

GAPS, GHOSTS AND GAPLESS RELATIVES IN SPOKEN ENGLISH¹

Chris Collins, New York University

Andrew Radford, University of Essex

Abstract

This paper looks at the syntax of so-called *gapless* relative clauses in spoken English. §1 contrasts *gap relatives* (like that italicised in ‘something *which I said*’, in which there is a gap internally within the relative clause associated with the relativized constituent) with *gapless* relatives (like that italicised in ‘They were clowning around, *which I didn’t really care until I found out they had lost my file*’, in which there is no apparent gap within the relative clause). In §2, we note that a number of recent analyses take *which* to function as a subordinating conjunction in gapless relatives, but we argue against this view and provide evidence that the *wh*-word in such clauses is indeed a relative pronoun. In §3, we argue that the relative pronoun in gapless relatives serves as the object of a ‘silent’ preposition. In §4, we present an analysis under which a preposition can be silent when it (or its containing PP) undergoes a type of deletion operation called *Ghosting*. §5 shows how Ghosting (like other deletion operations) can serve to rescue structures which would otherwise induce constraint violations. §6 discusses gapless relatives which have a Topic-Comment interpretation, and argues for an extended Ghosting analysis under which a predicate of SAYING associated with the ghosted preposition is also ghosted. Our overall conclusion is that supposedly ‘gapless’ relatives are more properly analysed as containing a gap created by relativization of the object of a ghosted preposition.

1. Introduction

Relative clauses in English typically involve a *gap* internally within the relative clause in a position associated with the relativized constituent – as illustrated by the bracketed restrictive relatives below (where --- marks a gap):

- (1) a. the picture [which Bill saw ---]
- b. the picture [that Bill saw ---]
- c. the picture [Bill saw ---]

In WH RELATIVES like (1a), the relative clause is introduced by a WH constituent; in COMP RELATIVES like (1b), the relative clause is introduced by a complementiser like *that*; and in ZERO RELATIVES like (1c), there is no overt WH constituent or complementiser introducing the relative clause. Under movement-based accounts of the syntax of relative clauses, the gap in the relative clause arises via movement of a constituent which originates in the position marked by the gap and moves to the edge of the bracketed relative clause. Under the WH-MOVEMENT analysis of Chomsky (1977), the moved constituent is a *wh*-operator (overt in the case of 1a, and null in the case of 1b,c) which moves to the edge of CP, so that (1a) has a structure like (2a) below; on the alternative ANTECEDENT RAISING analysis of Kayne (1994), it is the antecedent *picture* which moves to the edge of CP, so that (1b) has a structure like that shown in (2b):

- (2) a. [DP [D the] [NP [N picture] [CP *which* [C \emptyset] Bill saw ---]]]
- b. [DP [D the] [CP *picture* [C that] Bill saw ---]]]

In either case, movement of the italicised constituent leaves a gap behind in the relative clause.

Alongside *gap* relatives, spoken English also has *gapless* relatives (i.e. structures in which there appears to be no gap within the relative clause associated with the relativized constituent). Gapless appositive relatives have been discussed (among others) by Kjellmer (1988, 2010), Miller (1988, 1993), Kuha (1994) and Loock (2005, 2007, 2010). Illustrative examples of such clauses cited by the linguists in question are bracketed below:

- (3) a. And I have to stay on to May, [**which** when I'm 16 in March I could be looking for a job] (Miller 1993)
b. She gained a half pound, [**which** they were predicting she'd gain five pounds] (Kuha 1994)
c. And she decided to move out, [**which** I think she's crazy] (Loock 2007)

The appositive relative clauses introduced by *which* in sentences like (3) are gapless in the sense that *which* is not associated with any obvious gap in the clause (e.g. there appears to be no subject, object or adjunct gap in the *wh*-clause which could have arisen by moving *which* out of the gap position to the front of the relative clause). However, we argue in this paper that so-called gapless relative clauses involve a relative pronoun used as the object of a 'silent' preposition which undergoes a specific type of deletion operation termed *Ghosting* and we show that the Ghosting analysis is superior to alternative analyses of gapless relatives. The illustrative examples we use (unless otherwise specified) come from a corpus collected by Anonymous of non-canonical clause structures found in recordings of live, unscripted British radio and TV broadcasts: we will refer to this as the *British Broadcast English/BBE* corpus³. We begin (in the next section) by outlining (and arguing against) an analysis which claims that *which* in gapless appositives has become grammaticalised as a conjunction or connective.

2. A conjunction analysis

Miller (1993), Kuha (1994) and Loock (2005, 2007, 2010) all argue that *which* in gapless relative clauses like those in (3) has lost its status as a relative pronoun in present-day English and instead become grammaticalised as a subordinating conjunction like *although* – a claim which is far from implausible in principle, given that van Gelderen (2009) has documented cases of re-analysis of pronouns as conjunctions in a wide range of languages. More specifically, Miller (1993, p.113) claims that (in gapless appositives) *which* “is not a relative pronoun tying a relative clause to a particular noun but functions to signal a connection between the preceding chunk of text and the following one.” Noting that relative *that* was originally a pronoun and subsequently became reanalysed as a conjunction, he comments in relation to sentences like (3a) that ‘It seems as though *which* is following the same path’ (the apparent implication being that *which* functions as a conjunction in this use). Likewise, Kuha (1994: 1) argues that gapless relatives are used by a wide variety of (both British and American) speakers from differing backgrounds and age groups. She further claims (1994: 3) that ‘This *which* does not carry out the function of a relative pronoun’ and instead categorises it as a *connective*, drawing parallels with uses of the (subordinating) conjunction *because*. In a similar vein, Loock (2007:75) claims that gapless Appositive Relative Clauses/ARCs introduced by *which* are not relative clauses because ‘No gap is apparent in the ARC and also, no antecedent seems to be systematically retrievable for the relative’. He concludes that *which* in gapless relatives is a simple connective (i.e. a conjunction).

A key claim underpinning Loock's analysis of *which* as a conjunction (made explicit in the quotation at the end of the previous paragraph) is that *which* cannot be a relative pronoun in gapless relatives because it has no antecedent in such structures. Against this, however, it can be countered that the preceding clause is the antecedent of *which* in sentences like (3) – e.g. *She decided to move out* is the antecedent of *which* in (3c). Further evidence that *which* does indeed have an antecedent in gapless appositives comes from the observation that (as examples like those below illustrate), sometimes *which* has an (italicised) nominal antecedent:

- (4) a. *The right deal here* (**which** I'm just thinking about conservative voters) isn't for Labour to get into bed with the Lib Dems (Tony Livesey, BBC Radio 5)
- b. Let's talk about *the economy*, **which** we're all going to be paying back taxes for God knows how long (Ian Collins, Talk Sport Radio)
- c. Then you've got *your right side*, **which** I think Aaron Lennon coming back against Man United was a good sign for England (Perry Groves, BBC Radio 5)
- d. All we've had so far are *words*, **which** frankly we need to see the numbers (Economics reporter, BBC Radio 5)
- e. We want reaction from *the Southampton dressing-room*, **which** the door remains firmly shut (Keith Hill, BBC Radio 5)
- f. There's always *the Landon Donovan approach*, **which** Landon Donovan said: "You know what, I make plenty of money, I'm happier playing for Major League Soccer" (Sean Wheelock, BBC Radio 5)
- g. There's also the stunning crash on *the Tour de France*, **which** I watched the highlights last night and I was amazed at what happened (Adrian Durham, Talk Sport Radio)
- h. Look at *the passes* (724 against 199), **which** Arsenal are generally known as a passing team (Terry Gibson, Sky Sports TV)
- i. Neighbours have described *a horrendous fire*, **which** even though the fire engine arrived within three minutes, the two children still died (Reporter, BBC Radio 5)

Furthermore, *which* is not the only wh-pronoun used in gapless appositives. As the examples below illustrate, *who* also occurs in gapless appositives:

- (5) a. They're complaining to the referee about *Cristiano Ronaldo*, **who** possibly it was a foul on Gonzalez (Terry Gibson, Sky Sports TV)
- b. He was tackled by *Vincent Kompany*, **who** it was a bit of a rash challenge, but it was a decent one (Craig Burley, BBC Radio 5)
- c. Now it's 1-0 to *Villa*, **who** we've just been saying it's a goal against the run of play (Connor MacNamara, BBC Radio 5)
- d. He lobbed the ball in for *Lee*, **who** I've gotta say it was an excellent finish (Listener, BBC Radio 5)
- e. If there's no money available, then why not tell *the fans*, **who** some pay 5 or 6 grand for a season ticket]? (Alan Brazil, BBC Radio 5)
- f. You take Theo Walcott off and replace him with *Rosicky*, **who** Walcott's a better player than Rosicky (Listener, Talk Sport Radio)

- g. The name that sticks out for me is *Lee Clark*, the former Huddersfield Town manager, **who** the eyebrows were raised when he lost that job in the first place (Colin Murray, BBC Radio 5)

The choice between *which* and *who* is determined by the gender properties of the (italicised) antecedent, with *who* being used where there is a human antecedent (like *Cristiano Ronaldo* in 5a) and *which* being used where there is a non-animate antecedent (either an inanimate nominal antecedent like *the right deal* in 4a, or a genderless clausal antecedent like *She decided to move out* in 3c). This makes it clear that wh-words do indeed have potential (nominal or clausal) antecedents in gapless relatives, and thus makes it more plausible to suppose that they are relative pronouns.

