine instances of swiping in the sense of Merchant (2002).

Keywords: swiping without sluicing, coordination, conjoined *wh*-questions, grammaticality, acceptability

1. Introduction

Swiping is an acronym invented by Jason Merchant for sluiced *wh*-word inversion with prepositions in Northern Germanic. As the name suggests, this phenomenon is observed in some of the Germanic languages. An example of swiping in English is given in (1):

(1)   Lois was talking, but I don't know who to ~~(Lois was talking)~~.

(Merchant (2002:294), with modifications)

The strike-through in (1) indicates that swiping involves sluicing. Merchant (2002) claims that the application of sluicing is essential for the generation of swiping, formulating the sluicing condition in (2):

(2)   Swiping only occurs in sluicing.   (Merchant (2002:298))

In contrast, Tyler (2017) presents the sentences in (3) and argues that they are a piece of evidence against the sluicing condition:

(3)   a.   Speed is defined to be distance divided by time; **when and who by** was this definition first put forward?   (Tyler (2017:291), emphases original)
        b.   So jumping forward slightly, **where and who with** did you study?
        c.   I'm in Alverthorpe—[n]ot far really—**when and how long for** were you needing a holiday home?
        d.   However, if you need to do this on your own, Planned Parenthood will at least let you know **when and what for** they need parental consent before they flat out call them for you.

(Tyler (2017:294), emphases original)

Tyler calls these sentences swiping without sluicing (henceforth, SWS). Unlike (1), sentences (3) do not end with the inverted prepositions. In SWS, instead of the application of sluicing, two *wh*-expressions are coordinated, and the inverted sequence of a preposition and a *wh*-word/phrase is located in the second conjunct. Looking at the second conjunct of SWS, we, including Tyler, are tempted to use the term "swiping without sluicing" to refer to sentences like (3). However, it is not trivial whether SWS has the same linguistic characteristics as swiping in the sense of Merchant.[1]

The goal of this study is to give the negative answer to the question shown in the title of this paper, Swiping without Sluicing: A Kind of Swiping? The answer amounts to the claim that SWS is not genuine instances of swiping. This in turn suggests that the term of "swiping without sluicing" is in fact a misnomer.

This paper is organized as follows. In section 2, we will review Tyler's (2017) prosodic analysis of SWS and point out some empirical problems. In section 3, we will take a syntactic approach to SWS and characterize it as an ungrammatical but acceptable construction. Section 4 argues that SWS and swiping do not form a natural class. Section 5 makes concluding remarks.

2. Problems of Tyler (2017)'s prosodic analysis of SWS

It is well-known that there is a difference across languages with respect to the presence/absence of *wh*-movement. For example, while English is a language which has *wh*-movement, Japanese is not. Richard (2010) argues that this difference is reduced to prosodic factors and puts forth the following condition.

(4)   Given a *wh*-phrase α and a complementizer C where α takes scope, α and C must be separated by as few Minor Phrase boundaries as possible, for some level of Minor Phrasing.

(Richards (2010:151))

Tyler reformulates this condition as in (5) and names his version Condition of *wh*-prosody:

(5)   Assign one violation mark for every ϕ_{max} boundary intervening between the *wh*-word and the complementizer.   (Tyler (2017:295))

In his optimality-theoretic system, this condition can be violated, and the output which has the smallest number of its violations is picked from among other candidates. (6) shows how Tyler's system works:

(6)   When and by who(m) was this first discovered?
        [AdvP when] [&' and [PP by [DP who(m)]]] was this first discovered?
        (ø   *wh*   ) (ø   *wh*   ) C
            wh   )   ) **C**   violations: 2
                        wh   ) **C**   violations: 1
                    Total CWhP [Condition of *wh*-prosody, HI] violations: 3
                                                                        (Tyler (2017:297))

Notice first that the sentence in (6) is not an instance of SWS, with the second conjunct being *by who(m)*. Between *when* and C, two ϕ_{max} boundaries exist. At this stage, the sentence has two violations of the condition in (5). In addition to these, the sentence has another violation of (5), which is induced by the ϕ_{max} boundary between *who(m)* and C. In total, sentence (6) has three violations of condition (5).

