

Research Paper II

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PRAGMATIC LICENSING OF SLICED PREPOSITIONAL PHRASES

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Abstract

In this paper I argue against the analysis of sluicing as IP ellipsis based on an in-depth examination of sluiced prepositional phrases which reveals a subclass of sluices for which interpretation is unobtainable by either syntactic or semantic parallelism with a proposition explicitly associated with any available antecedent. I propose accommodating this subclass (and by extension all sluices) by viewing sluices as syntactic fragments pragmatically licensed in the grammar by their ability to indirectly question a property of a semantically compatible and sufficiently salient antecedent. The results of both an investigation into sluices containing stranded prepositions and a grammaticality survey provide corroboration for this approach. The status of a sluiced prepositional phrase as a syntactic fragment associated with a full interrogative proposition reflects a mismatch between its syntax and semantics underlying the claim that the syntactic structure of such sluices comprises a phonetically-null interrogative CP with a PP complement. This structure is pragmatically licensed via an extension of Indirect Licensing (*cf* Culicover & Jackendoff, 2005) to include inferred propositions made implicitly available by a property of a sluice's antecedent. Under this analysis sluices containing stranded prepositions are the convergence of two question-forming strategies: using a sluiced PP as an indirect question and conventional *Wh*-movement.

PRAGMATIC LICENSING OF SLUICED PREPOSITIONAL PHRASES*

0. INTRODUCTION.

Sluicing is the term Ross (1969) originated for a phenomenon generally considered to be a particular variety of ellipsis in which a *Wh*-phrase, either alone or with a preposition, appears in lieu of a complete constituent question. The examples in (1) illustrate such constructions.

- (1) a. Somebody just left – guess who. (Ross, 1969)
- b. They claimed they had settled on something, but it wasn't clear what [*on*]. (Chung *et al*, 1995)
- c. Jack called, but I don't know {when/how/why/where from}. (Merchant, 1999)
- d. He said he left with some of the horses, but I can't remember how many with. (Culicover, 1999)
- e. Milupa claims endorsement by the 'medical profession' for its formulas with LCPs but will not say who by.¹
- f. I actually got a book for a prize once but I can't remember what for!²
- g. This is a review of a book by someone important, but I can't remember by whom. (Culicover, 1999)

Interpreting the embedded or indirect question corresponding to each of the sluices in (1) is dependent upon an overt (and in these cases preceding) antecedent clause. The equivalent results in (2) are generated by 'reusing' (to the extent possible) lexical items found in each of the relevant antecedents to replace the elided interrogative portions in (1).

- (2) a. Somebody just left – guess who just left.
- b. They claimed they had settled on something, but it wasn't clear what they settled on.
- c. Jack called, but I don't know {when/how/why/where} Jack called [*from*].
- d. He said he left with some of the horses, but I can't remember how many (of the horses) he left with.
- e. Milupa claims endorsement by the 'medical profession' for its formulas with LCPs but will not say who *it* claims endorsement by.
- f. I actually got a book for a prize once but I can't remember what *it was* {*given/awarded*} for!
- g. This is a review of a book by someone important, but I can't remember by whom *it was* {*written/authored*}.

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¹ <http://www.babymilkaction.org/update/update23.html>

² www.ageconcern.org.uk/discuss/messageview.cfm?catid=8&threadid=2400&startpage=65

These examples reveal a further contrast within sluicing phenomena analogous in some ways to the core/periphery distinction. Nearly all the literature to date focuses on ‘classical’ sluicing in which a *Wh*-term exclusively comprises the interrogative remnant *e.g.* (1)a-c. Cases like (1)d-g in which the remnant includes a *Wh*-term followed by a preposition, if addressed at all, are relegated to the sidelines on the following two perceptions: 1) these examples constitute a non-systematic variation of sluicing involving only a limited and relatively small number of prepositions (at least in English)³ and 2) the most theoretically interesting aspect of these examples is the word-order alternation in which the preposition may either precede or follow the *Wh*-term⁴, despite being attested in only a very few northern Germanic languages (excluding German itself)⁵.

The objectives of this paper are two-fold. The first is determining the validity of these perceptions based on newly acquired empirical evidence from American English. The second is relating insights gained by an in-depth focus on the phenomena of sluiced prepositional phrases⁶ (hereafter SPPs) to broader issues central to sluicing in general. In particular conventional wisdom assumed in much of the literature equates the synonymy of the examples in (1) to the results in (2) with the necessity for the content of a sluice to be syntactically parallel to its antecedent. Such an assumption, however, fails in several significant ways. While (2)e is grammatical, it is also oddly contradictory in a way that the corresponding sluiced version in (1)e is not. The content of the sluice in (1)e is semantically closer to “. . . who exactly it claims endorsement by”; or in the opinion of Ginzburg (1992) such examples are better paraphrased as “. . . who those in the medical profession Mulipa claims endorsement by are”. In either case, a sluice can clearly convey semantic and/or pragmatic connotations which do not necessarily survive parallel reconstruction. Just what is necessary and sufficient for the contents of a sluice to be syntactically parallel to its antecedent is also not clear. For instance, the sluice in (1)d might be reconstructed equally well by “. . . how many he left with” or “. . . how many of the horses he left with” or even “. . . how many horses he left with”. Furthermore, there are a variety of circumstances, as in (1)f and g, in which a sluice cannot be grammatically reconstructed without syntactically altering and/or adding to the elements in the antecedent. The limiting case is found in pragmatically determined antecedents such as in (3) which dramatically depicts how any such approach cannot possibly reconstruct a sluice without being telepathic as regards unrealized lexical content.

- (3) [John is in a used-car lot, and the salesperson approaches with her sales pitch:]
 Salesperson: Look at this beautiful Mustang.
 John: OK, but first tell me how much [*e*]. (Lobeck, 1993)

Better understanding how SPPs function and how they are licensed in the grammar are important

³ This is the explicit position taken by Culicover (1999) and Culicover & Jackendoff (2005) *inter alia*.

⁴ With the exception of phrases including *which*

⁵ Word-order alternation is the major aspect concerning prepositions in sluicing addressed by Riemsdijk (1978), Lobeck (1995), Culicover & Jackendoff (2005) or Merchant (2002) who are among the few to analyze such data at all.

⁶ Meaning these prepositional phrases are the result of a sluice (as opposed to the contents of a sluice)

steps towards formulating an analysis free of the shortcomings inherent in maintaining syntactic isomorphism between the content of a sluice and its antecedent.

In this paper I present empirical data which dispel several previous perceptions and which support an analysis reflecting a systematic mismatch between the syntax and semantics of SPPs. The findings argue against syntactic reconstruction of a sluice in favor of semantic/pragmatic association represented in as minimal a syntactic fashion possible via Indirect Licensing (*cf* Culicover & Jackendoff, 2005) of a syntactic fragment. The paper is organized in the following manner. Key features and characteristics of SPPs are reviewed in §1 and an initial hypothesis discussed. A novel investigation into the range of English prepositions participating in SPPs is described in §2. A supplemental survey of grammaticality judgments on a small number of prepositions not found by the primary investigation is detailed in §3. The import of the combined (investigation and survey) findings on understanding the nature of SPPs and informing the initial hypothesis is discussed in §4. Adoption of a formal mechanism to account for SPPs is advocated in §5 and comparisons made to some previous accounts in particular those of Merchant (1999), Potsdam (in press), and Chung, Ladusaw and McCloskey (1995). Final conclusions are given in §6 along with some wider implications for ellipsis/inference-related phenomena in the grammar.

1. SPPS: KEY FEATURES AND CHARACTERISTICS.

Apart from some recent contributions by Merchant (1999), all the defining features of sluicing received initial description in the seminal work of Ross (1969). These features are commonly divided into two sets in the literature: 1) those exhibiting connectivity effects; and 2) those associated with a lack of structural isomorphism between a sluice and its antecedent. The examples in (4) illustrate connectivity effects arising from arguments of a predicate expressed as prepositional phrases and from preposition stranding.

- (4) a. I have been really depressed and angry but not sure what at.⁷
 b. Well, I got it online, and I can't exactly remember who from.⁸
 c. "She took them from somebody but doesn't remember who from," explains Joseph.⁹
 d. I taped it and then sold it, but I can't remember who to.¹⁰
 e. I voted last year, but I can't remember who for.¹¹
 f. Yeah I do remember buying a sharon fruit for somebody - I can't remember who for, but what a great present!¹²
 g. Hey, lance needs your email address for something, I'm not really sure what for.¹³
 h. I thought I would get drafted but was not sure who by.¹⁴

⁷ dianataurasi.org/shoutouts.htm

⁸ www.esato.com/archive/t.php/t-77207

⁹ www.theroseandthornezine.com/Fiction/33Bessie.html

¹⁰ www.soulfulkindamusic.net/guyhenigan.htm

¹¹ news.bbc.co.uk/vote2001/hi/english/newsid_1333000/1333466.stm

¹² profile.myspace.com/index.cfm?fuseaction=user.viewprofile&friendid=3653783 (Sharon fruit is a variety of persimmon.)

¹³ profile.myspace.com/index.cfm?fuseaction=user.viewprofile&friendid=27863344

Before examining these examples in more detail, some clarification regarding terminology is in order. In each of 4(a-h) the *Wh*-term *who* or *what* followed by a preposition is commonly referred to as the *remnant* (on the presumption that it derives from a more complete clause). In these particular examples an alternative order of preposition followed by *Wh*-complement is equally grammatical¹⁵. Culicover (1999) differentiates these word orders by using *sluice-stranding* for a *Wh*-term preceding a preposition versus *sluice-piedpiping* for a preposition followed by a *Wh*-term. His terms are based on analogy with conventional *Wh*-movement (e.g. in 4(e) . . . I can't remember *who I voted for* vs . . . I can't remember *for who I voted*) in which either just the *Wh*-term or the entire PP has moved to [Spec,CP] prior to IP deletion.

Either way, the *Wh*-term is interpreted as the complement of the preposition whether it is displaced or not, thus the combination semantically functions as a prepositional phrase regardless of the word order. Taking the position that these are two variants of the same phenomena, I adopt the more inclusive term *sluiced prepositional phrase* (SPP) except in situations where using either *stranded* or *piedpiped* may be more perspicuous. The initial full clause (in these examples at least) serves as the *antecedent* upon which interpretation of the SPP depends. In all of these examples, the SPP correlates with a subcategorized argument of the antecedent VP. This *Wh*-correlate may either be explicit as in (4)f in which *for somebody* serves as the indirect object; or implicit as in (4)e in which an object is not overtly expressed. The *Wh*-correlate may function as any valid argument of its predicate (e.g. IO or O in 4d-e, passive agent in 4h, etc.); however, if explicit it must be an indefinite NP. A SPP can also relate to its antecedent as an adjunct as in a variation on (1)c given in (5) below.

(5) Jack called, but I don't know at what time.

In all such cases the presence of a *Wh*-correlate is optional but if included (e.g. Jack called *at a particular time*, but I don't know at what time) it must also be an indefinite NP¹⁶.

1.1 Connectivity effects involving SPPs.

Connectivity effects in the present context refers to sluiced phrases exhibiting grammatical dependencies parallel to those arising were these phrases to be in full clauses without any ellipsis. One such effect involving SPPs is found in the optionality of including a preposition in a sluiced phrase *only* if the corresponding *Wh*-correlate is overtly headed by the same preposition in the antecedent clause. Thus, examples (4)c, f, g remain grammatical even if the sluiced

¹⁴ www.soccernewengland.com/articles/view_article.php?id=937

¹⁵ although with varying degrees of preference by individual speakers

¹⁶ cf Chung, Ladusaw and McCloskey (1995) for pertinent discussion and evidence regarding semantic interpretation of sluices as interrogatives requiring an available variable (which only an indefinite *wh*-correlate can satisfy) for binding by a Q-operator.

phrase consists of the *Wh*-term alone without the preposition. This optionality in English contrasts with the obligatory repeating of the preposition in many other languages like German as depicted in (6).

- (6)a. Peter was talking with someone, but I don't know (with) who(m).
 b. Peter hat mit jemandem gesprochen, aber ich weiß nicht *(mit) wem.
Peter has with someone.DAT spoken, but I know not with who.DAT

Merchant (1999) has pointed out that the optionality of the preposition patterns directly with the grammaticality of preposition-stranding *Wh*-movement in a given language. Thus for only a handful languages such as English, Frisian, Danish, Swedish, Norwegian or Icelandic in which preposition stranding is possible, is it also *not* necessary for a sluiced phrase to repeat the preposition heading a *Wh*-correlate.

The question then arises as to what constrains the repeated use of the preposition in most languages if the predicate governing (*i.e.* subcategorizing for) the inclusion of the particular preposition is not overtly present in the sluice. Similarly, in English and languages permitting preposition stranding, if a *Wh*-correlate requiring a preposition is implicit then the sluiced phrase *must* include the particular preposition. This is exemplified in (4)a, b, d, e, and h each of which is rendered ungrammatical if the preposition of the SPP is omitted. When a predicate is subcategorized for expressing an argument by means of a prepositional phrase (*e.g.* flirt with), the choice of the particular preposition can be idiosyncratic in much the same way as the choice of an argument's case can be in languages with robust case systems. Comparing the German sluicing examples from Ross (1969) in (7) to their reconstructed counterparts in (8) illustrates this case-matching constraint.

- (7)a. Er will jemandem schmeicheln, aber sie wissen nicht { *wer / *wen / wem }.
He wants someone.DAT flatter but they know not who.NOM / who.ACC / who.DAT.
 'He wants to flatter someone, but they don't know who.'
 b. Er will jemanden loben, aber sie wissen nicht { *wer / wen / *wem }.
He wants someone.ACC praise but they know not who.NOM / who.ACC / who.DAT.
 'He wants to praise someone, but they don't know who.'
 (8)a. . . . Sie wissen nicht, { *wer / *wen / wem } er schmeicheln will.
they know not who.NOM / who.ACC / who.DAT he flatter wants
 '. . . they don't know who he wants to flatter.'
 b. . . . Sie wissen nicht, { *wer / wen / *wem } er loben will.
they know not who.NOM / who.ACC / who.DAT he praise wants
 '. . . they don't know who he wants to praise.'