Moreover, there is evidence against analysing the wh-word as a conjunction or connective. Recall that Loock (2007) suggests that *which* in gapless appositives like those in (3) serves the function of being a CONNECTIVE which “relates or links two clauses, one of which is subordinate to the other” (2007: 79). This suggests that *which* in gapless appositives is a *subordinating conjunction* in the relevant use⁴. On this view, *which* in a sentence such as:

- (3) b. She gained a half pound, *which* they were predicting she’d gain five pounds (Kuha 1994)

would have much the same function as a subordinating conjunction like *although*, and would serve to link a subordinate clause introduced by *which* to a main clause.

However, there are at least four aspects of the subordinating conjunction analysis which are potentially problematic. Firstly (as illustrated below), the *which*-clause cannot be positioned in front of the main clause, even though this is possible with subordinate clauses introduced by a typical subordinating conjunction like *although*:

- (6) a. She gained half a pound, *which/although* they were predicting she’d gain 5 pounds
 b. *Although/*Which* they were predicting she’d gain 5 pounds, she gained half a pound

Secondly (as illustrated below), *which* cannot be modified by the kind of adverbial (like *even*) which can be used to modify a subordinating conjunction:

- (7) a. She gained a half pound, (*even*) **though** they were predicting she’d gain five pounds
 b. She gained half a pound, (**even*) **which** they were predicting she’d gain five pounds
 c. He asked Mary, and (*even*) **she** didn’t know the answer
 d. He asked Mary, (**even*) **who** didn’t know the answer

As the examples in (7) illustrate, *even* can modify a subordinating conjunction like *though* or a non-relative pronoun like *she* but not a relative pronoun like *who*. The fact that *even* cannot modify *which* in a gapless relative like (7b) therefore suggests that *which* is a relative pronoun.

Thirdly, as noted earlier, the antecedent of *which* in sentences like those in (4) is nominal rather than clausal, thereby undermining any analysis of *which* as a conjunction linking two clauses. Fourthly, *who* is used in place of *which* when the antecedent is human (as illustrated in 5 above), and typical subordinating conjunctions in English are not gender-sensitive in this way.

By contrast, the four properties noted in the previous paragraph can be given a straightforward characterisation if the wh-word in gapless appositives is treated as a relative pronoun. The fact that the *which*-clause follows the main clause in sentences like (6)

follows from the relative pronoun analysis, in that appositive clauses cannot precede their antecedents. The fact that appositive *which* cannot be modified by an item such as *even* (which can nonetheless modify subordinating conjunctions like *though/if/after* etc.) can be accounted for if *which* in gapless appositives is a relative pronoun, since relative pronouns cannot be modified by such items (as we see from 7d). Likewise, the fact that the wh-word has a (nominal or clausal) antecedent in gapless appositives follows from its status as a relative pronoun. Furthermore, the gender-sensitivity of the wh-word (*who* being used when there is a human antecedent, *which* when there is not) can be treated as a lexical property of the individual relative pronoun in question.

A further piece of evidence in support of analysing gapless appositives as introduced by a relative pronoun rather than a subordinating conjunction is that gapless relatives are found not only in appositive clauses, but also in restrictive relatives like those below which are introduced by a (bold-printed) wh-pronoun:

- (8) a. He's *someone* [**who** even my old gran can bat better] (Geoff Boycott, BBC Radio 5 Sports Extra)
 b. He's *a fellow* [**who** it often seems that the glass is half empty] (Tim Vickery, BBC Radio 5)
 c. West Brom had *a couple of crosses* [**which** the keeper looked a bit iffy] (Robbie Savage, BBC Radio 5)
 d. One-nil is always *a score* [**which** you can get back in] (sc. 'into the game'; Robbie Savage, BBC Radio 5)
 e. He crossed *a ball* [**which** Sam Allardyce, he wasn't too happy with his defenders] (Danny Mills, BBC Radio 5)

Moreover, alongside gapless wh-restrictives like those above, we also find gapless restrictive relatives introduced by the finite complementiser *that* (as in 9a,b), or the infinitival complementiser *for* (as in 9c,d), or a null finite complementiser (as in 9d,e), or a null infinitival complementiser (as in 9f,g):

- (9) a. There are a couple of guys [**that**, who knows, something might happen one day] (Web Mistress, Talk Sport Radio)
 b. It was also a club [**that** we knew there was a problem] (Steve Claridge, BBC Radio 5)
 c. This is a matter [**for** people to make their minds up] (Dave Watts, BBC Radio 5)
 d. Chelsea's a very much more difficult club [**for** him to go] (Jason Burt, Talk Sport Radio)
 e. This is something [I think we've spoken before on *Up All Night*] (Reporter, BBC Radio 5)
 f. It's something [we are working with our suppliers] (Businessman, BBC Radio 5)
 g. That's difficult [to make a judgment] (Civil servant, BBC Radio 5)
 h. It's a chance to give the two big lads something [to go and attack you] (Davie Provan, Sky Sports TV)

Since this is precisely the range of complementisers found in gap-containing restrictive relatives, it strengthens the case for positing that gapless relatives are indeed relative clauses.

Moreover, the BBE corpus also contains gapless free relative clauses introduced by the free relative pronoun *what*, like those below:

- (10) a. [**What** we need to make sure] is that we don't get too hysterical (Labour party blogger, BBC Radio 5)
- b. [**What** it's persuaded me] is that it's a lot more complicated (Listener, BBC Radio 5)
- c. [**What** there was evidence tonight] was a desire to win (Mark Chapman, BBC Radio 5)
- d. [**What** we're all waiting now] is the knock-on effect on Chelsea (Reporter, Sky Sports TV)
- e. [**What** I would agree with the caller], though, is that in the modern game you can get two soft yellows (Darren Fletcher, BBC Radio 5)
- f. [**What** he went wrong] was to come sliding in, in these conditions (Jimmy Armfield, BBC Radio 5)

The overall conclusion which such examples lead to is that gapless relatives occur in restrictive relatives, appositive relatives and free relatives alike, and that the wh-word in such structures is a relative pronoun (and not e.g. a conjunction).

Furthermore, just like typical relative pronouns, the wh-word in gapless relatives is positioned on the leftmost edge of the clause it introduces and so precedes other (italicised) peripheral constituents, which in turn precede the (underlined) subject – as illustrated below:

- (11) a. He crossed *a ball* [**which** *Sam Allardyce*, he wasn't too happy with his defenders] (Danny Mills, BBC Radio = 8e)
- b. The referee showed him a red card, [**which** *what else could he* have done in the circumstances?] (Alan Brazil, Talk Sport Radio)
- c. I'm sure Harry will send Crouch and Keane out, [**which** *if he gets money for either*, the club will be very pleased] (Ian McGarry, BBC Radio 5)
- d. He's a fabulous player [**who**, *given the right conditions and the right management*, we could be talking about one of the best players in the world] (Sid Lowe, Talk Sport Radio)
- e. We played them once at Barbados, [**which** *obviously we* know what the Aussies are all about] (Stuart Broad, BBC Radio 5)

The wh-word precedes an (italicised) dislocated topic in (11a), a fronted interrogative wh-constituent (and an inverted auxiliary) in (11b), and a variety of clausal or phrasal peripheral adjuncts in (11c-e). The position of the wh-word on the leftmost edge of the relative clause may reflect a requirement for a relative pronoun to be as close to its antecedent as possible (perhaps in order to facilitate antecedent identification). If we use the traditional label CP to denote the highest projection in the clause periphery, we can conclude that the wh-word is positioned on the edge of CP in gapless relatives⁶. But how does the wh-word come to be positioned on the outer periphery of the clause, and how is it linked to the inner core of the relative clause? In the next section, we provide a novel answer to this question.

