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1 Introduction

Merchant (2002, 2003) observes that English disallows *the hell* in sluicing constructions, while allowing the hell in swiping constructions. These constructions are near minimal pairs, differing only in the presence of a preposition. In this paper, I argue that the crucial distinction between these two constructions stems from the assignment of accent in English, and its interaction with a phonological output constraint, which I call the Accent Projection Principle (APP). I demonstrate that the interaction of the APP and do-support can account for previously unexplained VP ellipsis facts, thus lending independent support for the claim that the APP constrains phonological outputs. I further demonstrate that the APP can account for facts from American Sign Language, indicating that the APP is a phonological, and not phonetic, constraint.

2 The Puzzle

The syntactic puzzle can be summarized by the following data set:

- (1) a. They were arguing about something, but I don't know what.
- b. * They were arguing about something, but I don't know what the hell.
- c. They were arguing, but I don't know what about.
- d. They were arguing, but I don't know what the hell about.

The construction in (1a) is a canonical example of what Ross (1969) called *sluicing*. Merchant (2001) argues extensively for an analysis in which sluicing is the deletion of the scope of the embedded question under identity with the antecedent declarative. The construction in (1b) is the unacceptable addition of the intensifier *the hell* to the sluicing construction in (1a). The construction in (1c) is a variation of the sluice in (1a). Originally noticed by Rosen (1976), Merchant 2002 calls this construction *swiping*.¹ Intuitively, swiping is sluicing

¹Swiping: Sluiced Wh-word Inversion with Prepositions In Northern Germanic. In retrospect, this name seems a little misleading. The primary examples cited by Merchant (2002) are from Danish, Dutch, English, German, and Swedish, which are all Germanic languages, but not necessarily Northern.

with a preposition following the *wh*-word. (1d) presents the puzzle. We saw in (1b) that the addition of *the hell* to the *wh*-word in a sluicing construction is unacceptable, but in (1d), the addition of *the hell* to the *wh*-word in a swiping construction is acceptable (Merchant 2002). As will be shown presently, given the minimal difference between sluicing and swiping, the difference in acceptability between (1b) and (1d) is unlikely to be the result of syntactic or semantic facts.

3 Why Look to Phonology?

3.1 Eliminating Syntax: The Hell is always Displaced

An obvious place to begin searching for an account of the data in (1) is with the syntax of *the hell*. Indeed, much has been written about the syntax of *the hell* (see especially den Dikken and Giannakidou 2002, Huang and Ochi 2004). Here, I present a brief overview of the syntactic properties of *the hell* in English, and then demonstrate that these properties are satisfied in both sluicing and swiping.

First noted by Lasnik and Saito (1984), English appears to disallow a *wh*-word with *the hell* to remain in-situ:

- (2) a. Who the hell ate my sandwich?
 b. * Who the hell ate what the hell?

Of course, it could be the case that English disallows two *the hells* in a single utterance. This option is eliminated by the acceptable cases in which there are two the hells, each displaced:

- (3) Who the hell knows what the hell he is doing?

The prohibition of *the hell* in-situ in English could potentially differentiate (1b) from (1d), however, Merchant's analysis of sluicing crucially relies on the overt displacement *wh*-word:

- (4) ...I don't know [_{CP} what [_{TP} ~~they were arguing about.~~]]

As schematized in (4), Merchant argues for an analysis in which the *wh*-word is overtly displaced, followed by phonological deletion of the embedded TP. He argues for this analysis on several grounds, the curious reader is referred to Merchant 2001 for the details. Crucially here, we see that both

sluicing and swiping would satisfy the syntactic requirement that *the hell* not be in-situ.²

3.2 Eliminating Semantics: The Interpretation of Pied Piping

With syntactic accounts unlikely, it may seem plausible to pursue a semantic analysis. An argument against such an approach comes from the following two paradigms:

- (5) a. ... I wonder what about
b. ... I wonder about what

As (5) demonstrates, swiping actually alternates with a form of sluicing + pied piping (for those speakers who accept pied piping). Once *the hell* is added, the picture becomes complicated:

- (6) a. ... I wonder what the hell about
b. * ... I wonder about what the hell

As this pair shows, while *the hell* is acceptable in swiping in (6a), it is no longer acceptable in the sluicing + pied piping example (6b). As of yet, I know of no clear semantic distinction between preposition stranding and pied-piping, thus a semantic account of these facts seems unlikely.³