Let us next take a look at what happens when Tyler's system is applied to SWS:

(7)   When and who by was this first discovered?
        [AdvP when] [&' and [DP who] [PP by who]] was this first discovered?
        (ø   *wh*   ) (ø   *wh*   ) (ø   ) C
            wh   )   ) **C**   violations: 3
                        wh   )   ) **C**   violations: 2
                            Total CWhP violations: 5
                                                                        (Tyler (2017:297))

As shown in (7), an instance of SWS *When and who by was this first discovered?* has five violations of condition (5) in total. More generally, as it stands, his system wrongly predicts that SWS cannot be observed in English. To circumvent this problem, Tyler takes the following property of coordinated *wh*-questions into consideration: [2]

(8)　　[· · ·] in coordinated *wh*-questions, each conjunct is enclosed within its own ∅, to the exclusion of material that is shared between the conjuncts.　　　　(Tyler (2017:298))

With the adoption of (8), his system is able to produce the representation in (9) in place of that in (7):

(9)　　When and who by was this first discovered?
　　　[AdvP when]　　[&' and [DP who] [PP by *who*]] was …
　　　(∅　　 wh　) (∅ (∅　　　　　 wh　) (∅　　　　)) C
　　　wh　)　　　　　　　　　　　　　　　　　) C　　　　 violations: 2
　　　　　　　　　　　 wh　　　　　　　　　) C　　　　 violations: 1
　　　　　　　　　　　　　　　　　　　　　 Total CWhP violations: 3
　　　　　　　　　　　　　　　　　　　　　　　　 (Tyler (2017:298))

The only and crucial difference between (7) and (9) is that in the latter, the second conjunct as a whole is enclosed by another ∅. Due to its presence, in the generation of the sentence *When and who by was this first discovered*, the total number of violations of Tyler's version of Condition of *wh*-prosody in (5) is reduced to three. Under Tyler's system, the sentence is predicted to be acceptable, since the sentence in (6), which has the same number of violations of condition (5), is acceptable. Tyler's prosodic analysis of SWS accommodates the existence of SWS in English in a successful way.

　　However, Tyler's system cannot capture the unacceptability of the sentences in (10):

(10)　a.　*　Who by and when was Jane seen?　　　　　 (Larson (2013:65))
　　　b.　*　Who with and when was Becky talking?　　　 (Larson (2013:65))
　　　c.　*　Mary doesn't know who with and why Bill danced.　 (Gračanin-Yuksek (2007:157))

The sentences are very similar to SWS, the only difference being the order of two conjuncts. In spite of the similarity, Tyler makes no mention of unacceptable sentences like (10). When we apply his system to (10a), we get the following representation:

(11)　[[DP who] [PP by *who*]] [&' and [AdvP when]] was …
　　　(∅ (∅　　 wh　) (∅　　　　)) (∅　　　　 wh　) C
　　　　　 wh　　　　　　　　)　　　　 **wh**　) C　　 violations: 2
　　　　　　　　　　　　　　　　　　　 wh　) C　　 violations: 1
　　　　　　　　　　　　　　　　　　 Total CWhP violations: 3

Since sentence (10a) has the same number of violations of his Condition of *wh*-prosody as an example of SWS in (9), his system predicts that sentence (10a) is acceptable, contrary to fact. Tyler's prosodic analysis of SWS cannot say nothing about why the inverted sequence of a preposition and a *wh*-word/phrase observed in SWS have to lie in the second conjunct position, rather than in the first conjunct position.