Each of these examples is grammatical only when the *Wh*-term has the same morphological case exponence as found on its correlate in the antecedent clause.¹⁷ This is the same effect as the

¹⁷ Merchant (1999) reports that similar facts are attested for English, Dutch, Greek, Finnish, Hungarian, Russian, Polish, Czech, Slovene, Hindi, Basque, Turkish and Korean.

preposition of a SPP having to match what would be required were the sluice to be reconstructed from its antecedent clause. Furthermore, in not permitting preposition stranding, a majority of languages also do not allow a preposition and its *Wh*-complement to be ‘inverted’, a peculiarity unique to sluicing and attested in only a subset of preposition-stranding languages namely English, Danish and Norwegian.¹⁸

Such issues concerning choice of preposition and case assignment are handled in a straightforward fashion by accounts which assume a sluice to be underlyingly a full syntactic clause, the IP of which is left unpronounced at PF, as depicted in (9) with the contents of the unpronounced IP in ~~strikeout font~~.

(9) John might flirt at the dance, but I can't imagine who ~~John might flirt~~ with.

By positing the missing IP to redundantly contain the same verb found in the antecedent, the presence of an idiosyncratic preposition such as *with* is locally licensed by *flirt* at some level of the derivation prior to phonetic deletion (and presumably subsequent to *who* undergoing *wh*-movement to SpecCP). Since Ross (1969) the prevailing opinion¹⁹ has been that interpretability of a sluice is contingent upon the underlying presence of an IP at some level of syntactic derivation²⁰. The differences among various proposals are found in: 1) the IP being base-generated before deletion at PF (as per Merchant 1999) versus not being base-generated but reconstructed at LF (as per Chung, Ladusaw and McCloskey 1995); and 2) phonetic omission of the IP being licensed by a morphosyntactic versus a semantic identity condition with an antecedent IP. Licensing a sluice via syntactic isomorphism with an antecedent faces some rather insurmountable challenges as discussed in the remainder of this section which has led Merchant (1999) and Potsdam (in press) among others to argue for licensing via semantic identity. The present proposal does not assume the underlying presence of an IP at any level of derivation for a sluice, and thus seeks instead to deduce how a sluice as a syntactic fragment is licensed by the grammar.

1.2 *Islands insensitivity*.

Cross-linguistically the most pervasive sluicing characteristic is a lack of any sensitivity to islands when a sluice is reconstructed from its antecedent in a syntactically parallel fashion. The examples provided in (10-13)²¹ illustrate how a SPP appears to have been extracted from a

¹⁸ Merchant (2002) calls such inversion *swiping* (sluiced *wh*-word inversion with prepositions in Northern Germanic)

¹⁹ as found in accounts by van Riemsdijk (1978), Lobeck (1991), Chung, Ladusaw and McCloskey (1995), Merchant (1999), and Potsdam (in press) among others.

²⁰ Although see Ginzburg and Sag (2000) and Culicover & Jackendoff (2005) for alternative semantic-based approaches which do not posit the syntactic structure of a sluice to contain an IP.

²¹ Ross (1969) first identified sluicing as being insensitive to these island types. The examples in (11-13) are based on ones found in Merchant (2006).

position internal to a variety of islands²². In each case the sluiced sentence is grammatical despite the ungrammatical consequences of reconstructing the sluice.

- Left-branch with attributive adjective

- (10) He lives only on a little money, but I don't know on how little.
 *... I don't know on how little *he lives only* [a ___ money].²³

- Relative clause island

- (11) They hired someone who was speaking in a Balkan language, but I don't remember in which.
 *... I don't remember in which (*Balkan language*) *they hired someone* [who was speaking ___]

- Derived position island

- (12) A biography about one of the Marx brothers will appear this year - guess about which!
 *... guess about which (*of the Marx brothers*) [a biography ___] *will appear this year*.

- Adjuncts

- (13) Ben will be mad if Abby talks to one of the teachers, but she couldn't remember to which.
 *... she couldn't remember to which (*of the teachers*) *Ben will be mad* [if she talks ___].

Situations in which syntactically reconstructing a sluice from an antecedent is illicit are quite common and may coincide with a SPP relating to its antecedent as either an argument or an adjunct. In (10-13) the *Wh*-correlate is the complement in a prepositional phrase which functions uniquely in each case. The PP bears a relationship to: the matrix VP in (10), the relative clause VP in (11) the subject NP in (12) and the conditional clause VP in (13). Also, in all but (10) the *Wh*-correlate is an indefinite NP. As indirect interrogatives, sluices may function either to question the identity of their correlates or, as in (10), to question an attribute of the correlate (*e.g.* degree of being *little*).

It is precisely the inability to license sluicing via syntactic isomorphism with an antecedent IP in cases like (10-13) which has motivated various approaches to licensing a sluice via semantic identity with an antecedent. For instance, Merchant (1999) proposes that in examples like (10-13) semantic parallelism between a missing IP and its antecedent IP still holds even if syntactic parallelism between them does not. Thus per Merchant (1999) the semantics associated with the antecedent IP *who was speaking in a Balkan language* in (11) and the elided IP of the corresponding sluice *in which he was speaking* mutually entail each other thereby licensing IP deletion. The specific details accomplishing mutual semantic entailment varies across islands types²⁴ but crucially, for this and other accounts based on semantic parallelism, the semantics of

²² Chung, *et al* (1995) cite additional examples of island insensitivity including complements to nouns, embedded questions, and COMP-trace effects.

²³ Square brackets in these examples indicate the particular island being illustrated.

²⁴ *cf* §5.2.1 for further discussion

the elided IP must be associated with that of an explicit antecedent IP. However, as shown in the next section, such semantic parallelism does not hold in all cases.

1.3 Additional cases of non-isomorphism.

Another widespread characteristic of sluices is a further lack of structural isomorphism that can arise between a sluice and its antecedent in situations other than *Wh*-extraction from islands.

This can occur in quite a variety of circumstances, six of which are given in (14-19).

- (14)a. My parents have some gifts from Santa waiting at their house and I'll put one out for Christmas morning that has their name on it but doesn't say who from.²⁵
 b. ≠ * . . . who [I'll put one out] from
 c. = . . . who [*it (i.e. the gift) is*] from
- (15)a. The only thing I can come up with is contamination but I do not know what from.²⁶
 b. ≠ * . . . what [the only thing is contamination] from
 c. = . . . what [*the contamination is*] from
- (16)a. I remember the presentation at the Climatic Committee meeting but do not remember who by.²⁷
 b. ≠ * . . . who [I remember the presentation] by
 c. = . . . who [*the presentation was*] by
- (17)a. It strongly reminds me of some European comic I read once, but I can't remember who by.²⁸
 b. ≠ * . . . who [it strongly reminds me of some European comic] by
 c. = . . . who [*the European comic was*] by
- (18)a. I remember going to school for a while but can't remember what for.²⁹
 b. ≠ * . . . what [I remember going to school] for
 c. = . . . what [*my going to school was*] for
- (19)a. The government talks of putting a permanent base on the Moon but doesn't say what for.³⁰
 b. ≠ * . . . what [the government talks of putting a permanent base] for
 c. = . . . what [*the permanent base is*] for

Like the examples in §1.2, these are additional situations in which syntactically reconstructing a sluice from an antecedent is illicit. However, unlike (10-13) none of the antecedents in (14-19) contains an explicit *Wh*-correlate. Rather, each antecedent contains a semantically compatible (*i.e. relevant*³¹) NP about which the SPP, as an indirect interrogative, questions an attribute. Thus in (14) *gift* is associated with a GIVER (*i.e. having a GIVER is in this way an attribute of gift*) and it is this particular attribute which the SPP *who from* questions. Similarly in (15)

²⁵ www.mothering.com/discussions/archive/index.php/t-2929.html

²⁶ www.photo.net/bboard/q-and-a-fetch-msg?msg_id=00BWOM&tag=

²⁷ www.environmental.org.uk/index.php?name=Forums&file=viewtopic&p=7

²⁸ www.pelleas.net/aniTOP/index.php?p=195&more=1&c=1&tb=1&pb=1

²⁹ www.mlmug.org/PE34DP.html

³⁰ http://stupiddevilbastard.com/index/seb/comments/house_republicans_vote_to_slash_pbs_funding_by_23/

³¹ *semantically compatible* is used to avoid misconstruing *relevant* with terminology related to Relevance Theory (cf Sperber & Wilson 1986).

contamination is associated with a SOURCE which the SPP *what from* questions. In (16) the attribute associated with *presentation* is its PRESENTER and in (17) the attribute associated with *comic* is its AUTHOR, each of which the SPP *who by* questions. Finally in (18) the verbal NP *going to school* is associated with a GOAL and in (19) *base* is associated with a PURPOSE, each of which the SPP *what for* questions.

The significance of these examples, which to my knowledge has not been previously pointed out in the literature, is the lack of parallelism in each case between the semantics most naturally associated with the SPP and the semantics of any available explicit antecedent IP. For instance, the interpretation associated with the SPP in (16) is *who the European comic was by*. Yet neither the matrix clause containing *reminds* nor the relative clause containing *read* provides a semantic proposition equivalent to *...that a comic is by someone* which is essential for the SPP to be licensed via semantic parallelism. On the premise that examples like (14-19) are the same phenomena as sluices which do not involve a preposition, an approach having greater empirical reach than either syntactic or semantic parallelism is required. My investigation into stranded SPPs and related grammaticality survey (described in §2 and §3, respectively) support my contention that the interpretability of SPPs (and *ipso facto* sluicing in general) crucially involves a pragmatic inference process.

1.4 Claims about SPPs in the literature and some initial counter-evidence.

To my knowledge no comprehensive investigation into the empirical extent to which SPPs occur in English (or any other language) exists anywhere in the literature. Considering the full range of prepositions as well as *wh*-terms in English alone, an exhaustive search of all their combinations as sluiced constructions would be far from a trivial undertaking. On a more restrictive scale, some claims have been made regarding specifically *stranded* SPPs (*cf* Merchant 2002, Culicover 1999, Culicover & Jackendoff 2005). The prevailing opinion is that the prepositions participating in (English) stranded SPPs are limited to a very small number, *per* Culicover & Jackendoff (2005) only ten: *about, at, by, for, from, in, of, on, to, and with*. Culicover & Jackendoff (2005) further claim: 1) that nine of these (all but *by*) combine with *what*; 2) that seven of these (all but *on, in* and *about*) combine with *who*; and 3) the only other *wh*-terms found in stranded SPPs are in the combinations *where to, where from* and *how much for* (to which Merchant 2002 adds *when till, how many to* and *how long for*). Based on these claims, stranded SPPs are perceived by them as idiosyncratic and at least syntactically not derived from the more basic and presumably commonplace piedpiped SPPs.

Some cursory Internet searching using Google readily produced results which counter-exemplify these claims and minimally suggest them to be too restrictive. To the extent such examples found with Google may be considered “naturally occurring” English, the items in (20) are evidence that the putatively non-existing combinations of *who* with *on* or *about* as well as

what with *by* are in fact used by some speakers, *contra* Culicover & Jackendoff (2005).

- (20)a. I have wasted my pathetic little life and I can't remember who on.³²
- b. I have heard the phrase benign dictator - but I can't remember who about.³³
- c. Then we were stung but we weren't quite sure what by.³⁴

Similarly the items in (21) show that stranded SPPs can involve prepositions other than the specific ten identified by Culicover & Jackendoff (2005).

- (21)a. We're on to the semi-finals, though I don't know who against.³⁵
- b. The style and intention of this site has changed, but I'm not sure what into yet.³⁶
- c. Main character, Sam, is obsessed and his daughter is named Lucy - I'm sure you can guess who after.³⁷

The examples in (20) and (21) raise basic questions regarding the distribution of both prepositions and *wh*-terms in stranded SPPs. Furthermore, the results of an investigation into stranded SPPs (*cf* §2) indicate their formation to be a systematic (as opposed to idiosyncratic) process, thus raising issues concerning both the status of stranded and piedpiped SPPs in relation to one another (*i.e.* whether one is derived from the other) as well as whether the grammar licenses stranded and piedpiped SPPs in the same manner. These issues are further addressed in §4 and §5.

1.5 An initial hypothesis.

Before describing and reporting on my investigative efforts to answer the questions raised at the end of §1.4, it is worthwhile to sketch the gist of the hypothesis motivating and in part guiding those efforts. At least superficially a SPP appears to be a syntactic fragment which is semantically interpreted as a full clause representing an indirect question. At the crux of the matter is accounting for the process and/or mechanism by which this interpretation succeeds and correspondingly what is necessary and sufficient for SPPs to be grammatical. As previously mentioned, theories to date range from those based on syntactic parallelism (at some level) with an antecedent clause for licensing IP deletion³⁸; to those based on semantic parallelism with an antecedent clause for either licensing IP deletion before/at PF (Merchant 1999, Potsdam in press) or IP reconstruction at LF (Chung, *et al* 1995)³⁹.

The divergent characteristics of SPPs described in §1.1-3 pose significant challenges to

³² www.xanga.com/home.aspx?user=La_Diablo

³³ saloon.javaranch.com/32/005028.html

³⁴ www.travelpod.com/cgi-bin/guest.pl?tweb_UID=liz_hawkins&tweb_tripID=lizzy_2003-2004&tweb_entryID=1070158920&tweb_PID=tpod

³⁵ wolfangel.calltherain.net/index.php?s=against&submit=ww

³⁶ www.coldframe.net/log/archives/0311.html

³⁷ www.beatlelinks.net/forums/archive/index.php/t-3436.html

³⁸ *cf* Fiengo and May (1994)

³⁹ A more detailed comparison of the present proposal with each of these four approaches is given in §5.

analyses requiring parallelism with an antecedent, whether syntactic or semantic. Syntactic parallelism sufficiently accounts for SPPs exhibiting connectivity effects in which the sluiced *wh*-term directly correlates with an indefinite argument (explicit or implicit) of a predicate in the antecedent clause; but this approach is inadequate for explaining SPPs exhibiting either island insensitivity or other forms of non-isomorphism. On the other hand, semantic parallelism may sufficiently account for SPPs exhibiting both connectivity effects and island insensitivity; however this approach is stymied by examples of non-isomorphism.