3. Silent prepositions

An interesting property of gapless relative clauses is that they have a close paraphrase in which an (overt or null) wh-pronoun serves as the object of a preposition. For example, each of the bracketed gapless relative clauses in (12) below can be paraphrased as a

structure containing a silent preposition (below enclosed in angle brackets, but not pronounced):

- (12) a. When I went over there, they were clowning around, [which I didn't really care <about> until I found out they had lost my file] (unidentified American informant, Kuha 1994)
- b. Laura Maxwell is with someone [who I think, Laura, that's happened <to>] (Aasmah Mir, BBC Radio 5)
- c. That's the situation [that Obama and to some extent the party find themselves <in>] (American reporter, BBC Radio 5)
- d. It was one [that the whole team played a big part <in>] (Mike Gatting, BBC Radio 5)
- e. He's had a fine game, the Slovakian, for a Liverpool side [that Roy Hodgson has made 7 changes <to>] (Darren Fletcher, BBC Radio 5)
- f. It was also a club [that we knew there was a problem <with>] (Steve Claridge, BBC Radio 5)
- h. The one [he got Strauss out <with>] was excellent (Geoff Boycott, BBC Radio 5 Sports Extra)
- g. The penultimate game [that you took charge <of> at Chesterfield], you lost one-nil (Pat Murphy, BBC Radio 5)

There is evidence that the preposition must be present in the syntax of such sentences (albeit it is given a 'silent' pronunciation at PF). The evidence comes from the fact that non-wh counterparts of the relativized constituent require an (italicised) preposition to introduce them, as we see from:

- (13) a. I didn't really care **(about)* that
- b. That's happened **(to)* her
- c. Obama and the party find themselves **(in)* a difficult situation
- d. The whole team played a big part **(in)* that one
- e. Roy Hodgson has made 7 changes **(to)* the Liverpool side
- f. There was a problem **(with)* the club
- g. He got Strauss out **(with)* a bouncer
- h. You took charge **(of)* the game at Chesterfield

But if (as we claim) structures like those in (12) involve relativisation of the object of a preposition, how does the preposition come to be 'silent'?

One possible answer is suggested by work by Caponigro and Pearl (2008, 2010) on free relative clauses like those bracketed below in which an (italicised) wh-pronoun in a nominal position (serving as the direct object of a transitive verb) is associated with a PP gap inside the relative clause:

- (14) a. Lily adores [*where* this very tree grows <PP>]
- b. Lily dreaded [*when* Jack had to go <PP>]
- c. Lily loathes [*how* all thieves work <PP> secretly]

Caponigro and Pearl justify the claim that the wh-pronoun is in an NP position and is associated with a PP gap (inter alia) by the observation that the relevant structure is paraphraseable as a relative clause structure containing a relativized prepositional object with a nominal antecedent (e.g. the *where*-clause in 14a is paraphraseable as '*the place in*

which this very tree grows’). The analysis they propose for ‘silent preposition’ structures like (14) claims that the *wh*-word originates as the object of a silent counterpart of the preposition *in*, and then the *wh*-word (which they take to be an NP) undergoes *wh*-movement to spec-CP on its own, leaving the empty preposition stranded in situ. On this view, the bracketed relative clause in (14a) has the following superficial structure:

(15) Lily adores [_{CP} where [_C \emptyset] this tree grows [_{PP} [_P \emptyset] <where>]]

They further maintain that *where/when/how* can be used as the complement of a silent preposition not only in free relative clauses like those in (15), but also in interrogative clauses like (16a) below, which they take to have a structure like (16b):

(16)(a) Where did Lily sleep?

(b) [_{CP} Where [_C did] Lily sleep [_{PP} [_P \emptyset] <where>]]

They claim that (in such structures) *where/when/how* are base-generated as the complement of a preposition which can be silent when it has an interpretation which matches that of the *wh*-pronoun: consequently, a locative preposition can be silent when it has the locative complement *where*, a temporal preposition can be silent when it has the temporal complement *when* and a manner preposition can (and, they claim, *must*) be silent when it has the manner complement *how*.

They argue that their ‘silent preposition’ analysis gains independent motivation from the fact that the *wh*-word can serve as the object of a (bold-printed) overt preposition in a free relative clause such as that bracketed below:

(17) Jack disliked [where we just ran **past** <where>] because it smelled funny

The fact that *where* can serve as the object of an overt preposition like *past* in a structure like (17) adds plausibility to the claim that *where* can serve as the object of a silent preposition in a structure like (16b), they maintain. Moreover, they note that independent research by Emonds (1976, 1987) and McCawley (1988) has argued for the presence of a silent preposition in so-called *adverbial NPs* such as those italicised below:

(18) a. John arrived *that day/Sunday/yesterday*

b. You have lived *there/few places that I like*

c. You pronounced my name *that way/every way one could imagine*.

The italicised NP (they claim) serves as the complement of a preposition which is a silent counterpart of temporal *on* in (18a), of locative *in* in (18b), and of manner *in* in (18c).

Although Caponigro and Pearl do not discuss gapless relatives, their ‘silent preposition’ analysis of free relatives and adverbial NPs could potentially be extended to account for these if we were to posit that (in spoken English) a relative pronoun like *which/who* (or a null counterpart) can be used as the object of a silent preposition. If so, the relative clause bracketed in (12a) would have a structure along the following lines:

(19) [_{CP} which [_C \emptyset] I didn’t really care [_{PP} [_P \emptyset] <which>] until I found out...]

The relative pronoun *which* would originate as the complement of a silent counterpart of the preposition *about* in (19), and *which* would subsequently move to spec-CP on its own, leaving the silent preposition stranded.

However, there are a number of problems which would face the ‘silent stranded preposition’ analysis of gapless relatives sketched in (19). One such is *interpretive* in nature. In this respect, it should be noted that there is a clear interpretive asymmetry between the standard English ‘silent preposition’ structures discussed by Caponigro and

Pearl and their non-standard spoken English gapless relative counterparts discussed by us. In standard English ‘silent preposition’ structures, the preposition has a narrow range of (place/time/manner) interpretations, with the semantic properties of the preposition matching (and so being able to be inferred from) those of its complement – e.g. a silent preposition is interpreted as having a locative interpretation when it has a locative *where* complement in a structure like (15). This in effect means that a preposition can only be silent when its content can be inferred from its complement. However, no such *matching* effect holds between the preposition and its complement in gapless relative clauses like those in (19) and (12): e.g. *which* has no specific interpretive properties that would allow the null preposition in (19) to be interpreted as a null counterpart of *about*. Given that an unrestricted range of prepositions can be ‘missing’ in gapless relative, an analysis like that in (19) would seemingly require us to suppose that the missing preposition has a potentially unrestricted interpretation which cannot be inferred from the relative pronoun and which has instead to be inferred from syntactic, semantic and pragmatic clues: this would create a clear asymmetry with the silent preposition structure posited by Caponigro and Pearl in (14-18).

A second problem posed by the silent preposition analysis is *distributional* in nature. Silent prepositions in Caponigro and Pearl’s analysis are said to occur in free relative clauses like (14), interrogatives like (16) and in situ adverbial nominals like (18) in standard varieties of English. However, the kind of non-standard ‘missing’ preposition structures which we are concerned with here are restricted to occurring in relative clauses in our recordings ($n = 243$), there being no clearcut interrogative examples⁷, and no in situ adverbial examples. Thus, there is a clear distributional asymmetry between the relatively wide range of contexts in which silent prepositions occur in standard varieties of English (relative clauses, interrogative clauses, and in situ adverbials) and the much narrower range of contexts (only relative clauses) in which prepositions can be silent in non-standard varieties of spoken English. The analysis which we will develop in the next section accounts for this distributional asymmetry, but we see no principled way of accounting for it in terms of the kind of silent preposition structure posited by Caponigro and Pearl.