3. Proposal

3.1 Syntactic Approach to SWS

As an alternative to Tyler (2017)'s prosodic analysis of SWS, we will present our syntactic approach to the construction. First of all, it is necessary for us to determine which analysis of conjoined *wh*-questions should be adopted. In the literature, several types of analysis have been developed for conjoined *wh*-questions. Below is a partial list of them:
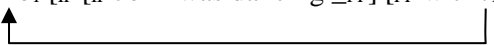
(12) a. ellipsis analysis ((e.g.) Browne (1972), Giannakidou and Merchant (1998))
　　 b. movement analysis ((e.g.) Gribanova (2009), Zoerner (1995))
　　 c. multiple dominance analysis ((e.g.) Gračanin-Yuksek (2007))
　　 d. non-syntactic analysis ((e.g.) Larson (2013))
　　 e. WH-hopping analysis ((e.g.) Nagahara (2003))

For the present purpose, we make use of the ellipsis analysis in (12a). Under this type of analysis, sentence (13) is derived in the way depicted in (14):

(13) What and when did Becky eat?
(14) a. [What did Becky eat] and [when did Becky eat] ?
　　 b. [What ~~did Becky eat~~] and [when did Becky eat] ?

(cf. Larson (2013:37))

Despite its appearance, the first conjunct is a clause underlyingly, as shown in (14a). On the basis of the identity of the relevant part of the second conjunct, *did Becky eat* in the first conjunct undergoes backward sluicing, which is indicated by the strike-through in (14b)

　　 Another ingredient of our syntactic approach to SWS is the syntactic derivation of swiping proposed by Nakao (2009). She argues that the sequence *who with* in (15) emerges through the derivational steps in (16):

(15) John was dancing, but I don't know who with.
(16) a. $[_{IP}$ $[_{IP}$ John was dancing $\_{PP}]$ $[_{PP}$ with who$]]$

　　 b. $[_{CP}$ who$_1$ $[_{IP}$ $[_{IP}$ John was dancing $\_{PP}]$ $[_{PP}$ with $t_1]]$

　　 c. $[_{CP}$ who$_1$ $[_{IP}$ ~~$[_{IP}$ John was dancing $\_{PP}]$~~ $[_{PP}$ with $t_1]]$

(Nakao (2009:82))

First, the PP moves rightward to the IP-adjoined position. Nakao calls this movement operation PP-shift and makes an important assumption that this movement does not leave a trace behind.[3] Next, *who* moves from the IP-adjoined position to the CP domain. Finally, as shown in (16c), the inner IP is deleted, as a result of which the sequence *who with* surfaces.

　　 Combining the above two models into a package, we will address the problem that Tyler's analysis of SWS has, which is that it cannot rule out the sentences in (10). In the course of generating them under our framework, each sentence has the representation in (17b), (18b), and (19b): [4], [5], [6]

(17) a. * Who by and when was Jane seen? (=(10a))
　　 b. $[_{CP}$ $[_{CP}$ who$_i$ $[_{C'}$ was $[_{TP}$ Jane seen$]]$ $[_{PP}$ by $t_i]]]$ and $[_{CP}$ when$_i$ $[_{C'}$ was $[_{TP}$ Jane seen $t_i]]]$
(18) a. * Who with and when was Becky talking? (=(10b))
　　 b. $[_{CP}$ $[_{CP}$ who$_i$ $[_{C'}$ was $[_{TP}$ Becky talking$]]$ $[_{PP}$ with $t_i]]]$ and $[_{CP}$ when$_i$ $[_{C'}$ was $[_{TP}$ Becky talking $t_i]]]$
(19) a. * Mary doesn't know who with and why Bill danced. (=(10c))
　　 b. $[_{CP}$ $[_{CP}$ who$_i$ $[_{C'}$ C $[_{TP}$ Bill danced$]]$ $[_{PP}$ with $t_i]]]$ and $[_{CP}$ why$_i$ $[_{C'}$ C $[_{TP}$ Bill danced $t_i]]]$

In each representation, the shaded part corresponds to the one to be elided. Notice that the C′ in the first conjunct is different from that in the second conjunct due to the absence of the trace within the TP. What causes this situation is the application of PP-shift, which is assumed to leave no trace behind. Given some version of syntactic identity requirement for ellipsis (contra Merchant (2001)), it is impossible for the shaded part to be elided, since it is not syntactically identical to the C′ in the second conjunct. This is why sentences (10), repeated as sentence (17a), (18a), and (19a), are all unacceptable.