In cases like (22) below (a variation of (16)a) in which the antecedent clause lacks a *Wh*-correlate, the most natural interpretation of the SPP (*i.e.* “who the presentation was by”) would derive from the proposition . . . *that a presentation is by someone* which is not in any obvious way parallel to the semantics of the antecedent clause, [REMEMBER(John, presentation)].

(22) John remembers a presentation but does not remember who by.

It might be argued that an implicit correlate in the form of a prepositional phrase like *by someone* serving as an adjunct to the NP, *presentation*, provides the needed propositional content in the antecedent to license the SPP under semantic parallelism. However simply positing the presence of such an implicit correlate still does not directly generate any additional propositional content in itself (*i.e.* the syntax of “...a presentation *by someone*...” still requires inferring the proposition . . . *that a presentation is by someone*). Only positing the implicit presence of an *entire* clause (*e.g.* “...a presentation *that was by someone*...”) would actually satisfy the requirements of semantic parallelism. Clearly this is not a satisfactory state of affairs as it is inconceivable how the presence and composition of any such implicit clausal constituent might be constrained leading to vast over-generation (*e.g.* ... *that was given/presented/delivered... etc.*).

The logical alternative, I claim, is positing the SPP in (22) to be interpretable via a pragmatic inference process in which the antecedent NP, *presentation*, is associated with having something like a ‘PRESENTER/AGENT’ as a semantic property that is being indirectly questioned. The relationship between the SPP and this inferred property of the antecedent underlies the expected interrogative semantics for the SPP represented in (23).

$$(23) \parallel \text{who by} \parallel^w = \lambda\rho[(\exists x : \text{person}(x))[\rho = \wedge[\text{BE-BY}(\text{presentation},x)]]]$$

Following Hamblin (1973), Karttunen (1977) and Berman (1991), the intensional logic formula in (23) denotes the set of propositions comprising the answer space to the indirect question in (22) and where *x* represents a *Wh*-indefinite⁴⁰ (*i.e.* who) semantically bound by an interrogative operator. Per Berman (1991) constituent questions are quantificational structures with three parts: 1) a *nuclear scope* which provides a propositional function ([BE-BY(presentation,x)]); 2) a

⁴⁰ Following Kamp (1981) and Heim (1982) indefinites are interpreted as ‘restricted free variables’ available for binding by an operator; and *per* Berman (1991) and Chung *et al* (1995) it is assumed *wh*-pronouns can be interpreted in this way.

restrictor which defines restrictions on the domain of the propositional function ($\exists x : person(x)$); and 3) an *interrogative operator* which imposes the interpretation as a set of propositions.⁴¹

Central to this pragmatic approach to licensing SPPs is the relationship between the SPP and an inferred property of the antecedent. The grammaticality of an SPP is claimed to depend on two particular aspects of this relationship: 1) whether *semantic compatibility* holds between the antecedent and the preposition in the SPP; and 2) whether the association between the antecedent and the SPP is *sufficiently salient*. Semantic compatibility holds whenever the use of a particular preposition in connection with an antecedent is meaningful. For example, the combinations of *angry* and *about/at/over/with* are all meaningful (and these prepositions are predicted to form grammatical SPPs with *angry* as an antecedent); however, it is difficult to imagine a context in which the combinations of *angry* and *off/in/on/to* would be meaningful (and SPPs involving these are predicted to be ungrammatical). In some cases semantic compatibility may hold, but for other often contextual reasons the strength of the association is not sufficiently salient for the SSP to be considered grammatical. For instance, in *clothes tossed about a room* semantic compatibility arguably holds between *tossed* and *about*. Nevertheless, in *He saw a lot of clothes tossed but he doesn't remember what about*, the SPP fails to be grammatical because the association between the SPP and its antecedent is not sufficiently salient. Both semantic compatibility and saliency are discussed at length in §4.1 and §4.2 respectively.

Thus in general terms the relationship of a SPP to its antecedent clause is best characterized as indirectly questioning some property associated with a semantically compatible and sufficiently salient constituent. When viewed this way the interpretability of a SPP is contingent upon neither syntactic nor semantic parallelism with an antecedent clause, while at the same time not being incompatible with either possibility. In addition to explaining SPPs exhibiting forms of non-isomorphism like that in (22), this approach also accounts for SPPs exhibiting connectivity effects in which the sluiced *wh*-term directly correlates with an argument (explicit or implicit) of a predicate in the antecedent clause as in (24).

(24) John might flirt at the dance, but I can't imagine who with.

A flirting event can have a 'goal' property (*i.e.* the individual targeted by the flirter) which is grammaticalized as an object of the verb, and which for *flirt* is subcategorized to be expressed as a prepositional phrase headed by *with*. Based on the implicit object in (24) being a property of the VP, *John might flirt*, the SPP is interpreted as an indirect question with the semantics $\lambda\rho[(\exists x : person(x))[\rho = \wedge[FLIRT(JOHN,x)]]]$ where FLIRT represents the flirting event and the identity of the goal property of that flirting event is being questioned⁴².

⁴¹ Discussion concerning the specifics of the syntactic structure associated with (23), and in particular how the interrogative operator is identified syntactically, is provided in §5.1.2.

⁴² §5.1.1 discusses the mechanism for constraining the corresponding syntax to be *who with* and not just *who*.

This same characterization of a SPP indirectly questioning an attribute of a semantically compatible constituent in the antecedent clause extends to other properties for which a predicate may not be subcategorized as illustrated by (5) repeated below in (25).

(25) Jack called, but I don't know where from.

Although not grammaticalized like the roles of subject, object or agent, an event such as that denoted by the VP, *Jack called*, is nevertheless understood to be situated in space and time making 'location' a property of such an event. Consequently the SPP in (25) is interpretable as an indirect question with the semantics $\lambda\rho[(\exists x : place(x))[\rho = \wedge[BE-FROM(CALLING,x)]]]$ where CALLING represents the calling event and this event's location is being questioned.

Syntactic and/or semantic parallelism in (24) or (25) may coincidentally enable a purportedly elided IP to be recovered and thereby yield the desired semantics for the SPP. However, there is no motivation to do so when a SPP is understood as functioning to question a property of a semantically compatible antecedent constituent via a pragmatic inference process which sufficiently enriches its semantics⁴³ so as to make it interpretable without recourse to recovering any elided material. Furthermore, the characterization of SPPs adumbrated here provides a unified approach to analyzing the full range of SPPs whether they exhibit connectivity effects, island insensitivity or other non-isomorphism. Despite the potential advantages of this approach, its ultimate merit demands adequate explication of the interpretability conditions constraining the underlying inference process which crucially relies on the presence of a semantically compatible and sufficiently salient constituent in the antecedent clause. The results from an in-depth investigation into stranded SPPs (*cf* §2) as well as from a grammaticality survey (*cf* §3) provide some significant insight into the factors determining a constituent's semantic compatibility and salience for the purposes of interpreting a SPP. The contribution of these combined findings to this hypothesis is detailed in §4; after which in §5 an adaptation of Indirect Licensing (*per* Culicover & Jackendoff, 2005) is proposed as a formal mechanism for the pragmatic licensing of SPPs in the grammar.

2. A NOVEL INVESTIGATION INTO STRANDED SPPS.

The characterization of SPPs given in the preceding section constrains neither which prepositions may grammatically occur in SPPs, nor what the word order may be. Indeed this approach predicts that potentially any preposition can head a SPP as long as the antecedent clause contains a semantically compatible and salient constituent. Given that, in English at least, the *Wh*-term is interpreted as the complement of the preposition whether displaced or not, the combination semantically functions as a prepositional phrase regardless of the SPP's word order. Thus, apart

⁴³ *i.e.* provides the SPP as a syntactic fragment with a full propositional meaning

from any prosodic constraints, it is also predicted that either the prep+*Wh* or the *Wh*+prep order is possible for any *meaningful* combination. This prediction is necessarily qualified in two ways. As noted in the literature (*cf* Merchant 2002, Culicover 1999, Culicover & Jackendoff 2005) the ‘inverted’ *Wh*+prep order is only attested for a very limited number of combinations involving other than monomorphemic *Wh*-terms (*e.g.* *how long for*, *how much for*, and *how many to*) which Merchant (2002) in particular attributes to prosodic conditioning factors. Furthermore, not all *Wh*-terms combine meaningfully with all prepositions. Seemingly no prepositions combine with *why* or *how* and a very limited number with *when* and *where*. Effectively, then, either word order is predicted to be possible in SPPs for any combination of a single-word preposition and *who* or *what*.

These predictions directly contradict the claims of Culicover & Jackendoff (2005) who view stranded SPPs to be idiosyncratic and to be treated on a par with idioms. However, as shown in §1.4, counterexamples do not appear difficult to find. In an effort to determine the actual extent to which the above predictions hold, a comprehensive investigation into finding empirical evidence for stranded SPPs was conducted using a combination of internet searching techniques and customized code for filtering. The objectives, constraints, method and results of this novel investigation into stranded SPPs are discussed in what follows.

2.1 Stranded SPP investigation: objective and constraints.

Simply put, the objective of this investigation was to find naturally occurring examples of stranded SPPs containing *who* or *what* for as many single-word prepositions as possible. The first concern was where to find them. Preliminary testing revealed that often used corpora like *Brown*, *Wall Street Journal* or *British National Corpus* do contain stranded SPPs, however in many cases only instances involving the most frequently occurring prepositions are found. Thus it was soon apparent that searching across the world-wide web at large would be necessary. The search engine selected was Google both for its breadth across all types of Internet domains and for its application programming interface (API) through which large-scale searching could be conducted. Using Google did impose several constraints. Most significantly the Google engine ignores punctuation in a search string. Consequently search results could not be narrowed down to include only sequences such as ‘*who against?*’ or ‘*what over!*’ which would have been particularly desirable in looking for SPPs. The solution was the use of custom Python code to filter out examples with sentence-final punctuation from the initial result set produced by Google. Additionally, Google will only return the first 1000 matches for any API search. Going beyond this requires re-executing the same search with a higher start threshold specified.

The second consideration was which prepositions to specifically include as each would have to be individually specified as part of a unique search string in combination with both *who* and *what*. The *Oxford American Dictionary* online includes 85 prepositions for English, 30 of which are multi-word combinations. Out of the remaining 55 another 17 were eliminated. These

included: 9 frequently used other than as prepositions (*as, concerning, regarding, except, like, unlike, opposite, round* and *past*); 6 of the overall least frequently occurring (*aboard, along, amid, among, despite, and par*); and 2 less frequent orthographic variants (*besides* and *toward*). The inability to restrict searches by part of speech combined with Google ignoring punctuation made inclusion of the first 9 too problematic while keeping the project manageable led to the exclusion of the remainder.

The 38 candidate prepositions are listed in Appendix I sorted according to overall frequency. Preferably such frequency values are relative to the corpus containing the terms. As the ‘corpus’ is the Internet at large, the closest approximation is to use the number of hits reported by Google (rounded to the nearest million) after searching on just each term alone. The total hits reported by Google is subject to a number of variables as Google essentially maintains a continuously revised snapshot of the Internet based on factors such as the time since a page was last accessed, the number of accesses to/from a page, etc. The total hit number is also not sensitive to use or part of speech, so no distinction is made in particular for prepositions functioning as particles. Nevertheless, at least an approximate sense of the frequency distribution for these terms can be gleaned, and repeating the calculations over a several week period did not drastically shift the broad relative order (*i.e.* items in the top third remained in the top third, and those in the bottom third remained in the bottom third)⁴⁴. Interestingly the top ten most frequent prepositions coincide exactly with the ten prepositions claimed by Culicover & Jackendoff (2005) to be the only ones participating in stranded SPPs. No search results were initially obtained for these 10 as they undisputedly occur in stranded SPPs. However, results for them were subsequently obtained for comparative purposes, especially for determining whether factors related to semantic compatibility and saliency varied significantly for these most frequently occurring items as compared to the other candidates.

2.2 Stranded SPP investigation: method.

The most efficient method for executing these rather extensive searches involved communicating with the Google engine directly using Perl scripts and sending the results to a series of text files. For each term 20 search strings were created. Half of these contained 10 predicates (*believe, clear, find out, forget, guess, know, recall, remember, say, and sure*) followed by *who* and a candidate preposition. The other half contained the same 10 predicates followed by *what* and the same candidate preposition. These predicates were specifically used because they can select clausal complements - the only context in which sluicing occurs. The inclusion of the predicates proved necessary as a direct result of Google ignoring punctuation. Simply searching on a *wh*-term and preposition combination alone produces such a vast number of results that within

⁴⁴ For comparison purposes Appendix I also includes frequency values for these prepositions as reported by the word frequency list for the Brown corpus. Both lists have the same broad relative order for these prepositions.

Google's limit of the first 1000 hits there were likely no sluiced examples at all. Including the predicate greatly improved the odds of zeroing in on stranded SPPs. On the downside, any examples involving other predicates or other forms of these predicates (*e.g.* past, gerund, *etc.*) were automatically excluded.

No effort was made to go beyond Google's search threshold of the first 1000 hits given that 20 searches on each term could potentially yield 20,000 results which would then have to be filtered to identify only those with sentence-final punctuation. Additionally, Google imposes a daily limit on searching via the API interface which meant having to spread out searching on some terms over more than one day in order to complete all 20. The results from all 20 searches for each preposition were output to a single text file. Each result included the URL address and Google's abbreviated context consisting of the search string and about a line of text preceding and following it (as opposed to the entire webpage). In most instances this was sufficient for determining whether a hit was actually a stranded SPP or not; but if necessary the URL could be used to re-examine the source page. For the majority of the candidates a full 20,000 initial hits were produced. However after secondary filtering using Python code to extract only examples with sentence-final punctuation, the net results typically numbered less than 100. These filtered files had to be further manually examined to be sure that each result was actually a stranded SPP (with an identifiable antecedent) as searching the Internet at large unavoidably yields a relatively high degree of 'noise' (*i.e.* nonsense, gibberish, stray punctuation, random strings, *etc.*). The final results ranged from 0 to about 20 percent of the intermediate filtered set.