A third problem posed by the silent preposition analysis relates to the fact that a core assumption of Caponigro and Pearl’s analysis which they make explicit (2008:5 and 2010: 159; fn.3) is that ‘silent Ps are always stranded’ when they have a *wh*-object. However, our recordings contain relative clauses such as the (a) examples in (20-25) below in which *unstrandable* prepositions are silent, as we see from the paraphrases of the relative clauses in the corresponding (b, c) examples:

- (20) a. If we don’t get rain in the next week, then water levels will have reached the point [that we will need to impose a hose-pipe ban] (Water company spokesman, BBC Radio 5)
 b. ...the point [*at which* we will need to impose a hose-pipe ban]
 c. ...*the point [*which* we will need to impose a hose-pipe ban *at*]
- (21) a. Manchester United have got a good goalkeeper, [which Torres could’ve had a goal] (Peter Allen, BBC Radio 5)
 b. ...[*without which* Torres could’ve had a goal]
 c. ...*[*which* Torres could’ve had a goal *without*]
- (22) a. We didn’t get the standards physically, [*which* obviously we’ve lost the game]

(Steve Bruce, BBC Radio 5)

- b. ...[*because of which* obviously we've lost the game]
 - c. ...*[*which* obviously we've lost the game *because of*]
- (23) a. There's always the Landon Donovan approach, [*which* Landon Donovan said: "You know what, I make plenty of money, I'm happier playing for Major League Soccer"] (Gary Richardson, BBC Radio 5 = 4f)
- b. ...[*in which* Landon Donovan said "You know what, ..."]
 - c. ...*[*which* Landon Donovan said *in* "You know what, ..."]
- (24) a. It's an environment [that people are trying to get better] (Gabby Logan, BBC Radio 5)
- b. ...[*in which* people are trying to get better]
 - c. ...*[*which* people are trying to get better *in*]
- (25) a. Players need to play on a level [which you know what you're going to get out of them] (Ray Parlour, Talk Sport Radio)
- b. ...[*at which* you know what you are going to get out of them]
 - c. ...*[*which* you know what you're going to get of them *at*]

The fact that the (a) examples only allow a paraphrase with a pied-piped preposition (and not one with a stranded preposition) calls into question Caponigro and Pearl's central assumption that prepositions with wh-objects can only be silent when stranded.

Having examined (and argued against) the possibility that gapless relatives involve relativisation of the object of a silent stranded preposition, we now turn to develop a novel *deletion* analysis in the next section.

4. Ghosting

An alternative to a silent preposition analysis of missing prepositions in gapless relatives is to suppose that prepositions go missing via a *deletion* operation of some kind. One way in which prepositions can be deleted is via Ellipsis. In this connection, consider how the angle-bracketed preposition comes to be 'silent' in the following:

- (26) a. The fact that it was against the opposition [that it was <against>], does that make it even more special? (Interviewer, Sky Sports TV)
- b. That's why I'm in the position [I am <in>] (Mark Webber, BBC Radio 5)
 - c. The teams are in the colours [you'd expect them to be <in>] (Nigel Adderley, BBC Radio 5)

The reason why the preposition inside the bracketed relative clause is unpronounced is that it undergoes the same form of Ellipsis (involving Antecedent-Contained Deletion) as that which results in the angle-bracketed verb phrase being elided in sentences such as the following:

- (27) The fact that you were playing against the opposition [that you were <playing against>], does that make it feel even more special?

This raises the question of whether all 'silent' prepositions in gapless relatives can be taken to be the result of Ellipsis.

The answer is 'No', for the following reason. Cases of Ellipsis involve a constituent being given a null spellout when it has an *antecedent*. However, only 19/243 (8%) of the gapless relatives in our recordings were structures like (23) where the 'missing' preposition in the relative clause had an antecedent in the matrix clause; the overwhelming majority of

gapless relatives with ‘missing’ prepositions in our recordings (224/243 = 92%) were antecedentless. How do such structures come about? What we shall argue in this section is that they are the result of a different type of deletion operation which Collins and Postal (2012) term *Ghosting*. They argue for the need to distinguish

ellipsis (i.e., deletion linked to the need for some type of antecedent) from what we will call *ghosting*. The latter term will denote the grammatical deletion of elements whose deletion does *not* depend on the existence of any antecedent phrase

[Collins and Postal, 2012: 32]

In this section, we argue that gapless relatives containing missing antecedentless prepositions arise when a preposition or prepositional phrase undergoes *Ghosting*.

As already noted, an interesting property of the kind of preposition ghosting found in our recording is that it occurs only in structures in which the object of the preposition undergoes wh-movement, and not in structures in which the prepositional object remains in situ. So, for example, we have no examples of structures like those in (13) in which an italicised in situ preposition undergoes Ghosting (as we see from the ungrammaticality of ghosting *about* in 13a **I didn't really care <about> that*). This observation suggests possible parallels with structures such as the following (discussed by Kayne 2005 and Collins 2007), in which an italicised preposition which can be overt in (28) is obligatorily silent when it undergoes WH-MOVEMENT in (29):

(28) a. Where did you go (*to*)?

b. Where is he staying (*at*)?

(29) a. (**To*) where did he go?

b. (**At*) where is he staying?

Collins (2007) accounts for the pattern in (28-29) as follows. Following Katz and Postal (1964: 128, 135) he posits that English *r*-pronouns (like *here*, *there* and *where*) are the objects of the prepositions *to/at* in sentences like (28-29). Following van Riemsdijk (1978: 41; 87), Collins further claims (2007: 4) that ‘*r*-pronouns obligatorily move to the specifier of TO/AT in English’, by an operation which we will call *Prepositional Inversion* (because it inverts the order of the preposition and its object)⁸. This results in the structure below (in which *where* moves from being the complement to becoming the specifier of the preposition *to/at*):

(30) [PP *where* [P *to/at*] <where>]

Following Koopman (2000) and Koopman and Szabolsci (2000), Collins posits that a structure like (30) violates a generalised version of the Doubly Filled COMP Filter of Chomsky and Lasnik (1977), which can be given the following formulation for present purposes (differing in inessential ways from Collins 2007):

(31) **Edge Constraint**

No more than one position on the edge of a phase can be filled by an overt constituent

(Collins takes phases to include CP, vP, PP and DP). The Edge Constraint accounts (inter alia) for why relative clauses cannot contain both an overt wh-word and an overt complementiser in structures such as:

(32) **It was a film [CP which [C that] I enjoyed watching]*

Returning now to our earlier PP structure in (30), it should be clear that if nothing else happens, the Edge Constraint (31) will rule out the PP in (30) as ill-formed because it has an overt head *to/at* and an overt specifier *where*.

One way of ‘rescuing’ (30) is for *where* to undergo WH-MOVEMENT on its own, resulting in the structure (33) below (cf. Collins 2007:6;19b), if we take *where* to be a DP, and assume that *where* transits through spec-PP on its way to spec-CP (because PPs are phases):

(33) [DP *where*] is he staying [PP <DP> [P *at*] <DP>]]

Since the preposition *at* is the only overt constituent on the edge of the PP in (33), there is no violation of the Edge Constraint, and the resulting structure in which the preposition *at* is stranded in situ is grammatical.

However, since prepositions can be pied-piped when their objects are wh-moved, an alternative possibility is for the whole PP in (30) to undergo WH-MOVEMENT, so resulting in the following structure (cf. Collins: 2007:6;19a):

(34) [PP *where* [P *at*] <where>] is he staying <PP>

A structure like (34) falls foul of the Edge Constraint (31), since the fronted PP has both an overt (italicised) specifier and an overt (bold-printed) head. In such cases, violation of the constraint is obviated by *ghosting* the preposition *to*, so mapping (34) into:

(35) [PP *where* [P <*at*>] <where>] is he staying <PP>

Since the only overt constituent in the fronted PP is the wh-word *where*, there is no Edge Constraint violation in (35). On this view, Preposition Ghosting in structures like (35) serves to obviate violation of the Edge Constraint, in the sense that a preposition is ghosted in a structure which would otherwise violate the Edge Constraint (i.e. a preposition is ghosted when it has an overt specifier).

An interesting question which arises from the discussion above is whether we can deal with gapless relative clauses like those in (12) above in spoken English by extending the Preposition Ghosting analysis sketched above from *r*-pronouns like *where* to other relative pronouns like *who/which*, and from the prepositions *to/at* to other prepositions. We could then suppose that (in spoken English) Preposition Ghosting would also apply (inter alia) in structures such as the following:

(12) a. When I went over there, they were clowning around, [*which* I didn’t really care <about> until I found out they had lost my file] (unidentified American informant, Kuha 1994)

b. Laura Maxwell is with someone [who I think, Laura, that’s happened <to>] (Aasmah Mir, BBC Radio 5)

Pursuing this possibility, let us suppose that *which* undergoes Prepositional Inversion and moves to become the specifier of *about* in (12a), so deriving:

(36) [PP *which* [P *about*] <which>]

If *which* moves on its own to spec-CP and if C in finite declarative clauses is lexicalised as *that*, we derive the following structure:

(37) [CP *which* [C *that*] I didn’t really care [PP <which> [P *about*] <which>] until...]

The CP in (37) violates the Edge Constraint (since it has an overt head and an overt specifier), but can be rescued by Ghosting *that*, resulting in the structure below:

(38) [CP which [C <that>] I didn't really care [PP <which> [P about] <which>] until...]
 (38) incurs no violation of the Edge Constraint (31) since the edge of CP contains only one overt constituent (= *which*), and the edge of PP likewise contains only one overt constituent (= *about*).