3.3 Evidence in Favor of Phonology: Rosen's Observation

Merchant (2002) points out that in the production of the swiping constructions, the final preposition carries some sort of stress or accent. This fact in itself is uninteresting, until placed in context of Rosen's (1976) observation that

²There is the possibility that *the hell* may not be permitted in sentence final position, and this may lead to a distinction between sluicing and swiping. While this is on the right track for a phonological analysis, as formulated this appears to be too weak as a syntactic constraint:

- (i) * Who gave what the hell to who?

³There is also a theory-internal argument against semantic accounts. One of Merchant's arguments for phonological deletion is that the semantics are trivially satisfied, as the deleted TP will still be present at LF and for semantic interpretation. Under this account, the difference between sluicing and swiping is whether the preposition is phonologically deleted; it is always present for semantic interpretation.

the *wh*-word in a sluicing construction can (and must) have an antecedent in the preceding declarative, while in swiping the *wh*-word must not have an antecedent:

- (7) a. I'm getting involved in something, but I don't know exactly what.
 b. *I'm getting involved in something, but I don't know exactly what in.
 c. I'm getting involved, but I don't know exactly what in

Given Merchants observation, Rosens observation can be recast: it is not the case that the *wh*-word cant have an antecedent, but rather that the preposition cannot have an antecedent. This fact would follow directly from the phonology of English: repeated lexical items cannot carry an accent (**bold** indicates accent):

- (8) a. *John went to the **beach**, and Mary went to the **beach**.
 b. John went to the **beach**, and Mary went to the beach **too**.

If this is on the right track, then it seems that phonology is already constraining the acceptability of swiping constructions; why not swiping + *the hell?*⁴

4 The Proposal

As stated above, Rosens observation falls out directly if the accent is required on the preposition in swiping. This does not, however, account for any of the *hell* facts presented in (1) or (6). To account for these, the domain in which the accent is required, and the placement of the accent within that domain, must be constrained. The conditions that must be met can be summarized as follows:

- (i) The accent must be required in the section of the PF string in which the preposition occurs in swiping
 (ii) The preposition must carry an accent
 (iii) The accent must be required regardless of what PF element appears in that position

⁴Again, there is a theory-internal argument for looking to the phonology for the answer: Merchants analysis of sluicing/swiping employs phonological deletion. If the difference between a sluice and non-sluice is only a difference in the PF string, then it seems logical that PF principles would operate on the output of the PF deletion.

- (iv) *The hell* must not be able to carry the accent if it appears in that position

Conditions (i-iv) and the domain calculations that they propose appear rather complicated, especially to account for one data set. Fortunately, properties (ii-iv) were independently proposed by Gussenhoven (1984) to account for the placement of the accent in English. Therefore condition (i) simply needs to be formulated in terms of Gussenhovens system. This is the *Accent Projection Principle*:

- (9) The Accent Projection Principle (APP)
Every Focus Domain (FD) must have a sentence accent.

For Gussenhoven, Focus Domains are the domains within which the placement of sentence accents are calculated, in order to convey the information structure of the utterance. The calculations are performed using his *Sentence Accent Assignment Rule*, which as we shall see independently satisfies the conditions (ii-iv) above:

- (10) Sentence Accent Assignment Rule (SAAR) (Gussenhoven 1984)

A=Argument, P=Predicate, C=Condition (i.e. adverbs, PP adjuncts, etc.)

<u>AP</u>	→	[AP]
<u>ACP</u>	→	[A][C][P]
<u>ACP</u>	→	[ACP]
<u>APC</u>	→	[AP][C]
<u>APAA</u>	→	[A][PAA]
<u>APA</u>	→	[A][PA]
<u>APA</u>	→	[APA]
<u>APA</u>	→	[APA]
<u>ACPCC</u>	→	[AC][P][C][C]

Given a string of constituents (left side of the equations), and given that a subset of those constituents should be marked as focused (underlined on the left side of the equation), then the SAAR calculates the domains in which an accent can be specified (within square brackets on the right side), and which constituent must carry the accent (**bold** on the right side). In this way, a single accent can indicate either that the accented element is focused, or that an entire phrase is focused.