2.3 Stranded SPP investigation: results.

Appendix II contains the full list of 38 candidates (including the 10 undisputed prepositions) ranked according to the number of unique predicates found in the antecedent clause upon which interpretation of the SPP depends. Also shown is the total number of results as well as the total number of VP, NP and AP antecedents found for each candidate. A breakdown by type of antecedent constituent revealed that across all 38 prepositions 45% were VPs, 45% were NPs, and 10% were APs.⁴⁵ The most striking and significant outcome is finding examples of stranded SPPs containing 26 of the 38 prepositions, approximately two-thirds, and at least 40 percent more than claimed by Culicover & Jackendoff (2005). This is clear evidence that stranded SPPs involve a much greater degree of systematicity than previously acknowledged.

In all the investigation netted approximately 3000 well-formed sluices⁴⁶. Nearly 2800 of these included one of the 10 undisputed prepositions, and the remainder one of 16 newly documented as occurring in stranded SPPs. A representative sampling of the 200 examples containing one of these 16 prepositions is provided in Appendix III. A few examples of these 16

⁴⁵ The APs were exclusively adjectival phrases. Adverbs can be the target of a sluice as in *I'll be done soon, I just don't know how soon*. However, no such occurrences were found in connection with SPPs.

⁴⁶ *i.e.* complete sentences with an identifiable antecedent clause (not examples like *He didn't say with who.*)

prepositions in (26) illustrate the strong tendency for prepositions in SPPs to be used in an abstract as opposed to spatial manner, a predominate aspect throughout all the culled examples.

- (26)a. All that's happened is a right-wing christian "Crusade" (Bush's poorly chosen words!), but I'm not sure what against now.⁴⁷
- b. Cupcake [*is a*] - mix terrier not sure what between (mother was a mix - don't know about father).⁴⁸
- c. I cried yesterday, but I can't remember what over.⁴⁹
- d. She and I had met each other some years previously, I can't remember who through.⁵⁰
- e. I feel like I'm progressing but I don't know what towards.⁵¹
- f. I remember registering though.... I don't remember what under.⁵²

Most prepositions have some sort of spatial⁵³ connotation conveying the position, direction or orientation of an object, often with respect to another object (*e.g.* the afghan is *under / over / between* the sheets). A number of prepositions also have additional non-spatial or abstract connotations such as those in (26). In some cases an association between the abstract and spatial uses is still apparent (*e.g.* *against* in (26)a stemming from combatants physically striking against each other). In other cases the link between them is all but lost and the abstract connotation has become conventionalized (*e.g.* *over* meaning 'concerning or regarding' in (26)c or *through* meaning 'by means of' in (26)d). Abstract uses of prepositions can also become arbitrarily associated with particular predicates (*e.g.* *register under* in (26)f, *degree in, flirt with, etc.*). Prepositions such as *of* or *for* retain exclusively abstract connotations as well as some grammaticalized uses (*e.g.* *for* to mark indirect objects with some verbs; and *of* in genitive constructions). While the spatial use of prepositions in SPPs is not semantically or syntactically precluded (as confirmed by the grammaticality survey in §3), the conventionalized and grammaticalized uses of some prepositions clearly strengthens the requisite semantic compatibility as well as salience with an antecedent resulting in a preponderance for abstract uses of prepositions in SPPs.⁵⁴

Several interesting correlations are also worth noting. The ranking according to the number of unique predicates in Appendix II gives an indication of the extent to which the use a particular preposition is tied to various verbs, nouns or adjectives. Such associations are an important factor in both the semantic compatibility and saliency necessary for a SPP to be

⁴⁷ web.talktous.org/gallery/album06/Canadian_woman2?PHPSESSID=d1c25dcb31ccb16e996ca350e72769ce

⁴⁸ www.showdog.com/login/philboard_read.asp?id=19999&recordnum=0

⁴⁹ altopiccolo.mindsay.com/

⁵⁰ www.hereinmyhead.com/artimp/cindy/interview.html

⁵¹ mixvio.com/ar/2004/06/i_started_to_cr.html

⁵² www.gotapex.com/forums/archive/index.php/t-49270

⁵³ which includes but is not restricted to specifically *locative* uses

⁵⁴ The specific roles of semantic compatibility and salience are discussed at length in §4.

grammatical. For the most part, the rankings in Appendix II correspond to the overall frequency rankings given in Appendix I; but there are some notable exceptions including the relatively low number of predicates associated with *in*, and the relatively large number of predicates associated with *against*. Another interesting correlation is found by comparing the rankings in either Appendix I or II with the possibility of using each preposition in an abstract as opposed to spatial manner. In terms of frequency as a preposition alone as well as frequency of occurring in stranded SPPs, the most common prepositions are also the most likely to be used with an abstract connotation. Conversely the least common prepositions are also among those for which an abstract connotation is least available, and examples of stranded SPPs for these were either not found at all or only very sparsely. Among the 10 undisputed prepositions *in* and *on* are the two for which either connotation is most easily obtained. However, examination of all the stranded SPPs found for each of them revealed a conspicuous lack of any in which the use of these prepositions had a specifically spatial connotation.

The 12 candidates for which no examples of stranded SPPs were found raise another issue. As these are among the least frequent prepositions, they were also the most likely not to have been found due to the limitations on the search method. Thus it is uncertain whether these prepositions do not/cannot occur in specifically stranded SPPs, or whether they do not occur in any SPPs (stranded or piedpiped). In an attempt to determine if they might be found in piedpiped SPPs the same searches were re-executed for each of these 12 with the *wh*-term following the preposition. This resulted in one example each for 5 of them, *across*, *during*, *inside*, *outside*, and *without*. While hardly an encouraging result, each of the examples did exhibit an interesting similarity in the form of an ‘echo’ characteristic illustrated in (27).

(27) This week I can’t eat anything other than rice without – well, you know without what.

Technically (27) contains a SPP, however it carries a distinct pragmatic force of the speaker intentionally repeating something not completed in the antecedent clause. This is true of the other 4 examples as well, and is not something either required or expected of SPPs in English. In fact among the most robust examples of SPPs the preposition is not part of the antecedent clause at all. Nevertheless, such examples are in keeping with the claim made here that semantic compatibility and sufficient saliency with an antecedent are the primary determiners of a SPP’s grammaticality. The surest means of satisfying these constraints is though repeating a given preposition which in some circumstances (*i.e.* those in which the preposition lacks any grammaticalized, conventionalized, or applicable spatial relationship with an antecedent) may be the only option.

Even though SPPs for these 12 were not found (at least in a robust sense), there remained the possibility that if given the proper context for optimal semantic compatibility and saliency, some or all of these 12 could also function as grammatical SPPs. Having exhausted the available techniques for using Google, the possibility of these 12 functioning in SPPs was alternatively

tested by means of a grammaticality survey discussed in the next section.

3. A SUPPLEMENTAL GRAMMATICALITY SURVEY.

As argued in §1.5 the grammaticality of a SPP hinges on the availability of a semantically compatible and sufficiently salient constituent (*e.g.* VP, NP, AP) in the antecedent clause. Even more precisely, the strength of the association between the preposition in the SPP and the particular property of the antecedent being questioned can be a decisive factor. This ‘strength of association’ is the same dynamic underlying the contrast, pointed out by Hornstein and Weinbeg (1981), between the potential ambiguity of (28)a (with a canonical prepositional phrase) and the total non-ambiguity of (28)b (with a stranded preposition).

(28)a. John decided on the boat.

b. What did John decide on?

For some speakers even (28)a is not particularly ambiguous without additional contextual support to make the locative (*i.e.* spatial) connotation of *on* more salient. In reference to the claimed non-ambiguity of (28)b Newmeyer (2005) argues that given the necessary contextual enrichment, the preposition *on* in (28)b can convey the alternative locative construal. This same contrast occurs in SPPs as illustrated in 29.

(29)a. John made a decision, but you’d never guess what on!

b. John has no problem making decisions when traveling on buses, trains or planes.
He made several en-route decisions this trip, but you’d never guess what on!

The stranded SPP in (29)a is seemingly unambiguous in questioning what John’s decision was about as opposed to where the decision was made. However, (29)b with an enriched context considerably strengthens the association of *on* with the location of the event denoted by the VP, *he made decisions*. The grammaticality survey described in this section was conducted specifically to test whether strengthening the association of a sluiced preposition with its antecedent could result in native speakers judging as grammatically acceptable some of the 12 prepositions lacking SPP examples from the investigation.

3.1 *Design of the survey.*

Appendix IV contains the entire survey and reports the mean values obtained for each stimulus. Several challenges were faced in designing this survey. One fundamental issue concerned the choice between constructing stimuli containing stranded SPPs versus piedpiped SPPs. It could not be determined from the stranded SPP investigation whether the lack of examples⁵⁵ for 12 of

⁵⁵ Other than the five ‘echo’ style examples

the prepositions was due to some factor constraining these from occurring in SPPs at all; or if their possible occurrences are so infrequent they escaped detection. However, it is clearly an empirical fact of English that the linear combination of a *wh*-term followed by a preposition is restricted to either sluiced constructions in full sentences or to bare argument ellipsis (BAE)⁵⁶ in fragmentary utterances (*e.g.* Postman: “I have a package.” Resident: “Who for?”). Thus apart from SPPs or BAE, the canonical word order for prepositional phrases (in which the preposition has not been stranded) is strictly that of the preposition followed by its complement.

Nevertheless, *within* the limited context of sluicing or BAE, determining which order (*wh*+prep or prep+*wh*) is more basic in the sense of being more commonplace is subject to further investigation (and a question not answered in this paper). Given these circumstances it was not obvious which option to go with. Ultimately the choice was to only construct stimuli with the more ‘canonical’ piedpiped SPPs. The premise of this decision lay not in a concession to this order being more ‘basic’ in sluicing; but rather in the possibility that the low frequency of these 12 prepositions alone could reduce the acceptability of them when occurring in a stranded SPP.

A fifty-fifty ratio of distractor stimuli to target stimuli was used. The 12 target prepositions were each included twice for a total of 24 target stimuli. By allotting two stimuli to each target preposition it was possible to include both spatial and abstract uses of a given preposition in cases where optimal contexts for both uses could be constructed. All 24 target stimuli were constructed to give each preposition the best chances of being judged acceptable even if both stimuli for some of them reflect only a spatial (or only an abstract) use. To match these, there were 24 distractor stimuli which were evenly divided into good and bad distractors. The 12 bad distractors included 3 stimuli lacking a SPP. These intentionally mimicked the other stimuli in being complex (*i.e.* multi-clausal) with ungrammatical word orders such as the inversion of a subject and auxiliary in a finite complement clause. The other 9 bad distractors included a variety of sabotaged SPPs including ones which: attempt to sluice the particle of a verb-particle construction (VPC); contain a semantically incompatible (*i.e.* irrelevant) preposition; or attempt to use a predominantly abstract preposition in a low frequency spatial association⁵⁷. The 12 good distractors also included 3 stimuli lacking a SPP which correspond to the same 3 bad distractors except with the expected word order. The other 9 good distractors were constructed with an even mixture of salient VP, NP and AP antecedent constituents. All the distractor stimuli with SPPs, both good and bad, contained only one of the 10 most frequent, undisputed prepositions. The entire set of 48 stimuli was sorted in random order and counter-balanced across subjects.

⁵⁶ *cf* Culicover & Jackendoff (2005).

⁵⁷ *e.g.* *about* can be used in a spatial sense with *scatter* as in ‘coins scattered about the gutter’ yet the association does not easily survive in a SPP like ??I saw a lot of coins scattered but I don’t remember what about.

3.2 *Procedure: participants, task and evaluation.*

This section provides a procedural overview of the grammaticality survey. The participants who took part in the survey are described. Also explained are the task that was involved and how the completed surveys were qualified and tallied. Permission to conduct the survey was granted by the UCSD Institutional Review Board (IRB) as Project #060731S.

3.2.1. *PARTICIPANTS.*

The participants in the survey were 90 volunteers solicited from two undergraduate linguistics and human development classes at UCSD in La Jolla, California. As an incentive, the professors for each class agreed to give volunteers extra credit for participating. Participation was also open to any students in those classes. There were no age, gender, or ethnicity restrictions.

3.2.2. *TASK.*

The survey was conducted over five separate days in the Syntax Laboratory of the Linguistics Department at UCSD. Participants were required to sign and date a consent form which is kept confidential and not keyed to the survey forms. Participants were also given their own copies of the consent form. Each survey consisted of a cover sheet and another sheet with the 48 randomized stimuli. The cover sheet contained five questions about the participant's native language(s), their language(s) of instruction in elementary and high school, the language(s) they are most comfortable with, and the cities they grew up in. It also contained general directions and 4 practice items. Participants then had an opportunity to ask questions before starting the survey itself. To complete the survey participants were asked to rate each sentence for acceptability on a scale of 1 to 5 where 1 was completely unacceptable and 5 was perfectly fine. There was no preset time limit to complete the survey, although the directions encouraged participants to rely on their intuitions and not analyze the sentences.

3.2.3. *EVALUATION.*

Although there were no restrictions on which students could participate, only surveys completed by native English speakers were suitable input to this type of grammaticality survey. Only surveys with cover sheets indicating English as the sole native language and English as the response to each of the other questions qualified as being completed by a native English speaker. Participants indicating use of languages in addition to English during elementary or high school also qualified as long as English was listed as the only native language. The surveys were tallied manually by calculating the mean value of all qualified responses for each stimulus. The mean values obtained for each of the stimuli are reported in Appendix IV. The primary interest was the response to the 24 target stimuli, in particular those judged at or above a mean of 3. Also of interest was any asymmetry among target stimuli in regards to those with prepositions used in a spatial manner versus those used in an abstract manner. Secondary interests included any good distractors receiving a majority negative judgment and any spatial/abstract asymmetry among the distractors.