An alternative possibility is for the whole PP in (36) to undergo WH-MOVEMENT, resulting in the structure below:

(39) [CP [PP which [P about] <which>] [C that] I didn't really care <PP> ...]

There is a double violation of the Edge Constraint in (39), since both CP and the fronted PP have an overt head and specifier. However, this double violation can be rescued by Ghosting both the head P of PP and the head C of CP, so mapping (39) into:

(40) [CP [PP which [P <about>] <which>] [C <that>] I didn't really care <PP> ...]

The resulting structure (40) no longer violates the Edge Constraint, since the fronted PP has an overt specifier *which* but a null head, and CP has an overt specifier (a PP containing *which*) and a null head. As should be obvious, the analysis sketched here can be generalised from gapless *which*-relatives like (12a) to gapless *who*-relatives like (12b).

Now consider how to deal with preposition ghosting in gapless relatives introduced by the complementiser *that*, such as:

(12) e. He's had a fine game, the Slovakian, for a Liverpool side *that Roy Hodgson has made 7 changes* <to> (Darren Fletcher, BBC Radio 5)

Let us suppose that the relative pronoun *which* is the object of the preposition *to* in (12e). If *which* undergoes Prepositional Inversion and raises to become the specifier of *to* and the resulting PP undergoes WH-MOVEMENT to spec-CP, we derive:

(41) [CP [PP which [P to] <which>] [C that] Roy Hodgson has made 7 changes <PP>]

There is a double violation of the Edge Constraint in (41), since both CP and the fronted PP have an overt head and an overt specifier. One way in which (41) can be rescued is by ghosting the whole PP containing *which* and *to*, so deriving the following:

(42) [CP [PP <which> [P <to>] <which>] [C that] Roy Hodgson has made 7 changes <PP>]

Neither CP nor PP in (42) violates the Edge Constraint, so in this case Ghosting obviates a potential double violation of the Edge Constraint, and derives the structure associated with the italicised relative clause in (12e).

Finally, consider the derivation of gapless ZERO relatives like that italicised in:

(12) g. It's one of those games *the Scotland players will raise their game* <in> (John Collins, BBC Radio 5)

Let's suppose that the relative clause in (12g) contains a relative pronoun *which* serving as the object of the preposition *in*, and that *which* is raised by Prepositional Inversion to become the specifier of *in*, resulting in the PP [PP which [P in] <which>]. If *which* then moves to spec-CP on its own, it will leave the preposition *in* stranded in situ, and the preposition will be spelled out overtly on our assumptions. But if the preposition is pied-piped along with *which* and the whole PP moves to spec-CP, we derive the following structure instead:

(43) [CP [PP which [P in] <which>] [C that] the Scotland players will raise their
game <PP>]

The resulting structure induces a double violation of the Edge Constraint, since both CP and PP have an overt head and an overt specifier. However, there are several ways in which Ghosting can rescue the structure in (43).

One is for *in* to be ghosted in order to avoid a PP with an overt head and specifier, and for *that* also to be ghosted in order to avoid a CP with an overt head and specifier: this would derive a silent preposition structure like (40). A second is for the whole PP [_{PP} which [_P in] <which>] to be ghosted, resulting in a *that*-clause structure with a silent preposition like (42). A third is for both the PP specifier and the complementiser *that* to be ghosted, so deriving the structure shown in simplified form below:

(44) [_{CP} [_{PP} <which> [_P <in>] <which>] [_C <that>] the Scotland players will raise
their game <PP>]

(44) is then the superficial structure of the italicised relative clause in (12g)⁹.

The Ghosting analysis outlined here proves superior to the *silent stranded preposition* analysis sketched in the previous section in respect of overcoming all three problems which beset that analysis, viz. (i) the *interpretive* problem, (ii) the *distributional* problem, and (iii) the *stranding* problem. The interpretive asymmetry between ‘silent prepositions’ in standard English (which are restricted to having a place/time/manner interpretation) and ghosted prepositions in spoken English (which can have an unrestricted interpretation) can be accounted for by positing that ghosted prepositions have an unrestricted range of possible interpretations precisely because *any* preposition can be ghosted. The Ghosting analysis also provides a principled account of *distributional* differences between ghosted prepositions in spoken English (which occur only in relative clauses) and silent prepositions in standard English (which occur in relatives, interrogatives and adverbial NPs) by positing that Ghosting only occurs with relative pronouns in spoken English because these are ‘light’ constituents which have developed caseless variants (see below for a fuller account). Finally, the Ghosting analysis also accounts for why prepositions which can’t be stranded can nonetheless be ghosted by positing that ghosted prepositions undergo pied-piping¹⁰.

Since gapless relatives are characteristic of spoken rather than written English, an important question arising from our analysis is what differences exist between spoken and written English which allow prepositional constituents to be ghosted in informal registers of spoken English but not in formal registers of written English. In this connection, it should be noted that Collins (2007) suggests that only light nouns (i.e. ‘defective’ nouns with limited semantic and grammatical content) can land in spec-PP by Prepositional Inversion and trigger Preposition Ghosting, whereas other constituents can only *transit* through spec-PP (when being extracted out of PP). Collins also argues (2007: 19) that the noun *home* in expressions like *He stayed home* is a light noun which originates as the complement of the preposition *at*, but thereafter moves to become the specifier of *at*, so forming the structure [_{PP} home [_P at] <home>]; subsequent Ghosting of *at* derives the structure [_{PP} home [_P <at>] <home>]. He further suggests (ibid.) that light nouns like *home* lack case, and that the preposition *at* in such structures ‘checks no case feature’ (Collins, 2007: 19). He claims that that *r*-pronouns incorporate the light noun PLACE (so that *where* has a more abstract structure paraphraseable as WHAT PLACE), and notes that expressions incorporating the light noun PLACE allow Inversion and Ghosting (as in ‘We went someplace different’), although he concedes (2007: 11) that ‘I do not have any answer at this point to the deeper question of what drives movement of light noun place/PLACE (including the *r*-pronouns) into Spec P’.

However, it may be that we can develop an answer along the following lines. Let us suppose that UG incorporates the following constraint:

(45) **Case Constraint**

A caseless constituent cannot occur in a case position (in the c-command domain of a case assigner)

Such a constraint gains empirical motivation from the fact that the complementiser *that* (which Safir 1986 argues to be caseless) cannot occur in the domain of a transitive preposition like *of* – as we see from:

(46) I'm convinced of his remorse, but not convinced (**of*) **that** he should be freed
It will then follow that movement of a caseless light noun from being the complement of a preposition to becoming its specifier provides a way of avoiding violation of the Case Constraint (45). Let us further suppose that a caseless light noun is frozen in place once it moves to spec-PP: we can suppose that this is because (in the same way as spec-FocP is the criterial position for a fronted focused constituent: Rizzi 1996), spec-PP is the criterial position for the caseless object of a preposition. If the light noun is frozen in place in spec-PP, any subsequent movement of the light noun will induce pied-piping of the whole PP. Why should a caseless light noun be frozen in place in spec-PP? The answer may lie in a constraint to the effect that the complement of a preposition can only be extracted out of a containing PP if it enters into a case/agreement relation with the preposition (so that the object of a preposition can only be extracted out of its containing PP if there is some morphological marking of the relation between the preposition and its object). Since, by hypothesis, caseless relative pronouns do not enter into any case/agreement relation with the relevant preposition, they cannot be extracted out of their containing PP.

Given this theoretical background, let us suppose that relative pronouns like *which/who* are 'light' (perhaps by virtue of having an antecedent from which their content is recoverable) and have developed caseless counterparts in spoken English. This latter assumption is plausible, given the attrition of case endings on relative pronouns in spoken English, with the archaic accusative form *whom* being defunct and *whose* relatives being supplanted by relatives like:

(47) Players like Fabio Cannavaro, **who** we know *their* quality, haven't been great this season (Alvin Martin, Talk Sport Radio)

(See Tottie 1997, Tagliamonte 2002, Britain 2008, and Cheshire, Adger and Fox 2010 for evidence that *whom/whose* are not used in contemporary colloquial English.) If colloquial English has developed caseless counterparts of *which/who* alongside their case-marked counterparts, the caseless variants will obligatorily move to spec-PP by Prepositional Inversion in order to be outside the case domain of the preposition (while still remaining inside the PP they serve as the object of). If (as suggested above) an inverted caseless object is frozen in place in spec-PP, it follows that if the wh-pronoun subsequently undergoes wh-movement, it will obligatorily pied-pipe the rest of the PP along with it. But if the overall PP undergoes wh-movement, then in order to avoid violation of the Edge Constraint, either P or PP has to undergo Ghosting (as seen earlier). By contrast, in more formal registers of English, a relative pronoun like *who/which* carries case, and remains within the case domain of P (and is case-marked by P) unless extracted out of PP by an operation like wh-movement. If extracted, the relative pronoun transits through the edge of PP on the way to its ultimate landing site, because PP is a phase. On this view, spec-PP is

the *ultimate landing site* for caseless prepositional objects, but only *an intermediate transit site* for case-marked prepositional objects. In sum: formal registers of English have no caseless counterparts of *which/who*, and so don't allow gapless relatives with *which/who*; informal registers have both case-marked and caseless counterparts of *which/who*, and use of caseless relative pronouns gives rise to gapless relatives¹¹.