　　 At this point, where the problem of Tyler's analysis of SWS is successfully overcome, let us next confirm that our proposed derivation can generate the following sentences:

(20) a.   By who and when was Jane seen?   (Larson (2013:65))
    b.   With who and when was Becky talking?   (Larson (2013:65))
    c.   Mary doesn't know with who and why Bill danced.   (Gracanin-Yuksek (2007:157))

These sentences are minimally different from sentences (17a), (18a), and (19a) in that the clause-initial PPs preserve the normal linear order of the preposition and its object. Our proposal gives the sentences the representations in (21) at some point of their derivations.

(21) a. $[_{CP}$ $[_{PP}$ by who$]_i$ $[_{C'}$ was $[_{TP}$ Jane seen $t_i]]]$ and $[_{CP}$ when$_i$ $[_{C'}$ was $[_{TP}$ Jane seen $t_i]]]$
    b. $[_{CP}$ $[_{PP}$ with who$]_i$ $[_{C'}$ was $[_{TP}$ Becky talking $t_i]]]$ and $[_{CP}$ when$_i$ $[_{C'}$ was $[_{TP}$ Becky talking $t_i]]]$
    c. $[_{CP}$ $[_{PP}$ with who$]_i$ $[_{C'}$ C $[_{TP}$ Bill danced $t_i]]]$ and $[_{CP}$ why$_i$ $[_{C'}$ C $[_{TP}$ Bill danced $t_i]]]$

In the case of sentences (20), since the preposition and its object are not inverted, the application of PP-shift is unnecessary in their derivations. Instead, the PPs containing the *wh*-element are pied-piped to the spec of CP. This allows each shaded part in (21) to be syntactically identical to the C′ in the second conjunct. Hence, the ellipsis of the former is properly licensed and its execution produces the surface strings of (20).

    Furthermore, our proposal can correctly capture the acceptability of the sentence in (6), repeated below as (22):

(22)   When and by who(m) was this first discovered?

Comparing the sentence with (20), we see that a main difference lies at the order of the two conjuncts. In the absence of the inversion between *by* and *who(m)*, the derivation of sentence (22) also does not involve the application of PP-shift. Its representation at some point of the derivation is as follows:

(23) $[_{CP}$ when$_i$ $[_{C'}$ was $[_{TP}$ this first discovered $t_i]]]$ and $[_{CP}$ $[_{PP}$ by who(m)$]_i$ $[_{C'}$ was $[_{TP}$ this first discovered $t_i]]]$

With no application of PP-shift, the whole PP is moved to the spec of CP. The ellipsis of the shaded part, which is necessary for the representation to be pronounced as in (22), is possible, because the syntactic identity requirement is met between the C′s of the two conjuncts.

    Let us now turn to SWS, the linguistic phenomenon with which the present paper is concerned. One of its examples is given in (24):

(24)   When and who by was this first discovered?   (=(7)/(9))

This sentence is quite similar to sentence (22), differing in the linear order of the preposition and its object. But this difference yields a significant consequence for the syntactic derivation of the sentence, because the inversion between the preposition and its object makes an application of PP-shift come in. With its application, the following representation obtains:

(25) $[_{CP}$ when$_i$ $[_{C'}$ was $[_{TP}$ this first discovered $t_i]]]$ and $[_{CP}$ $[_{CP}$ who$_i$ $[_{C'}$ was $[_{TP}$ this first discovered]]$ $[_{PP}$ by $t_i]]]$

Due to the application of PP-shift, there is no trace within the TP in the second conjunct. In contrast, there is a trace of *when* within the TP in the first conjunct, because the movement of the *wh*-element is from its base-generated position. The shaded part, which is not the same as the corresponding part in the second conjunct in syntactic terms, is not qualified to be elided. Sentence (24) is incorrectly predicted to be unacceptable.[7]

    A straightforward interpretation of the above failure is that our syntactic approach to SWS is simply wrong. However, there remains a possibility that SWS is a construction which is licensed not syntactically but some other means. In the next subsection, we will pursue this line of thought, addressing the question of why SWS exists in English even though it cannot be derived syntactically.