3.3 Results of the survey.

The results reported in Appendix IV reflect the judgments of the 50 qualifying submissions received from the 90 total participants. Out of the total 12 target prepositions, 10 received a mean value of 3 or more for at least 1 of the 2 stimuli containing it, and for 3 of these 10 (*above*, *inside* and *near*) both stimuli received a mean value of 3 or more. These 10 prepositions are shown underlined on the copy of the survey in Appendix IV. The only two prepositions receiving a mean value below 3 were *during* and *without*. The stimuli included spatial versus abstract uses for 6 of the target prepositions for which 3 received a mean value below 3, and the other 3 received a mean value at or above 3. Consequently no asymmetry along this dimension was observed. This is perhaps not surprising given that these least frequent prepositions are also the least amenable to abstract use. More than might be expected by chance, individual qualifying submissions rated at least some of the good distractor stimuli containing one of the 10 undisputed prepositions at 3 or below. Such native speaker judgments seem peculiar, especially given that none of these good distractors received judgments of 4 or 5 across the board. A likely explanation lies in the decision to use only piedpiped SPPs. There is a high probability that participants were sensitive to the SPP word order in these good distractors. All the same, collectively most of the good distractors received a mean value of 4 or more, with the lowest mean of 3.42 received by *in who*. Thus none of the good distractors received a majority negative judgment. Attempts to use undisputed prepositions like *about* or *by* in a spatial context were included among the bad distractors and, as expected, each of these received mean values of 2 or less. Also among the bad distractors, only 1 received a mean value above 3 which was likely due to participants misreading the stimuli⁵⁸. All in all, these results indicate that strengthening the association of a sluiced preposition with its antecedent can result in such low frequency prepositions being judged grammatical in SPPs despite not having been found in the initial investigation.

4. IMPORT OF THE COMBINED FINDINGS.

As sketched in §1.5, the hypothesis being pursued views SPPs as a functional strategy for using a syntactic fragment to indirectly question some property associated with an antecedent constituent. Unlike most forms of sluicing involving a *wh*-term by itself, SPPs can involve examples of non-isomorphism like (14-19) in which interpretation is not achievable via strict syntactic or semantic parallelism with an antecedent⁵⁹. Rather, interpretability of such SPPs requires a pragmatic inference process which crucially hinges on the association between the

⁵⁸ The stimuli *They're going to Paris but haven't decided what will they see*, received a 3.12 mean value.

⁵⁹ Similar examples of non-isomorphism occur with *whose* as in 'A car is blocking the entrance – find out whose' and also with *how+adj* as in 'He bought a jalopy but I don't know how old'.

SPP and an appropriate constituent in the antecedent clause. This section discusses the roles semantic compatibility and salience play in interpreting SPPs in light of the results from both the investigation into stranded SPPs (*cf* §2) as well as from the grammaticality survey (*cf* §3).

4.1 *The role of semantic compatibility.*

Identifying what type of constituents can function as appropriate antecedents is the first step in examining how semantic compatibility constrains the inference process underlying the interpretability of SPPs. As described in §2.3, among the approximately 3000 well-formed sluices netted by the investigation into stranded SPPs, 45% have VP antecedents, 45% have NP antecedents, and 10% have AP antecedents. The high percentages of both VP and NP antecedents is interesting in so far as NP antecedents like those in (14-19) typically give rise to SPPs for which interpretability is independent of syntactic or semantic parallelism. The prevalence of such cases contrasts starkly with their lack of treatment in the literature, although focusing on sluices which involve a *Wh*-term alone (as nearly all the literature does) is also unlikely to detect these cases.

Revisiting the example in (15)a, repeated in (30), is particularly useful as the antecedent clause, *the only thing I can come up with is contamination*, is vague enough so that the NP constituent, *contamination*, remains semantically compatible to a range of possible SPPs. Contrasting these with unsuitable SPPs illustrates the necessity for the use of the preposition in connection with the antecedent to be meaningful in order for semantic compatibility to hold.

(30) The only thing I can come up with is contamination but I do not know what from.

Considering first the ten most frequent prepositions, a SPP headed by *with* or *by* would be equally grammatical as *from* in (30). Both CAUSER (*i.e.* an animate AGENT) and SOURCE (*i.e.* an inanimate substance) are plausible semantic properties associated with *contamination*. For instance the contamination might be from a chemical plant (CAUSER) or from a chemical compound (SOURCE). Consequently the canonical AGENT role which *by* denotes becomes ambiguous with the canonical SOURCE role denoted by *from*. Being a result of the default semantics associated with *by* and *from*, this is not a situation peculiar to *contamination* (*e.g.* substitute *infection* for *contamination*). This ambiguity is also restricted to the *Wh*-term *what* in this SPP. Using *who* would preclude a SPP with *from* or *by* from appropriately questioning an inanimate SOURCE property. Using *with* is also grammatical as the SOURCE property can be associated with a canonical INSTRUMENT role. The SPP in (30) can be grammatical with additional prepositions within a slightly richer context. Uttering (30) in a situation in which the contamination is understood to specifically involve the air, the water or some test samples, makes the use of *in*, *of* or *to* licit as well.

Given the appropriate context and pragmatic conditions, the semantic compatibility of

these six prepositions and *contamination* contrasts with the unsuitability of most other prepositions. The preposition *about* is canonically associated with a THEME/TOPIC role, and *for* canonically associated with a PURPOSE role, neither of which correspond to plausible properties of *contamination*⁶⁰. The prepositions *on* and *at* have no abstract uses applicable to *contamination* and their licit use in a spatial sense would require a high degree of contextual support (e.g. the contamination suspected as being specifically on the surface of something). Prepositions beyond the ten most frequent have increasingly spatial connotations and correspondingly fewer abstract ones; thus prepositions like *off*, *over*, *into*, *under*, etc. are unlikely to be semantically compatible in (30). However, one of these less frequent prepositions, *through*, has the abstract connotation ‘by means of’ making it licit by association of the SOURCE property to a canonical INSTRUMENT role.

It is important to clarify that semantic compatibility as described so far is strictly a function of compositional semantics and contextual parameters. The meaning associated with the preposition and that with the antecedent constituent are independent of each other. The use of a particular preposition is licit as long as the SPP containing it is appropriate for questioning a property that can be identified with a given antecedent constituent. Thus, there is no claim here that the lexical entry for *contamination* lists all and only the prepositions with which it can combine. This also does not preclude the suitability of a preposition solely by virtue of having an infrequent abstract connotation as long as such use isn’t arbitrarily restricted to a particular lexical entry. A case in point is comparing *specialist* to *degree*. The prepositions *in*, *for*, *of* and *on* are all licit in a SPP questioning *specialist* (e.g. He got a specialist but I don’t know in/for/of/on what.) although not all with the same frequency and/or particular context. In contrast only *in*, rather arbitrarily, is licit if *degree* is substituted for *specialist*. While a plausible property associated with *degree* is TOPIC, the question arises whether the syntax for *degree* necessarily subcategorizes for the preposition *in* to optionally realize its TOPIC property. In the general case syntactic functioning of an NP does not depend on properties like AGENT, SOURCE or TOPIC having a syntactic role (explicit or implicit) in a manner akin to arguments of a VP or AP predicate. Nevertheless, the restricted use of *in* with *degree* is at some level a syntactic feature of *degree*. As such lexical items like *degree* idiosyncratically govern certain prepositions in the same way as some verbs do. This poses a dilemma for the present approach to SPPs which explicitly does not posit SPP syntax to contain an IP (in which the preposition could be locally governed) at any point in the derivation. The details involved in resolving this matter are explicated in §5 where an adaptation of Indirect Licensing (*per* Culicover & Jackendoff, 2005) is proposed as a formal mechanism for pragmatically licensing SPPs in the grammar.

⁶⁰ *Contamination* doesn’t have an association with being ‘about’ something in the way that an NP such as *agreement* does (i.e. come to an agreement about something)

4.2 *The role of saliency.*

In the previous section, the role of semantic compatibility as a constraint on the inference process underlying the interpretability of SPPs was demonstrated only in relation to NP antecedent constituents; however, the same points hold in relation to either VP or AP constituents (including having to resolve the apparent dilemma posed by predicates which idiosyncratically govern particular prepositions). The discussion turns now to the role of saliency in interpreting SPPs. Saliency is a direct function of the strength of association between a preposition in a SPP and the particular property of the antecedent constituent being questioned. Precisely because this association is established via a contextually conditioned inference process, saliency is necessarily a proportionate as opposed to absolute constraint. Saliency is also distinct from, as well as secondary to, semantic compatibility with an antecedent. The distinction is particularly apparent with regards to prepositions like *about* or *by* which are most frequently used in SPPs in an abstract manner, even though both have spatial connotations as well. In examples like *coins scattered about a gutter* or *horses passing by a barn* these prepositions have a spatial connotation and are arguably semantically compatible with *scattered* or *passing*, respectively. Yet despite this semantic compatibility, a SPP with either preposition and corresponding antecedent fails to be grammatical as shown in (31).

- (31)a. *He found coins scattered but didn't remember what about.
 b. *He saw horses passing but didn't know what by.

The issue is not a lack of semantic compatibility but rather insufficient saliency. The results of the grammaticality survey indicate that given a sufficiently elaborated context SPPs with *about* or *by* could possibly retain a spatial association to *scatter* or *pass* should the saliency of that association being sufficiently strengthened.

The results of the investigation and survey indicate saliency to be affected by several factors including: the availability of abstract use(s) for a preposition; the relative frequency of individual prepositions; the comparative frequency of constituent-preposition pairs, and various blocking effects. The investigation into stranded SPPs yielded a conspicuous lack of examples for any of the 10 most frequent prepositions in which the association of the SPP to its antecedent constituent involved a purely spatial use of the preposition. Such examples were also quite limited in number among all the results found for the additional 16 prepositions as well. These facts corroborate the conclusion that, for discourse purposes, the typically more salient properties of entities and events are those for which prepositions have been grammaticalized (*e.g.* for encoding of thematic roles), conventionalized (*e.g.* for indicating topic, theme, focus, *etc.*), or otherwise idiosyncratically linked to a predicate. These specialized associations considerably strengthen abstract features of antecedents in comparison to spatial characteristics which by being perhaps so unremarkable become essentially indistinct with the background. Consequently

abstract uses of prepositions, which are greatest among the most frequently occurring ones, are predominant in SPPs.

Nevertheless, as the results of the grammaticality survey clearly indicate, SPPs with non-abstract connotations are judged to be grammatical given a context in which a spatial aspect of an antecedent is prominent. Outside of such circumstances using a SPP in a spatial manner is often obviated by using *where* instead (*cf* (29)b.), thereby contributing to a synergistic ‘blocking’ effect. In a similar way, one of the negatively judged SPPs in the survey, *during what*, is likely blocked by the use of *when*. Additional blocking effects are found among various individual prepositions. For instance, the TOPIC property associated with a noun like *agreement* can be questioned by a SPP using *about*, *on* or *over* however the greater frequency of the first two has the effect of blocking greater use of *over*. Similarly *under* in both having some abstract uses (*e.g.* file / list / register under) and being more frequent serves to block *beneath* which has no abstract connotations. This suppressing effect which more frequent elements have on less frequent ones likely contributes to frequency disparities between various constituent-preposition pairs such as the four-times greater occurrence of *promoted over* compared to *promoted above*. The two are entirely interchangeable and arguably semantically equivalent, only *over* is a more frequent preposition than *above* is.

4.3 Interim Summary.

The results from the investigation into stranded SPPs (*cf* §2.3) are clear evidence that such constructions, although attested in only a very few languages and restricted to sluicing and BAE contexts, are not entirely idiosyncratic (*contra* Culicover & Jackendoff, 2005) but are in fact much more regular if not systematic with monomorphemic *Wh*-terms and single-word prepositions (within prosodic constraints). While the little attention in the literature given to SPPs has focused solely on the alternating word-order variations, as significant an aspect is the relatively high number of SPPs with NP antecedents which were found to occur just as frequently as those with VP antecedents (*cf* §4.1). In examples having NP antecedents, like (14-19), syntactic and/or semantic parallelism is insufficient for these SPPs to be interpretable and thus to be grammatical (*cf* §1.5). Instead, I propose that these examples are interpretable via a pragmatic inference process which, subject to semantic compatibility and saliency constraints, allows these syntactic fragments to function as indirect interrogatives. The grammaticality survey results (*cf* §3.3) further support these conclusions by demonstrating that low frequency, non-abstract prepositions are judged grammatical in SPPs in which a spatial property of the antecedent is prominent. When NPs functioning in grammaticalized roles (*i.e.* thematic positions of object, passive agent, *etc.*) are viewed as properties of their predicate, this approach encompasses the entire range of SPPs.

The current proposal is also able to account for a number of correlations that are too striking to be simply accidental. Given the association of frequency with saliency (*cf* §4.2) and

grammaticalization with semantic compatibility (*cf* §4.1), it is no surprise that the ten most common prepositions in SPPs⁶¹ have the highest frequency among prepositions overall and are the most likely to be grammaticalized in connection with thematic roles. Similarly, given the overall greater saliency and semantic compatibility associated with abstract uses of prepositions, the otherwise seemingly arbitrary asymmetry observed between prepositions with an abstract versus spatial connotation in SPPs is equally unsurprising. The variation in acceptability of SPPs with lower frequency prepositions is also expected given that many if not most of these do not have abstract uses, and thereby require a sufficiently elaborated context without which the spatial property of a potential antecedent is unlikely to be prominent. Two further observations, the possibility for antecedent ambiguity and the failure of verb-particle constructions (VPCs) to sluice, are expected as well. A variation of (1)g illustrating antecedent ambiguity is repeated below as (32).

(32) This is a review of a book, but I can't remember by whom.

The SPP in (32) can licitly function to question either of two possible antecedent constituents, *review* or *book*, each of which is associated with the semantically compatible property of AUTHOR/AGENT, thus giving rise to potential ambiguity. The impossibility of sluicing a VPC is shown by the examples in (33).

- (33)a. *He messed something (up) but I don't know { what up / up what }.
 b. He messed something up but I don't know what.