A further difference is that formal registers only allow ghosting of the locative preposition *to/at* in *wh*-clauses like those in (28-29), whereas informal registers allow any preposition to be ghosted in gapless relatives. Why should this be? As noted earlier, Collins (2007) claims that movement to spec-PP is only possible for constituents which incorporate the light nouns PLACE and *home*, and it is natural to suppose that the only prepositions which these will only serve as the complement of are locative *to/at*. But in spoken registers, the pronoun "which" is a light noun that can move to spec-PP, and since "which" has no PLACE component in its meaning, it can occur as the object of an unrestricted range of prepositions.

5. Predicate Ghosting

Although the Prepositional Ghosting analysis outlined in the previous section provides a plausible account of the majority of cases of gapless relatives in the *BBE* corpus, there remains a residue of 68/243 (28%) of gapless relatives which have a Topic-Comment interpretation and which seemingly prove problematic for any account which assumes Ghosting of a P or PP alone. In this section, however, we show that such sentences can also be given a Ghosting analysis (although with more than just a single P or PP ghosted).

The kind of structures involved are the following:

- (48) a. You take Theo Walcott off and replace him with Rosicky, *who Walcott's a better player than Rosicky* (Listener, Talk Sport Radio = 5f)
 b. You look at some of the other papers, *who it's not going to be just the 'News of The World' running dodgy practices* (Reporter, Talk Sport Radio)
 c. He's a fabulous player *who, given the right conditions and the right management, we could be talking about one of the best players in the world* (Sid Lowe, Talk Sport Radio = 11d)
 d. This is something *that when you're abroad, people are blown away by the level of interest in the lower leagues* (Andy Brassell, BBC Radio 5)
 e. He's got to stay free from injury, *which he's had a horrible time at all the clubs he's been at* (Andy Goldstein, Talk Sport Radio)
 f. Look at the passes (724 against 199), *which Arsenal are generally known as a passing team* (Terry Gibson, Sky Sports TV)
 g. Jenson did get held up, *which you never put your best lap in on your first lap* (David Croft, BBC Radio 5)
 i. All we've had so far are words, *which frankly we need to see the numbers* (Economics reporter, BBC Radio 5)

For such structures it would seem implausible to posit that all that has happened is that a preposition has been ghosted, since none of the angle-bracketed prepositions in (48) below provides an appropriate paraphrase of (48a):

- (49) You take Theo Walcott off and replace him with Rosicky, *who Walcott's a better player than Rosicky* <*for/*with/*on/*by/*in/*at/*about>

So how are we to deal with structures like those in (48)?

One possibility (which we will reject) would be to adopt a Topic-Comment analysis, under which the relative pronoun is directly merged on the edge of CP and serves to mark its antecedent as a Topic on which the rest of the relative clause makes a relevant Comment. On this view, the relative clause in (48a) would have a structure such as that shown in the second line of (50) below:

- (50) You take Theo Walcott off and replace him with Rosicky,
[CP who [C \emptyset] [TP Walcott [T's] a better player than Rosicky]

The pronoun *who* would be base-generated on the edge of CP, and would be spelled out in the default form *who* (see Schütze 2001 on default forms). The relative clause would have a topic-comment interpretation loosely paraphrased as ‘about whom I would say that’. Such a topic-comment analysis of gapless relatives is plausible in principle, since Chinese has gapless relative clauses and gapless topic structures (Zhang 2008), and the relation between the antecedent and the relative clause in gapless relatives has been argued by Tsai (1997) to be one of *aboutness*¹². Under the Cartographic approach adopted in the works referred to in fn.6, the *wh*-pronoun could be taken to be base-generated in the specifier position of a Topic Phrase projection.

At first sight, the claim that (at least some) gapless relatives in English involve a gapless topic structure would appear to fall foul of the conventional wisdom that English (unlike Chinese) does not have gapless topic structures. However, this claim is undermined by the observation that the BBE corpus contains 58 examples of (potentially) gapless topic structures such as the following:

- (51) a. *England*, I agree with you completely on Capello (Listener, BBC Radio 5)
b. *Defoe*, even I could have scored that goal (Alan Green, BBC Radio 5)
c. *Temperatures*, we are talking 13 to 15 Celsius (Aasmah Mir, BBC Radio 5)
d. *An international manager's job*, there is no pleasing anybody (Steve McClaren, BBC World Service)
e. *A campaign like that*, it's one thing to get people's attention and another to get things changed (Declan Curry, BBC Radio 5)

Such sentences contain a (bold-printed) topic followed by a gapless clause which makes a comment that is interpreted as being relevant to the topic, seemingly without any overt syntactic link between topic and comment.

However, a topic analysis of gapless relatives along the lines outlined in (50) above brings with it the evident disadvantage that it presupposes that pronouns like *who* and *which* have two entirely distinct uses: viz (i) an argumental use in which they are base-generated as an argument of a preposition or verb and moved to the edge of CP, and (ii) a topical use on which they are base-generated in spec-CP and have a topic interpretation. Furthermore, if the topic has an *aboutness* function, topic structures are implicitly being treated as involving ghosting of a topic-marking preposition like *about*.

Let us therefore explore an alternative analysis for structures like those in (48) under which the relative clauses in question involve ghosting not only of a prepositional phrase headed by *about*, but also of parts of a clause containing a verb of SAYING. If we extend the Ghosting analysis in this way, the italicised relative clause in a sentence like (48b) would have a more elaborate ghost structure containing the ‘silent’ constituents

contained within angle brackets below (an abstract counterpart of the structure found in sentences like 5c,d):

(52) You look at some of the other papers, **who** <I would say about> *it's not going to be just the 'News of The World' running dodgy practices*

On this view, Ghosting in (52) would affect all material between the bold-printed fronted wh-word and the italicised embedded clause but leave intact the matrix CP layer (containing *who*), along with the italicised embedded CP.

At first sight, any such Predicate Ghosting analysis might appear to be unprecedented and unmotivated. However, there are potential parallels here with Ross's (1970) analysis of root declarative clauses as containing an abstract verb of SAYING, under which a sentence like (53a) below would be derived from a structure like (53b), involving Ghosting of all constituents other than the embedded clause

(53) a. It is raining again

b. <I say to you> it is raining again

Thus, an analysis involving Predicate Ghosting is by no means unprecedented.

Furthermore, such an extended Ghosting analysis could be argued to gain independent motivation from sentences like:

(4) b. All we've had so far are words, *which frankly we need to see the numbers* (Economics reporter, BBC Radio 5)

The adverb *frankly* is typically construed with the external argument of a predicate of SAYING or THINKING (e.g. in 'Max says that *frankly* there is little hope of finding the hostages alive', it is *Max* who is being frank). If we suppose that the italicised relative clause in (4b) contains the ghost structure contained within angle brackets below:

(54) *which* <I would say about> *frankly we need to see the numbers*

we can say that *frankly* is construed with *I* (i.e. with the speaker) in (4b).

A second piece of evidence in support of the Predicate Ghosting analysis comes from sentences such as the following, in which the relative clause contains an (italicised) direct question (capitals in 55e marking contrastive stress):

(55) a. The referee showed him a red card, [which *what else could he have done in the circumstances?*] (Alan Brazil, Talk Sport Radio)

b. Then you launched these podcasts, [which *how many times have these been downloaded?*] (Richard Bacon, BBC Radio 5)

c. We're all humans living in a world [which *what right does any country have to say "You can't come and live here"?*] (Listener, BBC Radio 5)

d. Many students go to university and then have a gap year, [which by the way *what's that supposed to be for?*] (Ian Collins, Talk Sport Radio)

e. THERE's a man [that *is he gonna get his first ever podium?*] (Steve Parrish, BBC2 TV)

f. Then we had Steve McClaren, [who, *do you know what the thing about Steve McClaren was?*] (Steve Claridge, BBC Radio 5)

g. You're looking at a lad in Rio [who *is he gonna be fit to play for England?*] (Alan Mullery, Sky Sports TV)

h. And now it's hello to Graham Taylor, [who *have you managed to lift your head after that six-nil defeat at St James's Park?*] (Colin Murray, BBC Radio 5)

The fact that Subject-Auxiliary Inversion/SAI takes place in italicised clause and that (in questions) SAI is found only in root clauses suggests that the italicised clause is a direct speech quotation. This in turn is consistent with the assumption that an abstract quotative predicate (like SAY or ASK) has been ghosted, with the result that the bracketed relative clause in (55a) has the structure shown below (where ghosted material is enclosed within angle brackets):

(56) [CP which [C \emptyset] <I would say about> ‘What else could he have done in the circumstances?']