Of course, the SAAR alone is not sufficient to account for all of the sentence level accents in English. Gussenhoven extends his system in several ways. First, he adds two crucial axioms to the domain calculation:

(11) Extra FD Axioms:

- i. Displaced *wh*-words form their own FD
 "... either a quantifier or an interrogative pronoun. These Arguments require a focus domain to themselves. (Gussenhoven 1984: 29)"
- ii. Non-focused material is included in the nearest FD
 "Note that any [focus] material has been included in the nearest focus domain (Gussenhoven 1984: 28)"

He also adds two axioms for the placement of accent, in effect allowing *do-support* and prepositions in English to carry the accent. As we shall see, these four axioms are also necessary to completely account for the facts in (1).

5 Deriving the Primary Facts

Armed with the APP formulated in terms of the SAAR, and the SAAR independently required to account for English intonation, we are in a position to account for the facts of (1), repeated here as (12), with the FDs calculated and accents assigned as per the SAAR:

- (12)
- a. ... [but I don't know] [**what**]
 - b. * ... [but I don't know] [**what**] [the hell]
 - c. ... [but I don't know] [**what**] [**about**]
 - d. ... [but I don't know] [**what**] [the hell **about**]

In each example, the *wh*-word will form its own FD as per axiom (i) in (11). This forces any material following the *wh*-word to form another FD, as per axiom (ii) in (11). The APP then contributes a simple requirement: within each set of brackets (FD), there must be a bold element (accented).

In (12a), there are no FDs after the *wh*-word, so the APP is satisfied. In (12b), *the hell* must form a separate FD as per (11). The APP requires an accent within that FD, but *the hell* is not licensed to carry an accent (it is not an A, P, C, *do*, or a preposition), therefore the APP is not satisfied. In (12c), *about* forms a separate FD as per (11), and is licensed to carry an accent, therefore the APP is satisfied. In (12d), *the hell* and *about* form an FD together. As such, the APP may be satisfied by the preposition.

In fact, the APP analysis accounts for one more swiping fact that has yet to be mentioned. As Merchant (2002) notes, the basic swiping paradigm is different when the *wh*-phrase is *D-linked* (Pesetsky 1987):

- (13) a. John went to the store with one of his friends, but I don't know which one.
 b. * John went to the store with one of his friends, but I don't know which one with.
 c. John went to the store with one of his friends, but I don't know with which one.

Intuitively speaking, *D-linked* (discourse linked) *wh*-phrases are *wh*-phrases that have a salient antecedent in either the linguistic or conversational context.⁵ The canonical instance of *D-linked wh*-phrases in English are *which NP* phrases. As (13a) demonstrates, *D-linked wh*-phrases can participate in sluicing. Surprisingly, *D-linked wh*-phrases may not participate in swiping (13b). Even more surprisingly, *D-linked wh*-phrases can participate in sluicing with a preposition, as long as the preposition appears before the *wh*-phrase (13c).

The APP analysis of these constructions is straightforward. Recall that Rosen's observation was that the preposition could not have an antecedent. *D-linked wh*-phrases, however, by definition have an antecedent. Thus the preposition in (13b and 13c) must also have an antecedent. As noted previously, Rosen's observation can be reduced to the interaction between the prohibition against accenting repeated material in English and the APP (repeated below as 14a). This parallels the case of *D-linked swiping*, in which the preposition is repeated by definition, therefore cannot carry an accent, and therefore violates the APP when it occurs after the *wh*-phrase (repeated below as 14b):

- (14) a. * I'm getting involved in something, but I don't know exactly [what] [in].
 b. * John went to the store with one of his friends, but I don't know [which one] [with].

In this way, the APP analysis proposed for swiping + *the hell* also predicts the unacceptability of swiping + *D-linked wh*-phrases. While the APP says nothing about the acceptability of (13c), it is easy enough to address: If displacement of the *wh*-phrase is what causes it to form its own FD, then pied-piping of the preposition with the *wh*-phrase should cause the preposition and

⁵Sluicing appears to require linguistic antecedents in general, therefore the discussion will assume linguistic antecedents.

wh-phrase to form an FD together. Since the wh-phrase carries the accent for the FD, example (13c) respects the APP.