In (33) *up* functions as a particle which forms a single semantic unit with the verb *messed*. Consequently, the antecedent VP in such a sentence lacks any semantically compatible property for a putative SPP containing *up* to licitly question.

5. A FORMAL MECHANISM AND COMPARISON TO SOME PREVIOUS ACCOUNTS.

In this section an adaptation of Indirect Licensing (*per* Culicover & Jackendoff, 2005) is proposed as a formal mechanism for the pragmatic licensing of SPPs in the grammar. The proposal is also briefly compared to the accounts of Merchant (1999), Potsdam (in press), and Chung *et al* (1995).

5.1. Two remaining issues.

Discussion on the proposed adaptation of Indirect Licensing includes addressing two remaining issues. The first in §5.1.1 is the apparent dilemma posed by predicates which idiosyncratically govern particular prepositions. The second in §5.1.2 is explicating the syntax of SPPs and the status of stranded and piedpiped SPPs in relation to each other (*i.e.* whether one is derived from the other).

⁶¹ which are also the same ten that are undisputed to occur in stranded SPPs

5.1.1. INDIRECT LICENSING AS A FORMAL MECHANISM FOR THE PRAGMATIC LICENSING OF SPPs.

Culicover & Jackendoff (2005) argue that a wide array of linguistic phenomena from the use of discourse deitics, bare argument ellipsis (BAE) and sluicing to left dislocation, topicalization and *wh*-movement indisputably involve pragmatic/semantic conditions regarding the relation of the (elliptical) utterance fragment or dislocated constituent to the pragmatic context, another sentence, or another clause. The generalization cross-cutting these phenomena is the use of a phrase whose syntactic position does not signal its semantic role in the propositional tier of the utterance (*i.e.* the aspect of meaning concerned with *who did what to whom*); therefore, the semantic role and, in some circumstances, syntactic properties of the phrase have to be determined indirectly. For example, the syntactic features of the deictic, *those*, in (34)a or (34)b cannot be attributed to anything that has been previously uttered:

- (34)a. Would you hand me those please. [gesturing towards scissors]
 b. Those look great on you. [gesturing towards pants]
 (Culicover & Jackendoff, 2005)

The only factor determining the plural form of the deictic in (34)a-b is the contextual presence of a physical item for which the corresponding NP in English is idiosyncratically *pluralia tantum*. Culicover & Jackendoff (2005) take this as evidence that activation of a lexical entry evoked by nonlinguistic context is in itself sufficient to determine syntactic features of a phrasal constituent not otherwise locally licensed. The possibility that words are present in underlying structure and then deleted at PF (*e.g.* *those scissors* in (34)a or *those pants* in (34)b) is acknowledged but abandoned by Culicover & Jackendoff (2005) as such an approach unavoidably leads to the massive and otiose syntactic ambiguity suggested by (35).

- (35)a. Look at that!
 b. Look at that ~~car~~!
 c. Look at that ~~vehicle~~!
 d. Look at that ~~thing~~!
 e. Look at that ~~red VW Jetta coupe~~! (Culicover & Jackendoff, 2005)

Does the utterance of (35)a while pointing at a car, have the underlying form in (35)b, (35)c, (35)d, (35)e or any of a number of other possible alternatives?

Culicover & Jackendoff (2005) use the term *Indirect Licensing* (IL) to refer to this indirect determination of semantic role and syntactic features. If such Indirect Licensing involving nonlocal connections with an antecedent has to be countenanced in the grammar in order to give pronouns their expected syntactic features, it is not so implausible that IL should also makes use of an antecedent sentence/clause as well as lexical entry information activated by an antecedent constituent. These additional possibilities are illustrated by the example of BAE in (36) and of a SPP in (37) repeated from (24).

(36) Ozzie took someone's picture. –Yeah, Harriet's/of Harriet. (Culicover & Jackendoff, 2005)

(37) John might flirt at the dance, but I can't imagine who with.

In (36-37) a mismatch exists between the syntactic form of the BAE/SPP fragment exhibiting connectivity effects (possessive case or preposition choice) and the conceptual form (*i.e.* corresponding semantics) in which the BAE/SPP is understood as embedded in a well-formed proposition. The sentence *Ozzie took someone's picture.* in (36) is an available antecedent for IL via an inference process to determine both the applicable proposition ...*that Ozzie took Harriet's picture* and the required syntactic case feature of the BAE, *-Yeah, Harriet's*. In a similar fashion, the VP *John might flirt* in (37) is an available antecedent for IL to determine the applicable proposition ...*that John might flirt with someone* and the requisite choice of preposition in the SPP, *who with*.

The specifics in Culicover & Jackendoff (2005) regarding IL as a mechanism in the grammar can be outlined using the two examples (36-37). IL constructions such as BAE or SPPs⁶² consist of a syntactic fragment which Culicover & Jackendoff (2005) refer to as an *orphan* (*i.e.* the phrase needing to be indirectly licensed). The orphan requires integration into a propositional structure which is a two-step process. The first step is identifying a proposition P in which the orphan plays a role. This may be a proposition pragmatically related to an antecedent sentence or nonlinguistic context for BAE; or a proposition associated with an antecedent clause for SPPs. The second step is identifying the exact role that the orphan plays in P. For either BAE or SPPs this may be accomplished via “matching” with an existing constituent in the antecedent; or via “sprouting”⁶³ an adjunct or implicit argument. The BAE example in (36) illustrates matching; while the SPP example in (37) illustrates sprouting. Under interpretation by matching in (36), syntactic features and relations of the NP *Harriet's* are able to be matched to those of the antecedent *someone's* along with the semantic interpretation. Under interpretation by sprouting in (37), processing the antecedent VP *flirt* necessarily activates the entire lexical entry in memory and, by virtue of this activation, sprouts the VP argument *with someone* at the level of CS; thereby making the VP *flirt* available to license both the semantic role of the orphan and the required choice of preposition. In this way Indirect Licensing allows orphan phrases to be assigned syntactic features without licensers in the local context provided appropriate licensers are available in: 1) a previous clause/sentence; 2) a part of the lexicon activated by a previous clause/sentence; or 3) a part of the lexicon activated by nonlinguistic context.

The notion of Indirect Licensing is consistent with the view taken here of SPPs being a functional strategy for using syntactic fragments to indirectly question a property associated with

⁶² Culicover & Jackendoff (2005) only make reference to sluicing constructions in general. In keeping with the topic of this paper, SPP is used here instead.

⁶³ Culicover & Jackendoff (2005) adopt this notion and terminology from Chung, Ladusaw and McCloskey (1995).

a semantically compatible and sufficiently salient antecedent as supported by the results of the stranded SPP investigation and grammaticality survey. However, Indirect Licensing as formulated by Culicover & Jackendoff (2005) is not adequate to handle SPPs with NP antecedents in the category of exhibiting other forms of non-isomorphism (*cf* §1.3) such as (38).

(38) I also still want to do a Masters degree at some point, although I'm not sure what in.⁶⁴

In its present formulation IL requires the presence of an explicit proposition associated with an antecedent clause in order to identify the role that the orphan (*i.e.* the *Wh*-term in the SPP) plays in that proposition. In (38) there is no VP, IP or other syntactic constituent conveying the proposition ...*that a degree is in something* which is required to integrate the orphan into some propositional structure. To remedy this shortcoming I propose that IL be re-formulated to incorporate either explicit propositions associated with an antecedent or propositions that are implicit by virtue of an antecedent's property. Thus the SPP in (38) would be licensed via IL by virtue of the antecedent *degree* having a TOPIC/THEME property by which the proposition ...*that a degree is in something* is implicitly available.

5.1.2. THE SYNTAX OF SPPS.

As shown in §1 and especially in §1.3 the interpretation if a SPP cannot in all cases be achieved by 'matching' its fragmentary elements to the contents of a proposition directly conveyed by an available antecedent. It is on this assumption of semantic parallelism that other accounts attempt to 'build' clausal syntax into a sluice (whether at LF, or base-generated and deleted at PF). In particular, the interpretability of examples like (38) above requires inferring a proposition from a property of the antecedent. As this inferred proposition is without explicit syntax of its own, it would seem misguided to attempt creating additional syntax in the SPP based on what would necessarily be inferred syntax. Furthermore, there would be nothing constraining the additional SPP syntax (*e.g.* the syntax of the SPP in (38) might be any of ...*what the degree will/should/might/could/may be in*). Thus, I will assume an SPP to have only the syntax for which there is direct evidence, with the consequence that its fragmentary syntax sanctioned by IL is reflective of a fundamental syntax-semantics mismatch in the grammar.

The use of *piedpiped* throughout this paper has been a convenient and recognizable descriptive term only. In not assuming SPP syntax to include an IP, there is no basis for the original sense of *piedpiped* in referring to an entire prepositional phrase undergoing movement to a higher Spec position. All the same, SPPs consisting of a preposition followed by a *Wh-term* are clear evidence that minimally SPP syntax comprises a PP. If further evidence supports optional *Wh*-movement, then stranded SPPs being derived from piedpiped SPPs is plausible. This raises the issue of whether SPP syntax consists only of a PP projection or if the PP is

⁶⁴ www.nonstoptokyo.co.uk/pages/page2.html

incorporated in any other functional projection. Clearly SPPs function as indirect questions, but does this mean their interrogative force is necessarily associated with a separate syntactic projection? Some clues may lie in a close cousin to the SPP, bare argument ellipsis (BAE). Some examples of BAE are on the surface solely a preposition and its complement as illustrated in (39).

- (39) a. Dick: Who is this card for?
 b. Jane: For Charlie.
 c. Dick: Who for?
 d. Jane: I just told you.
 e. Dick: For Charlie?

The dialog in (39) contains 3 examples of BAE. The first in (39)b is interpreted as an assertion and the other two in (39)c and (39)e are interrogatives. Additionally, (39)c includes a *Wh-term* and is in the *Wh*+prep inverted order (the only other context apart from SPPs in which this occurs in English). The standard treatment of the full clauses in (39)a and (39)d would involve a CP projection with which both the interrogative force and the *Wh*-movement in (39)a would be associated. If interrogative clauses are syntactically distinct from assertive clauses in having a Q-feature on C as well as in attracting a *Wh-term* to its Spec, then in absence of evidence to the contrary, the same would hold to syntactically differentiate assertive BAE from interrogative BAE. Given that SPPs are functionally identical to interrogative BAE, SPP syntax arguably includes a functional CP projection which is both +Q and +*Wh*, only with a PP complement rather than an IP one.

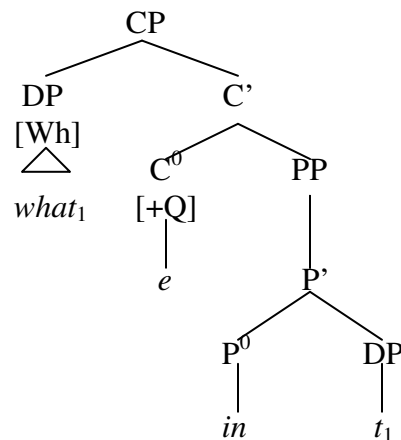
Further corroboration is found in a number of compelling reasons originally offered by Ross (1969)⁶⁵ for positing the syntax of a sluice to contain an interrogative CP. These can be summarized together as follows: 1) SPPs only occur if a predicate both s-selects questions and c-selects CPs⁶⁶; 2) agreement on a verb appearing with a SPP correlates with that of a CP as subject rather than with the *Wh-term* itself (*e.g.* ‘The solutions for some of these problems are self-evident, but for which problems {is/*are} not obvious’); and 3) the syntactic positions available to SPPs are the same as those available to interrogative CPs, (*e.g.* verbal complements, sentential subjects and extra-posed sentential subjects). In the present analysis these facts are collectively accepted as sufficiently establishing a SPP to syntactically comprise an interrogative CP.

The presence of a CP projection in SPP syntax then suggests that the alternative inverted SPP word order is the result of optional *Wh*-movement (or copy+merge in MP) as depicted in (40)a below using the SPP from (38).

⁶⁵ Ross (1969) however proposed the complement of the CP to be a (deleted) IP. He also only makes reference to sluicing constructions in general; but, in keeping with the topic of this paper, SPP is used here instead.

⁶⁶ S-selection refers to θ -role assignment and C-selection to subcategorization.

(40)a.



b. $[Q^a[\mathfrak{F}(\text{BE-IN}(\text{degree}, \alpha_1))]_2]_3 \Leftrightarrow [\text{CP what}_4[\text{PP in } [t_4]_1]_2^{\text{ORPH}}]_3^{\text{IL}}$

From a functional perspective the derivation depicted in (40)a also represents the convergence of two strategies in the grammar for the formation of questions: using a SPP as an indirect question and *wh*-fronting. The correspondences underlying the mismatch between the semantics and the syntax of the SPP derivation in (40)a are shown in (40)b using the notation of Culicover & Jackendoff (2005). In the semantic representation on the left-hand side of (40)a the \mathfrak{F} indicates the proposition implicitly available by the TOPIC property of the antecedent *degree* which is (idiosyncratically) subcategorized to be expressed using the preposition *in*. Furthermore, this proposition contains a *Wh*-variable α bound by the semantic Q operator giving it the meaning of a *Wh*-question. In the syntactic representation on the right-hand side of (40)a the PP is identified as the orphan (*i.e.* the syntactic fragment not locally licensed) out of which the *Wh*-complement has been displaced. The correspondences between the subscripted syntactic components and the subscripted contents of the semantic proposition are responsible via Indirect Licensing for giving the entire clause the interpretation expressed by that proposition⁶⁷.

Two final comments are in order. Based on the proposed IL adaptation to incorporate both explicit and implicit (property related) antecedent propositions, this approach treats both stranded and piedpiped SPPs in a uniform fashion. In Culicover & Jackendoff (2005) these are not treated identically, with the syntactic structure of each stranded SPP being stated separately based on the preposition involved, akin to idioms. This approach also does not account for inability to invert the *Wh*-term *which* in SPPs (*e.g.* The results of several electoral races will be announced but I'm not sure {for which / *which for}). A possible explanation may lie in the proposal by Merchant (2002) that *Wh*-inversion in SPPs is prosodically constrained to monomorphemic *Wh*-terms if *which* is analyzed as a PF reduction of *which one(s)*.