3.2 SWS=ungrammatical but acceptable construction

It has been suggested that the notion of grammaticality is orthogonal to that of acceptability (cf. Langendoen and Bever (1973)). If this is the case, there are four logically possible types of linguistic phenomena: (i) both grammatical and acceptable, (ii) grammatical but unacceptable, (iii) ungrammatical but acceptable, and (iv) both ungrammatical and unacceptable. The existence of type (iii) tells us that just because a particular construction is ungrammatical does not necessarily mean that it is unacceptable. This kind of distinction between grammaticality and acceptability can be found in the context of coordination. Some researchers have observed that grammatically anomalous expressions can occur in the second conjunct.[8] Consider the following sentence:

(26)   She and him will drive to the movies.   (Johannessen (1998:15))

In this sentence, *she and him* serves as the subject and therefore should be assigned nominative Case. But the second conjunct is morphologically manifested as *him* and does not conform to the grammatical requirement imposed by its grammatical function. In other words, sentence (26) contains a portion which should be ruled out for a grammatical reason. In spite of this, the sentence as a whole is accepted by speakers of English.
      The same pattern is observed in the following sentences:

(27)   a.   She wondered [what there was for dinner] and [the kind of mood that her father would
               be in].
        b.   … it looked then [like there really was a pattern (in the terrorism bombings and the
               street violence)], and [that it was a coordinated, and planned and executed thing].
                                                                           (Inada (1988:67))

In (27a), the verb *wonder* is used. What it selects as its complement is an interrogative clause, as the grammaticality of (28a) shows. On the other hand, the ungrammaticality of (28b) indicates that a noun phrase is not qualified as the complement of *wonder*.

(28)   a.   She wondered [what there was for dinner].
        b.   *   She wondered [the kind of mood that her father would be in].
                                                                           (Inada (1988:67))

It is reasonable to expect that when the complement of *wonder* consists of a coordinated structure where one of the conjuncts is a noun phrase, the whole sentence is unacceptable. This expectation is not borne out by the acceptability of sentence (27a). It is of interest to note that the potentially offending noun phrase is in the second conjunct. The same holds true for the sentence in (27b). As shown in (29), whereas clauses introduced by *like* can be the complement of *look*, *that*-clauses cannot.

(29)   a.   It looked [like there really was a pattern in them].
        b.   *   It looked [that it was a coordinated … thing].
                                                                           (Inada (1988:67))

This selectional property of the verb leads us to predict the unacceptability of sentence (27b), because the *that*-clause is conjoined with the preceding *like*-clause in the complement position of *looked*. As a matter of fact, even though it includes a portion which is not grammatically licensed, the sentence as a whole is acceptable.
      With this in mind, let us shift our focus on SWS, instances of which are repeated below as (30):

(30)   a.   Speed is defined to be distance divided by time; **when and who by** was this definition
               first put forward?   (Tyler (2017:291), emphases original)
        b.   So jumping forward slightly, **where and who with** did you study?
        c.   I'm in Alverthorpe—[n]ot far really—**when and how long for** were you needing a

holiday home?
d.   However, if you need to do this on your own, Planned Parenthood will at least let you know **when and what for** they need parental consent before they flat out call them for you.

Recall that the reason why SWS cannot be derived under our proposed syntactic derivation is the application of PP-shift in the second conjunct. Since it leaves no trace behind, the application of this movement operation makes the ellipsis site syntactically different from its antecedent. In this sense, the source of the ungrammatical status of SWS lies in its second conjunct. However, as described just above, even in the presence of such an ungrammatical linguistic form, as far as it is located in the second conjunct, the whole sentence remains acceptable. It is now obvious that SWS is an ungrammatical but acceptable construction. To the question of why SWS exists in English even though it cannot be derived syntactically, we can provide the following answer: the existence of SWS in English is made possible by its acceptable status.

Another fact about SWS to be accounted for is that the construction is only possible in the context of coordination, a descriptive generalization which is easily confirmed by the sentences in (30). Recall that the mere existence of the coordinate conjunction *and* does not make SWS possible. Observe the sentences in (10), repeated below as (31):

(31)   a.   *   Who by and when was Jane seen?
        b.   *   Who with and when was Becky talking?
        c.   *   Mary doesn't know who with and why Bill danced.