Under the Predicate Ghosting analysis proposed here, the relative clause in (56) would have a structure parallel to that of the bracketed relative clauses in (57) below (with the angle-bracketed preposition being ghosted):

- (57) a. It’s the one thing so far [that I would say <about> ‘*I’m not in agreement with what Capello has done*’] (Graham Taylor, BBC Radio 5)
 b. There’s nothing [that you can say <about> ‘*This is Champions League football played at its best*’] (Graham Taylor, BBC Radio 5)
 c. They can produce things [that you go <about> ‘*Where did that come from?*’] (Graham Taylor, BBC Radio 5)
 d. He’s the sort of player [that you might have said <about> ‘*Is he ever going to play for Australia again?*’] (Simon Mann, BBC Radio 5 Sports Extra)
 e. It’s a car [which years from now you won’t have to ask <about> ‘*What was I thinking?*’] (American TV commercial, reported by Paul Postal pc)

The potential parallels include the use of an (italicised) direct quotation after the verb of saying. In most cases like (55a-g) and (57), the ghosted preposition is *about*; however, in (55h) it appears to be *to* (since the speaker is talking directly to Graham Taylor).

The overall conclusion to be drawn from this section is that gapless relatives which have a topic-comment interpretation can be handled by a plausible extension of the Ghosting analysis under which Ghosting affects not only a PP out of which a relativiser has been extracted, but also additional superordinate material containing the Predicate which selects the ghosted PP as an argument, so that when the preposition *about* is ghosted in (55), we find concomitant ghosting of all the material between the fronted wh-word (*which*) and the embedded clause¹³.

5. Repair

It has been widely reported in the research literature that certain types of deletion operation can be used to ‘repair’ (or ‘rescue’ or ‘amnesty’) potential constraint violations (see e.g. Ross 1969; Chomsky 1972; Lasnik 2001; Fox and Lasnik 2003; Hornstein, Lasnik, and Uriagereka 2003; van Craenenbroek 2004, 2010; Boeckx and Lasnik 2006; Merchant 2008; Nakao 2009; Bošković 2011; and Radford and Iwasaki 2012). It is therefore reasonable to maintain that the Ghosting analysis of gapless relatives would gain additional plausibility if Ghosting turned out to be able to serve a similar constraint repair function. And in this section, we shall argue that this is indeed the case.

In this connection, consider why the angle-bracketed preposition is ghosted in structures such as the following:

- (58) a. He’s a fellow [who it often seems <to> *that the glass is half empty*] (Tim Vickery, BBC Radio 5)

b. This (= Frank Lampard) is a player [who you can't say <about> *that we've failed just because we've included Frank Lampard*] (Adrian Durham, Talk Sport Radio)

By hypothesis, such structures involve a relative wh-pronoun used as the complement of the capitalized ghosted preposition *to/about*. The resulting structures are ungrammatical if the capitalised preposition is not ghosted. Why should this be? The answer lies in a Preclausal Preposition Constraint/PPC which (in informal terms) bars a preposition from being stranded in front of a clause. PPC will account for contrasts such the following:

(59) a. someone *who* I can talk [_{VP} *to* <who> [_V <talk>] about my problems]

b. *someone *who* it seems [_{VP} *to* <who> [_V <seem>] that the glass is half empty]

In both structures in (59), the preposition *to* has been stranded in spec-VP: however, in (59a), *to* is stranded in front of a PP argument and the resulting structure is grammatical; by contrast in (59b) *to* is stranded in front of a *that*-clause argument and the outcome is ungrammatical. In the light of this constraint, it is plausible to suppose that ghosting of the preposition *about* in structures like (58) serves to repair a potential violation of PPC.

Furthermore, the extended Ghosting operation which takes place in structures involving Predicate Ghosting can also serve to repair PPC violations – as we can illustrate in relation to our earlier structure (52), repeated below:

(52) You look at some of the other papers, **who** <I would say about> *it's not going to be just the 'News of The World' running dodgy practices*

The preposition *about* is in stranded in spec-VP, so that overtly spelling it out would lead to violation of the Preclausal Preposition Constraint. Ghosting in (52) deletes (inter alia) the illicitly stranded preposition, and so 'repairs' the relevant structure.

Ghosting can also be used to repair potential violations of other constraints, as the following examples illustrate:

(60) a. It's something *that we have been training* <for> *for a long time* (Tom Daley, BBC Radio 5)

b. That's *what we paid the money* <for> *for you* (Alan Shearer, BBC1 TV)

c. The standard fix is to replace just the offending bushes – something *a main dealer will charge around £600* <for> *for parts and labour* (Edd China, Discovery TV)

d. Jenny Meadows wants to get back to her main event, *which she can certainly do some damage* <in> *in the European championships later this year* (Steve Cram, BBC1 TV)

If the angle-bracketed preposition were stranded by WH-MOVEMENT and pronounced in the position which it occupies in (60), the resulting structure would violate an *Iteration Constraint* which bars successive occurrences of the same item (Radford 1979, Bošković 2002, Demonte & Fernández-Soriano 2009) – e.g. two successive occurrences of the preposition *for* or of the preposition *in*¹⁴. However, Ghosting provides a way of rescuing such structures, as we can illustrate in relation to (60a). Let us suppose that the relative clause in (60a) contains the relative wh-pronoun *which* used as the object of the preposition *for*. Let us further suppose that *which* undergoes Prepositional Inversion and thereby moves to spec-PP, forming [_{PP} *which* [_P *for*] <which>]. If the resulting PP then moves to spec-CP, this will derive the following structure:

(61) [_{CP} [_{PP} *which* [_P *for*] <which>] [_C *that*] we have been training <PP> for a long time]

The resulting CP violates the Edge Constraint in that it has both an overt C head (*that*) and an overt PP specifier (*which for* <which>). Ghosting of the PP specifier results in:

(62) [CP [PP <which> [P <for>] <which>] [C that] we have been training <PP> for a long
time]

Since the resulting structure (62) no longer contains two occurrences of *for*, there is no violation of the Iteration Constraint barring a succession of two identical items, and so Ghosting provides a way of obviating the constraint.

Nonetheless, the claim that Ghosting can repair constraint violations would appear to be potentially undermined by apparent Island Constraint violations in Ghosting structures such as the following:

- (63) a. We want reaction from the Southampton dressing-room, *which* [*the door* <of>] *remains firmly shut* (Keith Hill, BBC Radio 5)
 b. We've had to buy players from clubs *that* [*the players* <of>] *are not first team players* (Jim McClean, Sky Sports TV)
 c. We've got a game on *that no-one really knows* [*what's happening* <in>] (Presenter, Talk Sport Radio)
 d. This is a race *you never know* [*what's going to happen* <in>] (Anthony Davidson, BBC Radio 5)
 e. We have languages *which we don't know* [*what is going on* <in>] (Ken Wexler, talk given to *Fifth Annual Conference on Formal Linguistics*, Guangdong University of Foreign Studies, China)

If such sentences involve an inverted (overt or null) prepositional wh-object moving to the front of the italicized clause (pied-piping along with it an angle-bracketed preposition which is subsequently ghosted), this will induce violation of the Subject Condition of Chomsky (1973) in (63a,b) or of the Wh-Island Condition of Ross (1967, 1986) in (63c-e): this is because the fronted wh-constituent is extracted out of a bracketed Subject Island in (63a,b) and out of a bracketed Wh-Island in (63c-e).

However, there are a number of ways of circumventing this problem. One is to suppose that in a sentence like (63e), *which* moves on its own from its initial position as the complement of *in*, transits through spec-PP and then moves to spec-CP in the main clause, so deriving the following structure:

(64) [CP *which* we don't know [CP what is going on [PP <**which**> [P in] <which>]]]

Since the Wh-Island Constraint bars a copy of a moved constituent inside a wh-island from having an antecedent outside the island, the structure in (64) violates the constraint in that the bold-printed occurrence of *which* in spec-PP is inside a wh-island clause beginning with *what* but its italicised antecedent lies outside the island. However, given the reasonable assumption that island constraints hold at a point in the derivation after Ghosting has applied and that ghosted constituents are invisible to island constraints, the structure in (64) can be rescued if the whole PP [PP <which> [P in] <which>] is ghosted. Note, however, that this involves positing a further kind of PP Ghosting which (while conceptually coherent in itself) differs from the Prepositional Ghosting operation posited earlier (since the latter was specifically linked to Prepositional Inversion and the Edge Constraint). We will therefore explore alternatives which do not involve positing an additional type of Ghosting.