⁶⁷ The subscript correspondences in (40)b do *not* extend to (40)a (*i.e.* the subscripts in (40)a only represent the dislocation of *what*).

5.2. Comparison to some previous accounts.

Since it was first investigated and named by Ross (1969), sluicing has been quite extensively further discussed in Rosen (1976); Williams (1977); van Riemsdijk (1978); Levin (1982); Chao (1987); Lobeck (1991); Ginzburg (1992); Chung, Ladusaw and McCloskey (1995); Romero (1997); Ginzburg and Sag (2000); Lasnik (2001); Merchant (1999), and Potsdam (in press), among others. Most of these accounts make only tangential reference to sluiced constructions which include a preposition, and none of them comprehensively addresses SPPs as a particular variety of sluicing. The accounts formulated by Merchant (1999), Potsdam (in press), and Chung *et al* (1995) are briefly examined in this section as they are representative of recent approaches which have garnered the greatest interest.

5.2.1. MERCHANT (1999).

Merchant analyzes sluicing as movement of a *Wh*-phrase out of a sentential interrogative constituent into [Spec,CP] followed by deletion of the IP node. While this approach is able to adequately account for the connectivity effects associated with sluicing in a straightforward fashion, more is required to explain island insensitivity and other cases in which the reconstructed sluice must be from a structurally non-isomorphic antecedent. A primary insight developed by Merchant is that when necessary a deleted IP in a sluice need not be syntactically parallel to its antecedent IP provided the two IPs are semantically equivalent (*i.e.* each entails the other). Combining this premise with other essentially syntactic adjustment mechanisms, like E-TYPE pronouns,⁶⁸ comprises Merchant's explanation for a subset of islands types which he refers to as having a 'propositional' proper subdomain such as (41) shown with the reconstructed sluice in angled brackets.

- (41) They want to hire someone who speaks a Balkan language, but I don't remember which₁
 < *he*^{E-TYPE} should speak *t*₁ >.

Under this approach the sluiced *Wh*-movement out of such islands types (*e.g.* relative clauses, clausal adjuncts and sentential subjects) is reanalyzed as local extraction which does *not* actually cross an island boundary. Merchant accounts for other islands such as left-branch constructions, COMP-trace, derived position, and coordinate structures as phenomena operating purely at PF and thus not a barrier to movement in sluicing.

No aspect of Merchant's analysis explicitly addresses sluicing examples like (42) in which interpretation of the SPP crucial relies on inferring a proposition made implicitly available by the antecedent, *bruise*, having a SOURCE property.

⁶⁸ *Per* Vehicle Change (Fiengo and May, 1994): nominals can be treated as non-distinct with respect to their pronominal status under ellipsis. Thus a [-pronominal] trace of a relative operator is equivalent to a [+pronominal] correlate, in this case an elided pronoun, *P_e*.

- (42) I woke up this morning with a painful bruise on the back of my arm and couldn't remember what from, and then it hit me!⁶⁹

Merchant's notion of antecedents containing a 'propositional' proper subdomain is limited to embedded propositions (*e.g.* in (41), *who speaks a Balkan language*) and so does not extend to the proposition ...*that a bruise is from something* which is inferred (not embedded) in (42). Nor does (42) appear amenable to Merchant's mutual-entailment solution to non-isomorphism between a sluiced IP and its antecedent as the only explicit proposition involves 'waking up with a bruise' and not 'a bruise being from anything'. Given Merchant's reliance on the lexical content of the antecedent (or its semantic equivalent) to identify the elements of a sluice, it is not clear how his approach could derive the contents a sluice from an inferred proposition.

Merchant's 'pluralistic' view of islandhood enables him to maintain an account in which the internal syntax of a sluice is lexically derived from its antecedent (apart from sluices whose interpretation requires an inferred proposition). This comes, however, at the theoretical cost of both having multiple derivations depending on island type as well as to some extent being telepathic about what lexically underlies a sluice which need only be semantically equivalent to its antecedent. For instance, is reconstructing the sluice in (41) by using an E-TYPE pronoun and the modal *should* any more equivalent to the antecedent than using a resumptive pronoun as in "... but I don't remember which Balkan language they want to hire someone who speaks it"⁷⁰?

5.2.2. POTSDAM (IN PRESS).

Potsdam cites intriguing examples of sluicing in Malagasy which he analyzes as deletion of an IP subsequent to predicate fronting; thus serving as evidence that sluicing need not involve conventional *Wh*-movement in all languages. In Potsdam's analysis the formation of embedded questions in sluicing is restricted to one of two possible question-formation strategies available in Malagasy as his examples in (43-44)⁷¹ show with the reconstructed sluices in angled brackets.

- (43)a. *tsy fantatr' i Soa hoe nahita inona izy* [Wh-in situ question formation]
NEG know Soa COMP see.AT what 3SG.NOM (only with non-subjects)
 Soa₁ doesn't know what she₁ saw.
- b. *tsy fantatr' i Soa hoe inona no hita-ny* [pseudocleft question formation]
NEG know Soa COMP what PRT see.TT-3SG
 Soa₁ doesn't know what she₁ saw.
- c. *nanontany aho hoe iza no mividy ny osy* [pseudocleft question formation]
ask.AT 1SG.NOM COMP who PRT buy.AT the goat
 I asked who is buying the goat.

⁶⁹ <http://profile.myspace.com/index.cfm?fuseaction=user.viewprofile&friendid=52433682>

⁷⁰ a grammatically acceptable variant for some English speakers

⁷¹ *cf* Potsdam (in press) p.7-9; the abbreviations are: ACTOR TOPIC (AT) and THEME TOPIC (TT). Both of the formations in (43) are also available in matrix clauses with the same non-subject/subject asymmetry as shown below.

- (i)a. *nividy inona i Soa* b. *inona no vidin' i Soa* c. *iza no mividy ny osy?*
buy what Soa *what prt buy.TT Soa* *who prt buy.AT the goat*
 What did Soa buy? What is being bought by Soa? Who is buying the goat?

- (44)a. *nandoko zavatra i Bao fa hadinoko hoe inona* <Op_i no nolokoin' i Bao t_i>
paint.AT thing Bao but forget.TT.ISG COMP what-be PRT paint.TT Bao
 Bao painted something but I forget what. <one that was painted by Bao>
- b. *nisy olona nihomehy ka nanotany ianao hoe iza* <Op_i no nehomehy t_i>
exist person laughed and ask.AT 2SG.NOM COMP who-be PRT laugh.AT
 Someone laughed and you asked who. <one that laughed>

In embedded clauses questioning non-subjects the *wh*-term, *inona*, may either remain in-situ as in (43)a, or fronted as part of an alternative construction as in (43)b. Only the latter of these options is available in clauses questioning subjects like that in (43)c. Potsdam analyzes the embedded clauses in (43)b-c as pseudoclefts which he schematizes as in (45)

- (45) [_{PredP/predicate} *Wh*-phrase] [_{DP/subject} Op_i no . . . t_i]

In (45) the *Wh*-phrase is represented as being projected in PredP. The subject of PredP is a headless relative with internal movement of a null operator to the specifier position of the complementizer, *no*. This headless relative raises to [Spec,IP] after which PredP undergoes predicate fronting to a higher Spec position,⁷² thus creating the linear surface order of *wh*-term, PRT and VP (of the headless relative).

The two options in Malagasy for forming full interrogative clauses contrast with the single option for forming sluiced ones in (44) on the assumption that the sluices are underlyingly full clauses. Potsdam arrives at this conclusion by analyzing the sluices in (44) to be the result of IP-deletion subsequent to predicate fronting of the *Wh*-term. If all sluices in Malagasy are structurally pseudoclefts they cannot be syntactically isomorphic to antecedent clause like the one in (44)a. However the semantics associated with the deleted IP of the pseudocleft in (44)a (*one that was painted by Bao*) and the semantics of the antecedent clause (*Bao painted something*) mutually entail each other per Merchant (1999). On this premise Potsdam claims that sluicing in Malagasy (and cross-linguistically, assuming recoverability of IP-ellipsis has a universal formulation) can only be licensed via semantic parallelism as opposed to syntactic parallelism.

In appealing to semantic parallelism this approach can adequately account for the island insensitivity found with sluicing; however, it fails to accommodate cases in which any reconstruction of a sluice would crucially rely on inferring a proposition made implicitly available by a property of the antecedent as in (42). Unfortunately Potsdam does not address the possibility of sluices containing prepositions in Malagasy. Yet even within the scope of the data he examines it remains unexplained, and apparently a stipulation, that sluices containing a non-subject *Wh*-term are necessarily derived from pseudoclefts as opposed to embedded questions formed with *Wh*-in situ.

⁷² Potsdam (in press) is not explicit about this higher specifier position only indicating it to be [Spec,FP] where FP is a functional projection having IP as its complement, and FP itself being the complement of the CP, *hoe*.

5.2.3. CHUNG, LADUSAW AND MCCLOSKEY (1995).

Chung *et al* also advocate an approach in which the internal syntax of a sluice is lexically derived from its antecedent, but in a way their analysis is the inverse of that in Merchant (1999). Rather than viewing the structural contents of a sluice as a redundant constituent which is deleted (or more neutrally, left unpronounced) at PF, they posit the sluiced IP to be a null component at spell-out made interpretable by recycling the antecedent IP at LOGICAL FORM. *Wh*-movement is not part of this analysis as the *Wh*-phrase is taken to be base generated in [Spec,CP]. However, the approach is contingent upon some indefinite within the recycled IP supplying a variable⁷³ for the *Wh*-phrase to bind. When the antecedent IP contains an explicit indefinite, the copy at LOGICAL FORM is free to be bound by the same existential operator binding the variable introduced by the *Wh*-phrase in [Spec,CP]. This process which Chung *et al* call ‘merging’ is illustrated in (43) with the LOGICAL FORM-copied content in bold and merging represented as co-superscription.

- (43) They’re going to serve the guests something, but it’s unclear what^x
they’re going to serve the guests something^x.

Conversely, if the antecedent IP does not contain an overt correlate to the base-generated *Wh*-phrase, Chung *et al* propose a novel LOGICAL FORM operation which they call ‘sprouting’ to supply the needed bindee. This process is shown using in (44) with the sprouted LOGICAL FORM content in bold italic.

- (44) We know that he was eating, but with whom^x **he was eating with *e^x*** isn’t clear.

For Chung *et al* LOGICAL FORM represents a level of structural derivation which accounts for sensitivity to syntactic licensing such as case government observed in recycled and sprouted lexical content.

Although Chung *et al* do not recognize sluicing examples in which interpretation crucially relies on inferring a proposition made implicitly available by a property of the antecedent, their example in (45) foreshadows just such an interpretation for the sluiced *Wh*-term, *whose*.

- (45) I know she talked to a teacher but I don’t know whose.

To quote Chung *et al* (1995 p.269), “. . . *whose teacher* merges with the inner antecedent *a teacher* and the result is a question about the individual related to the teacher, not about the inner antecedent itself.” The reference to merging with *a teacher* is on the premise that in the context of this sentence *a teacher* is understood as implicitly *someone’s teacher*, which is semantically identical to *a teacher of someone* just as *whose* is semantically identical to the SPP of *whom*. By

⁷³ assuming *per* Kamp (1981) and Heim (1982) that indefinites are not quantificational but instead provide a variable (with descriptive content) which is bound via existential closure.

acknowledging that this sluice is functionally a question ‘about the individual related to the teacher’ they are effectively saying (although not intentionally) that the semantics of the sluice require inferring the proposition ...*that a teacher is a teacher of someone* and are crucially not parallel to the explicit proposition ...*that she talked to a teacher*.

Chung *et al* also provide examples like (46).

(46) *Agnes wondered how John could eat but it’s not clear what. (Chung, *et al* 1995)

The deviance of (46) is typically judged by speakers to be, in the words of Chung *et al*, ‘quite pronounced’. Examples like (46) are furthermore considered by them to be evidence of an ‘important asymmetry’ not previously observed and a natural consequence of their analysis: that sluices interpreted by sprouting (*i.e.* containing an implicit correlate) are subject to island effects, unlike sluices interpreted by merger. Thus in (46) the CP *how John could eat* forms a *Wh*-island out of which the *Wh*-phrase *what* may not be grammatically extracted at LF. However, the structurally parallel examples in (47) show that with contrastive sluices extraction from a *Wh*-islands containing an implicit correlate is possible.

- (47)a. Agnes wonders **how** John could eat even if it’s not clear **what**.
 b. It’s clear to Agnes **how** John could eat but it’s not clear **what**.

Whatever may be contributing to the unacceptability of (46), any asymmetry does not appear to have an exclusively structural (*i.e.* island-related) source.

The absence of *Wh*-movement in Chung *et al*’s analysis gives the account a straightforward explanation for the corresponding lack of sensitivity to islands effects in sluicing. However some of the connectivity effects are more problematic. Even if case uniformity can be shown to be imposed under co-superscription at LOGICAL FORM, the facts surrounding preposition stranding remain recalcitrant. Finally, IP recycling must to some extent be telepathic about what lexically comprises a sluice in cases where interpretation requires inferring a proposition made implicit by a property of the antecedent such as in (42).

6. CONCLUSION.

By solely examining sluiced prepositional phrases this paper has revealed a subclass of sluices for which interpretability is unobtainable through direct appeal to a proposition explicitly associated with any antecedent clause. In an exemplar like *I woke up with a bruise but don’t know what from*. the proposition ...*that a bruise is from something*, required to interpret the sluice, is only implicitly available by inferring that the antecedent *bruise* has a SOURCE property. Consequently, any approach relying on either syntactic or semantic parallelism with an antecedent is unable to accommodate this subclass of sluices. In the proposal made here SPPs (and by extension all sluices) are viewed as syntactic fragments pragmatically licensed in the grammar by their ability to indirectly question a property of a semantically compatible and sufficiently salient antecedent.