In (31), the inverted sequence of a preposition and a *wh*-element is in the first conjunct. As discussed in the last subsection, our proposed syntactic derivation cannot generate these sentences. It follows that they are not syntactically licensed under our proposal. In addition to this, since the preposition and its object are located in the first conjunct in each sentence, they cannot utilize the "ameliorating" property of coordination and are unacceptable. In contrast, in the case of SWS, even though it cannot be grammatical on syntactic grounds, the "ameliorating" property of coordination contributes to its acceptability. To put it in a different way, the existence of SWS in English crucially depends on its occurring in coordinated structures. This dependence relation constitutes the answer for the question of why SWS is possible in the context of coordination.

4. SWS ≠ swiping

Having established that SWS is an ungrammatical but acceptable construction, we are now in a position to address the question given as the title of the present paper: Swiping without Sluicing: A Kind of Swiping? Swiping have attracted many linguists and several models of its syntactic derivation have already been put forward (for instance, the P-stranding analysis (Hasegawa (2006), Murphy (2016), Nakao (2009), Radford and Iwasaki (2015), Sugisaki (2007), van Craenenbroeck (2004, 2010)) and the pied-piping analysis (cf. Merchant (2002)). However, to the best of my knowledge, none of them claims that his/her proposed syntactic derivation of swiping eventually crashes. This fact is reasonably interpreted as reflecting the grammatical status of swiping. In what follows, we offer a piece of evidence for the separation of SWS from swiping.

Swiping is known for its colloquiality. Merchant (2001) makes the following remark:

(32)   Prescritively, we expect the form [for whom] here [[For who] was it that you voted?, HI], since the register that includes pied-piping also requires the archaic form *whom* after prepositions. This form is not found in swiping, however: *Peter went to the movies, but I don't know who(*m) with*. This is due perhaps to the clash of registers that would be involved in such a case: while *whom* belongs to the most formal register of written (and sometimes spoken) English, <u>swiping characterizes highly informal, colloquial speech, more so even than preposition-stranding in non-elliptical interrogatives</u>.
                                                 (Merchant (2001:124, note 8), emphasis by HI)

It is well-known that preposition-stranding gives rise to more colloquial expressions than pied-piping.[9] The underlined part in (32) shows that swiping has a very high degree of colloquiality. There is a very sharp contrast in register between SWS and swiping. As a comment to Iwasaki (2018), Robert Levine (Ohio State University) notes that sentence (3a), repeated below as (33), can be used for academic purposes.

(33)   Speed is defined to be distance divided by time; **when and who by** was this definition first put forward?

This single difference is sufficient to convince us that SWS requires a different linguistic treatment from swiping and in turn lead us to state that SWS is not genuine instances of swiping. This statement is equivalent to the negative answer to the question "Swiping without Sluicing: A Kind of Swiping?," which is the title of this present paper. If this view is on the right track, then the existence of SWS cannot be counterevidence to the sluicing condition proposed by Merchant (2002:298), repeated below as (34):

(34)   Swiping only occurs in sluicing.

It follows that the term of "swiping without sluicing" is contradictory and should be replaced by a more appropriate name.

5. Conclusion

In this paper, after pointing out empirical problems of Tyler's (2017) prosodic analysis of SWS, we have attempted a syntactic approach to the construction. As a consequence, we have argued that SWS is a type of construction which cannot be syntactically licensed. Its acceptable status has been shown to be attributable to the fact that the inverted sequence of a preposition and a *wh*-element of SWS is located in the second conjunct. Furthermore, it has been suggested that SWS and swiping do not form a natural class and Merchant's (2002) treatment of the latter is not challenged by the former.