6 Other Evidence for the APP

As with any new principle, it is necessary to demonstrate that it is operative in other phenomena, otherwise it is simply a re-description of the data. In this section, I present two representative examples to demonstrate that the APP is in fact a general PF output condition, and more importantly, that it is phonological, and not merely phonetic.

6.1 VP Ellipsis

The logical place to look for APP effects would be another construction in which PF deletion has been proposed as an analysis, such VP ellipsis. As the name suggests, VP ellipsis has been analyzed as the deletion of the VP or V-bar (see Lobeck 1995, and others). This is not, however, the whole story:⁶

- (15) a. * Mary bought a coat today, and Bill did.
 b. Mary bought a coat today, and Bill did **yesterday**.
 c. Mary bought a coat today, and Bill did **not**.
 d. Mary bought a coat today, and Bill didn't.
 e. Mary bought a coat today, but Bill **did**.

The apparent generalization is that VP ellipsis requires some sort of accented material at the end of the sentence. While this fact is unlikely to fall out from the syntactic analyses of VP ellipsis in the literature, it can be analyzed as a direct result of the APP: *do-support* (see Lasnik 1995) triggers a new FD, which must carry an accent. Given that VP ellipsis and sluicing share the operation PF deletion, it is unsurprising that both demonstrate APP effects, although it is supporting evidence for the APP as a general constraint, and not a re-description of sluicing facts.

⁶I have not been able to find a source for the generalization represented in (15), aside from some use of the generalization in Lasnik 1999, chap. 3 and Hornstein 1995, chap. 3. I apologize to any other author who has previously noted (or analyzed) this paradigm, and welcome any suggested references.

6.2 ASL Head Nod

Liddell (1980) observes that certain constructions in American Sign Language (ASL) require a specific non-manual gesture called *head nod* (HN). Of interest here is the nature of the constructions in which HN appears, and the defeasibility of HN under specific circumstances. Specifically, HN is required in VP topicalization (16a), pseudogapping (16b), and repetition of the subject pronoun (16c):

- (16) a. CHASE CAT **DOG**
 ‘As for chasing the cat, the dog did it’
- b. HAVE WONDERFUL PICNIC. I BRING SALAD, JOHN **BEER**,
 SANDY **CHICKEN**, TED **HAMBURGER**
 ‘We had a wonderful picnic. I brought the salad, John the beer,
 Sandy the chicken, and Ted the hamburger’
- c. MAN BUY CAR **HE**
 ‘The man bought the car, he did’

While HN is required over the signs in **bold** in (16) above, this requirement can be defeated if the signs in bold are exaggerated in size, and accompanied by an intense facial expression.

Liddell (1980) offers an explanation of the presence of HN in these constructions: HN is an existential predicate, akin to *be* and *do* in English, which conveys the reality of the assertions in (16). While this analysis seems to account for the presence of HN in these constructions (through stipulation), it cannot account for the loss of HN in the presence of exaggerated sign size and intense facial expressions. I propose that the loss of HN can be accounted for under an APP analysis if we understand both HN and sign exaggeration to be forms of accent.

The APP requires that all FDs have a sentence accent. In the examples in (16), the signs in bold each form their own FD, and therefore would require an accent to be well formed according to the APP. Given that HN and sign exaggeration are both forms of accent, one, but not both, would be required in these examples. Aside from providing evidence for the APP, the case of HN in ASL also leads to an interesting conclusion: the accent requirement imposed by the APP is not a phonetic requirement of English; it is a phonological well-formedness condition that holds both cross-linguistically and cross-modally.

7 Conclusion

In this paper, I have argued that neither the syntax nor semantics is likely to account for the difference between sluicing and swiping when it comes to licensing *the hell*. In proposing a phonological analysis, I observed that the properties necessary to account for the facts of the hell licensing overlap with the properties of sentential accent assignment in English. Assuming that this overlap was more than a coincidence, I proposed a phonological output condition, the APP, in terms of Gussenhovens (1984) SAAR. I then demonstrated that the APP, along with the SAAR, accounts for both the licensing of *the hell* in swiping and some previously unexplained VP ellipsis facts. Finally, I argued that the APP operates at a phonological, not phonetic, level, by demonstrating that it accounts for the distribution of *head nod* in ASL.

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