To probe the implications of this proposal, and ultimately provide further corroboration, an investigation into stranded SPPs and a grammaticality survey were conducted. The results of these efforts provide clear evidence to support the conclusion that stranded SPPs are systematic as opposed to idiosyncratic. Furthermore, the results show factors such as the grammaticalization of prepositions to mark thematic roles, the conventionalized use of prepositions, and the idiosyncratic association of prepositions with individual predicates all serve to establish semantic compatibility with an antecedent as well as strengthen its saliency. While these same factors also explain the predominance of abstract as opposed to spatial uses of prepositions in SPPs, the results of the grammaticality survey show the relative acceptability of SPPs containing a preposition used in a spatial manner, when the context is sufficiently elaborated to make the spatial property of the antecedent prominent.

The status of a SPP as a syntactic fragment associated with a full interrogative proposition reflects a mismatch between its syntax and semantics underlying the claim that the syntactic structure of such sluices comprises a phonetically-null interrogative CP with a PP complement. This structure is pragmatically licensed via an extension of Indirect Licensing (*cf* Culicover & Jackendoff, 2005) to include inferred propositions made implicitly available by a property of a sluice's antecedent. Under this analysis stranded SPPs are the convergence of two question-forming strategies: using a SPP as an indirect question and conventional *Wh*-movement.

The present study has focused only on sluices containing a preposition; however, the conclusions reached are directly applicable to sluicing in general under a view of thematic roles as grammaticalized properties of a predicate. Although the empirical scope here was limited to the English language, additional insight is likely to be gained from examining the pragmatic licensing of sluicing in other languages. Analyzing sluices as indirectly licensed fragments has interesting implications for other ellipsis-related phenomena, particularly bare argument ellipsis, in which interpretability relies on semantic association with an inferred proposition or is otherwise not directly obtainable via syntactic or semantic parallelism. Much still remains to be learned about the workings of the pragmatic inference mechanism involved with associating the contents of a sluice to its antecedent. Further insights into this mechanism are important to better understanding the referencing of propositional content as well as its relationship to the roles of event reference and coherence in the grammar generally.

APPENDIX I

38 Investigated Prepositions

Key

plain font: undisputed to occur in stranded SPPs

bold font: newly attested to occur in stranded SPPs

italic font: no evidence of occurring in stranded SPPs

Ranking by Google hits (in millions)

in	22870
to	22870
of	22810
for	20940
by	19340
on	18830
about	16540
at	16120
from	14670
with	10700
out	8030
up	7600
over	5880
into	5020
through	4290
after	4260
under	3880
off	3500
before	3480
<i>without</i>	3270
between	3100
since	2910
<i>below</i>	2830
around	2780
<i>down</i>	2510
<i>during</i>	2330
<i>above</i>	2010
<i>across</i>	1750
against	1720
<i>inside</i>	1490
<i>outside</i>	1370
<i>near</i>	1280
<i>beyond</i>	1170
behind	1050
until	970
towards	531
<i>beneath</i>	118
<i>beside</i>	77

Ranking in Brown corpus (1,015,945 total words)

of	36410
to	26154
in	21345
for	9489
with	7290
on	6742
at	5377
by	5307
from	4370
out	2096
up	1895
about	1815
into	1791
over	1237
after	1070
before	1016
through	969
<i>down</i>	895
between	730
under	707
off	640
since	628
against	626
<i>during</i>	585
<i>without</i>	583
around	561
until	461
<i>above</i>	296
<i>across</i>	282
behind	258
<i>outside</i>	210
<i>near</i>	198
<i>beyond</i>	175
<i>inside</i>	174
<i>below</i>	145
<i>beside</i>	78
towards	64
<i>beneath</i>	57

APPENDIX II

38 Investigated Prepositions

Key

plain font: undisputed to occur in stranded SPPs

bold font: newly attested to occur in stranded SPPs

italic font: no evidence of occurring in stranded SPPs

	Unique Antecedents	NP Antecedents	VP Antecedents	AP Antecedents	Total Antecedents
by	120	40	80		636
for	90	43	38	9	400
from	77	34	39	4	547
about	60	33	15	12	494
of	58	44	3	11	267
with	49	17	24	8	220
to	25	4	18	3	53
on	15	8	5	2	32
at	12	1	7	4	50
against	14	5	9		87
over	8	4	1	3	29
into	7		7		13
through	6		6		15
in	6	5	1		9
under	4		4		3
towards	2	1	1		3
after	2		2		2
off	2		2		2
up	2		2		2
behind	1	1			1
between	1		2		1
before	1		1		1
around	1	1			1
since	1		1		1
until	1		1		1
out	1		1		1
<i>without</i>					
<i>down</i>					
<i>during</i>					
<i>above</i>					
<i>across</i>					
<i>inside</i>					
<i>outside</i>					
<i>near</i>					
<i>beyond</i>					
<i>below</i>					
<i>beneath</i>					
<i>beside</i>					

APPENDIX III

Representative Sampling of Newly Attested Stranded SPPs

I do fight, but don't really know what against.

<http://www.homepages.hetnet.nl/~appeldoorn-ewp/bpsgb/harm.html>

I stood, raising my hands to defend myself, though I didn't know what against.

<http://theharrow.com/2004/fiction/pictureparadise.html>

They also had to do controlled explosions as safety precautions (don't know what against... maybe booby traps, leftover explosives, etc.)

<http://www.thespacesite.com/community/index.php?showtopic=2011>

Lollerskate, I remember him pissing me off once, but I forget what over.

<http://www.golivewire.com/forums/topic.cgi?topic=71094&start=42>

In my statutory declaration I stated that we were having an argument but I do not remember what over.

<http://www.nt.gov.au/ntsc/doc/judgements/2004/ntmc/ntmc079.html>

"An argument started at the house, we don't know what over," Johnson said.

http://english.people.com.cn/200111/27/eng20011127_85430.shtml

I feel profoundly that I am in the right place being led by God - but I am not sure what into.

<http://www.stphilipstjames.pwp.blueyonder.co.uk/india/indiaupdate.htm>

The style and intention of this site has changed, but I'm not sure what into yet.

<http://www.coldframe.net/log/archives/0311.html>

I think it's mostly evolving. I'm not sure what into.

<http://www.thechurchboard.com/viewtopic.php?bare=1&TopicID=51995>

I'm about to register a .net domain, not sure who through.

<http://www.notmyself.com/archives/2002/04/vote.php>

Apparently she's got her flight, although I don't know who through.

http://www.freelancers.net/show_forum/20011001/

She and I had met each other some years previously, I can't remember who through.

<http://www.hereinmyhead.com/artimp/cindy/interview.html>

Jessie Gates, she's on the forums, not sure what under.

<http://www.sccportal.org.uk/forums/showthread.php?t=3420&goto=nextoldest>

I remember registering though.... I don't remember what under.

<http://www.gotapex.com/forums/archive/index.php/t-49270>

I never played EQ (I think out of spite, but I'm not sure what towards).

<http://forums.gucomics.com/viewtopic.php?p=125955&sid=a34967714bf6191d870e5ce71bef4f74>

APPENDIX III - Continued

Representative Sampling of Newly Attested Stranded SPPs

I feel like I'm progressing but I don't know what towards, yet I feel that me as a spiritual being is doing nothing. http://mixvio.com/ar/2004/06/i_started_to_cr.html

Dave and Lew went to town but I don't know what after.
http://library.ci.fort-collins.co.us/local_history/topics/Anecdotes/anecdotes17.htm

Main character, Sam, is obsessed and his daughter is named Lucy - I'm sure you can guess who after.
<http://www.beatlelinks.net/forums/archive/index.php/t-3436.html>

I did get some but I can't remember who off.
<http://www.flexbeta.net/forums/lofiversion/index.php/t6159.html>

I have had two instant kisses, whatever they are, sent to me and I don't know who off.
<http://journals.aol.co.uk/jenniethebest/THELIFEOFAPREAK/entries/427>

For about that price I get 3 mbit down, I'm not even sure what up, but it sucks.
<http://thatsjustnotright.com/board/lofiversion/index.php/t8198.html>

When the second row pull away, my other team mate Andrew Young #25 also gets into the first corner in 2nd place, I can't say behind who though.
<http://www.motorcross.co.za/Stories/SaldanhaEnduroFromThePack.htm>

Cupcake - mix terrier not sure what between (mother was a mix - don't know about father)
http://www.showdog.com/login/philboard_read.asp?id=19999&recordnum=0

"You've been a caged bundle of frustration ever since--well, you know what since," Richard said.
<http://www.austen.com/derby/judyly7b.htm>

I wanted to beat the living crap out of this guy until he. . . . I don't know what until.
<http://www.kittikity.com/kittiblog/archives/000024.html>

APPENDIX IV**(Grammaticality Survey)****BACKGROUND QUESTIONS:**

What is your native language?

What was the language of instruction in your elementary school?

What was the language of instruction in your high school?

In what language do you feel most comfortable?

In what city (or cities) did you grow up?

INSTRUCTIONS

Please rate each of the following sentences for acceptability on a scale from 1 to 5.

- Choose 1 for completely unacceptable through 5 for perfectly fine.
- There is no need to analyze the sentences.
- There are no right or wrong answers.
- Place your intuitions above any “rules of grammar”.
- Simply circle the number corresponding to your opinion.

PRACTICE

	Unacceptable	Fine
1. This is a great photograph but I'm not sure of who.	1 2 3 4 5	
2. Iraq is now a democracy but I don't know who is the president.	1 2 3 4 5	
3. They got into another argument but I forget over what.	1 2 3 4 5	
4. They often forget to shut but I don't remember off what.	1 2 3 4 5	

If you have no further questions, please complete the next page (front *and* back).

		MEAN
1. He wrote a short story but I don't remember about what.	1 2 3 4 5	3.76
2. The children appear to be sliding but I can't see <u>down</u> what.	1 2 3 4 5	3.30
3. The chair <i>pro temp</i> has greater authority although I'm not sure <u>beyond</u> who.	1 2 3 4 5	3.16
4. He recently appeared in a TV commercial but I don't remember for what.	1 2 3 4 5	4.08
5. The evidence is buried but we have no idea <u>beneath</u> what.	1 2 3 4 5	3.28
6. He's now second in command but I don't know <u>below</u> who.	1 2 3 4 5	3.28
7. They're going to Paris but haven't decided what will they see.	1 2 3 4 5	3.12
8. He's obviously pointing but it's not clear at who.	1 2 3 4 5	4.18
9. He has three nieces but he doesn't remember what their ages are.	1 2 3 4 5	4.68
10. They're hiring a replacement but won't say for who.	1 2 3 4 5	4.20
11. Protestors disrupted the Olympics but I'm not sure during what.	1 2 3 4 5	2.90
12. He went skiing in the Alps but didn't say down what.	1 2 3 4 5	2.30
13. He's looking for a convenient location but I'm not sure <u>near</u> what.	1 2 3 4 5	3.16
14. They will exclude the worst scores although I don't know below what.	1 2 3 4 5	2.46
15. I saw the horse racing but I don't remember by what.	1 2 3 4 5	2.00
16. He seems very annoyed but I have no idea at what.	1 2 3 4 5	3.58
17. The FDA has begun testing but they won't say on who.	1 2 3 4 5	3.92
18. The mayor received a death threat but he won't reveal from who.	1 2 3 4 5	4.04
19. The hikers reported having to jump but I don't know <u>across</u> what.	1 2 3 4 5	3.60
20. The remains were clearly outer fortifications but archeologists couldn't imagine <u>outside</u> what.	1 2 3 4 5	3.00
21. I can see the smoke rising but I'm not sure <u>above</u> what.	1 2 3 4 5	3.38
22. The surgeon did find a tumor but you'll never guess <u>inside</u> who.	1 2 3 4 5	3.52
23. The US is sending thousands of troops abroad but isn't sure who are they to attack.	1 2 3 4 5	2.58
24. We have no doubt he's loyal although we're not sure to who.	1 2 3 4 5	3.88

		MEAN
25. I see a lot of coins scattered but I'm not sure about what.	1 2 3 4 5	1.68
26. She found a stain on her new blouse but she had no idea from what.	1 2 3 4 5	4.10
27. He was promoted but I don't know <u>above</u> who.	1 2 3 4 5	3.20
28. Management promised not to consider any other candidates but didn't say outside who.	1 2 3 4 5	1.82
29. They want a new bridge but I can't figure out across what.	1 2 3 4 5	2.90
30. Smugglers had concealed the stolen painting but authorities weren't sure <u>inside</u> what.	1 2 3 4 5	3.12
31. She never remembers to turn but I forget on what.	1 2 3 4 5	1.50
32. We won two free tickets but I don't remember to what.	1 2 3 4 5	4.02
33. I heard a new love song but I can't remember by who.	1 2 3 4 5	3.54
34. The drain is definitely clogged but it's not clear with what.	1 2 3 4 5	3.98
35. He bought the adjacent property but he didn't say <u>near</u> what.	1 2 3 4 5	3.14
36. He said he found another solution although he didn't say beside what.	1 2 3 4 5	2.04
37. The student was accused of sleeping but I'm not sure during what.	1 2 3 4 5	2.86
38. The team expects to win even with one less player but I can't imagine without who.	1 2 3 4 5	2.26
39. He has three nieces but he doesn't remember what are their ages.	1 2 3 4 5	2.78
40. Our coach has a lot of confidence although we're not sure in who.	1 2 3 4 5	3.42
41. They're going to Paris but haven't decided what they will see.	1 2 3 4 5	4.76
42. She's in love again but you'll never guess with who.	1 2 3 4 5	4.46
43. The police found another tunnel but haven't said beneath what.	1 2 3 4 5	2.92
44. She sat in the bleachers but couldn't remember <u>beside</u> who.	1 2 3 4 5	3.28
45. He's willing to test his limits but isn't sure beyond what.	1 2 3 4 5	2.90
46. Despite losing equipment John attempted the expedition although we didn't know without what.	1 2 3 4 5	1.98
47. The US is sending thousands of troops abroad but isn't sure who they are to attack.	1 2 3 4 5	3.56
48. My cousin recently earned a second degree but I'm not sure in what.	1 2 3 4 5	4.12

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