Our proposed syntactic derivation of SWS has remarkable implications for the syntactic analysis of conjoined *wh*-questions. Recall that in section 3.1, we adopted the ellipsis analysis, but it has sometimes been rejected in favor of other possible kinds of analysis. One of the strongest arguments for this position is that backward sluicing violates the Backwards Anaphora Constraint (cf. Ross (1969:281-282, note 13). Below is Hankamer and Sag's (1976) formulation of the constraint:

(35)   An anaphor cannot be interpreted as being in anaphoric relation to a segment that it precedes and commands in surface structure.   (Hankamer and Sag (1976:424))

To the extent that our proposed syntactic derivation of SWS is correct, the ellipsis analysis of conjoined *wh*-questions has to be seriously entertained.[10] This urges us to study the nature of the Backwards Anaphora Constraint in more recent terms. This topic is left for future research.

Acknowledgements

Notes

[1]   Henceforth, it is referred to simply as swiping.

[2] Tyler (2017:298-299) provides two pieces of evidence for this property, but his focus is only on the second conjunct. That is sufficient for his purpose, which is to rule in SWS under his system.

[3] Following Nakao's description, this paper keeps using the notion of trace. In what follows, nothing hinges on the choice of the trace theory over the copy theory of movement.

[4] We assume with Radford and Iwasaki (2015) that sluicing is the ellipsis of more than TP (FinP in their analysis).

[5] In the generation of sentence (17a), the passive *by*-phrase undergoes the application of PP-shift. A motivation for the assumption that swiping involves PP-shift comes from the following contrast:

(i) a. * John talked [PP to someone] yesterday, but I don't know who to.
     b. ? John talked t_{PP} yesterday [PP to someone], but I don't know who to.

<div align="right">(Nakao, Ono, and Yoshida (2006:297))</div>

There is a general tendency that complement PPs are more difficult to occur in swiping than adjunct PPs. This tendency is demonstrated by the unacceptable sentence (ia), in which the PP *to someone* is a complement PP. Interestingly, when the PP is rightward-moved across *yesterday*, the sentence becomes more acceptable, as shown in (ib). It follows that PP-shift has to apply to complement PPs in swiping. In this context, it is interesting to note that Angelopoulos, Collins, and Terzi (2020) argue that passive *by*-phrases are arguments rather than adjuncts.

[6] The derivation of sentence (19a) presupposes that *why* is moved into the spec of CP (contra Rizzi (1990), Ko (2005), and Stepanov and Tsai (2008)).

[7] Notice further that even if the ellipsis in question were possible, the surface string of (24) could not result, with *who* and *by* intervened by the rest of the second conjunct.

[8] Masaharu Shimada (University of Tsukuba) raises the interesting question of why this is possible for the first place. Inada (1988) treats the sentences in (27) as peripheral cases of coordinated structures. But it is clear that this characterization is not enough to understand why it is in the second conjunct that grammatically anomalous expressions are allowed to occur. At the present stage, no explanation can be provided. A clue is found in Chomsky's (2013:46) analysis of coordinated structures. According to his analysis, in the configuration in (i), the label of γ is equal to that of Z:

(i)   [$_\gamma$ Z [$_\alpha$ Conj [$_\beta$ Z W]]]

This amounts to saying that a coordinate structure is headed by the first conjunct. The fact that grammatically anomalous expressions do not occur in the first conjunct might be related to its property as a head.

[9] Yukio Hirose (University of Tsukuba) points out a possibility that the use of SWS is motivated by English speakers' preference of the construction over the following grammatical sentence, which is derived via pied-piping:

(i)   When and by who(m) was this first discovered?   (=(6)/(22))

The gist of his idea is that the formal character of this sentence encourages native speakers of English to express its linguistic meaning by using SWS, which is less formal than sentence (i), and this "performance" factor is responsible for the existence of SWS in English. As will be mentioned shortly, SWS is a much more formal construction than swiping. Then, we are likely to get the hierarchy in (ii), arranged with the most colloquial linguistic phenomenon to the left and the most formal one to the right:

(ii) swiping → preposition-stranding → SWS → pied-piping

[10] Chomsky's recent attempt at eliminating Merge in favor of MERGE (for instance, Chomsky, Gallego, and Ott (2019)) makes multiple dominance undefinable. Hence, in his current system, the multiple dominance analysis of conjoined *wh*-questions is no longer theoretically justified.

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