One such is proposed by Paul Postal (pc). He suggests that (under the analysis in Postal 1998) we can deal with sentences like those in (63) by positing that they contain a null resumptive pronoun whose presence ensures that there is no islandhood violation. He

claims that his analysis can provide a straightforward account of the grammaticality of structures such as the following (Postal, pc: \emptyset denotes a null resumptive pronoun):

(65) There are languages *which* I would say Bloomfield was probably sure he didn't know [what was going on in \emptyset], although he never told anyone that

However, while an analysis along the lines of (65) provides a way of obviating violation of the Wh-Island Constraint, it raises questions about the nature (and constraints governing the distribution) of null resumptives, about how the preposition comes to be ghosted in structures like (63), and also about the role played by *which* in the relative clause that it introduces.

An interesting alternative analysis which does away with the need for null resumptives and provides a principled answer to the question of the role played by *which* in such structures is provided by Jason Merchant (pc). He suggests that in wh-island cases like (63c-e), Ghosting targets a PP in the *matrix* clause, so that (63e) has an interpretation loosely paraphrased as 'We have languages *about which* we don't know what's going on' (related structures being found in Algonquian, Merchant tells us). Under our Ghosting analysis, this would mean that the italicised relative clause in (63e) has the structure bracketed below:

(66) We have languages [CP [PP *which* [P <about>] <which>] [C \emptyset] we don't know <PP>
what is going on]

The PP headed by *about* originates as a complement of the matrix verb *know*: the wh-pronoun *which* then moves to spec-PP, and then the whole PP moves to spec-CP, with *about* being ghosted in order to avoid violating the Edge Constraint (31). Note that if *which* were to move on its own to spec-CP, this would leave the preposition *about* stranded in a preclausal position as in (67) below, in violation of the Preclausal Preposition Constraint (PPC) which bars a (bold-printed) preposition from being stranded in front of an (italicised) clause:

(67) *We have languages which we don't know **about** *what is going on*

Thus, under our implementation of Merchant's analysis, Ghosting could be said to repair a potential violation of the Preclausal Preposition Constraint.

A significant potential drawback to Merchant's analysis is that it seemingly cannot be extended to handle structures like (63a,b), in which there is no matrix predicate which the PP headed by the ghosted preposition could serve as an argument of. However, we can overcome this problem if we adopt the Predicate Ghosting analysis outlined in §5, and suppose that such sentences involve relativisation of the object of a ghosted preposition which is in turn the argument of a ghosted predicate. On this view, the italicized relative clause in (63a) would have the (simplified) superficial structure bracketed below:

(68) We want reaction from the Southampton dressing-room,
[CP [PP *which* [P <about>] <which>] [C \emptyset] <I would say PP> the door remains firmly shut]

The relative pronoun *which* originates as the object of the preposition *about* (the PP *about which* serving as the specifier of VP, and the clause *the door remains shut* serving as the complement of VP). By virtue of being caseless, *which* obligatorily undergoes Propositional Inversion and moves to spec-PP. The whole prepositional phrase [PP *which* [P about] <which>] moves to spec-CP, and the preposition *about* undergoes Ghosting in order

to avoid violation of the Edge Constraint (31). There is no subextraction out of any island, and hence no violation of any island constraint.

It should also be noted that the Predicate Ghosting analysis could also be extended to handle *wh*-island cases like (63c-e). On this view, a sentence like (63e) would have the structure shown in simplified form below:

(69) [CP [PP *which* [P <about>] <which>] [C \emptyset] <I would say PP> we don't know what is going on]]

The relative pronoun *which* would originate as the object of the preposition *about*. By virtue of being caseless, *which* obligatorily undergoes Prepositional Inversion and moves to spec-PP. The whole prepositional phrase [PP *which* [P *about*] <which>] moves to spec-CP, and the preposition *about* undergoes Ghosting in order to avoid violation of the Edge Constraint (31). There is no subextraction out of any island, and hence no violation of any island constraint.

Although both the PP Ghosting analysis in (64) and the Predicate Ghosting analysis in (69) yield descriptively adequate analyses, the Predicate Ghosting analysis seems preferable for the following reason. At the end of §4, we suggested that relative pronouns in English can induce Prepositional Inversion and Ghosting because they are light pronouns with minimal intrinsic semantic content (this being recoverable from their antecedent) and minimal grammatical content (e.g. they lack case): by contrast, interrogative pronouns in English have intrinsic semantic and grammatical content (e.g. they function as interrogative operators which carry gender and D-linking properties, and have no antecedent to identify their properties). If relative (but not interrogative) pronouns in English are light proforms and only light proforms can undergo Prepositional Inversion, then any analysis of Ghosting (like that in 69) which involves Prepositional Inversion predicts that Prepositional Ghosting should only be found in relative clauses, not in interrogative clauses: by contrast, an analysis like (64) which does not involve Prepositional Inversion predicts that Prepositional Ghosting should be found in interrogative clauses as well. In this connection, it is interesting to recall our earlier observation that the BBE corpus contains no clearcut examples of prepositions being ghosted when they have an interrogative object (pace fn.7). This means that all examples of preposition ghosting in *wh*-clauses would involve relative clauses only.

Irrespective of whether a Ghosting analysis along the lines of (69) is deemed preferable to one along the lines of (64), the key point to emerge from this section is that there is evidence that Ghosting (like deletion operations such as Sluicing) can serve to repair constraint violations.

6. Response to ghost-busters

Although we have argued that our Ghosting analysis of gapless relatives proves superior to the alternative analyses we looked at, in this section we discuss potential conceptual, empirical, and theoretical drawbacks to our account raised by would-be ghost-busters (i.e. critics), and consider whether these undermine the Ghosting analysis. We shall argue that this is not the case.

Paul Postal (pc) points out that most of the structures we cite in our paper are ungrammatical (and in some cases unparseable) for him. This may in part be because Preposition Ghosting belongs to a highly colloquial register which more conservative

speakers find alien to them, and in part because ghosting of prepositions can cause parsing problems in recovering the ghosted preposition. Jason Merchant (pc) makes the related suggestion that the ghosting of prepositions may be the result of a production error. Anonymous et al. (in press) sketch a possible processing analysis in terms of spellout errors induced by memory decay: in simple terms, this amounts to claiming that speakers may mistakenly assume that they pied-piped a preposition and so fail to spell out a copy of a preposition at the foot of a wh-chain.

However, what the processing analysis fails to account for is why (in our recordings) there are 243 examples of preposition ghosting in relative clauses, but no clearcut examples of interrogative structures like the following (even though questions occurred frequently in the BBE corpus, e.g. in phone-ins and interviews):

- (70) a. *What situation do Obama and the party find themselves <in>?
 b. *What do you feel sorry for Everton fans <about>?
 c. *Which of these are you familiar <with>?
 d. *Who did that happen <to>?
 e. *What are you working <on> with your suppliers?

This asymmetry follows from the syntactic analysis outlined here, under which relative (but not interrogative) pronouns have caseless light counterparts which can undergo preposition inversion, leading to pied-piping and ghosting.

Bob Borsley (pc) questions the robustness of the Edge Constraint, pointing out that (under a traditional CP analysis) it is seemingly violated by the italicised strings in Subject-Auxiliary Inversion/SAI structures such as:

- (71) a. [_{CP} *How* [_C *could*] he have known]?
 b. [_{CP} *Never* [_C *had*] he heard anything so silly]
 c. [_{CP} *Such* [_C *is*] life]

Under a traditional CP analysis, the inverted auxiliary would be in C, and the fronted constituent preceding it would be in spec-CP, so resulting in a structure in which a CP phase has an overt head and an overt specifier. However, an alternative possibility is that the inverted string is not contained within a CP phase but rather within a projection positioned below the CP phase – as is suggested by the fact that the italicized inverted string is positioned below the phase head *that* in CPs like those bracketed below:

- (72) a. The strange thing with Joe Cole going to Lille is [**that** *why* did nobody in the Premier League want him?] (Ian McGarry, BBC Radio 5)
 b. He said [**that** *never had* he heard anything so silly]
 c. He mused [**that** *such is* life]

If so, the inverted strings italicised in (71) would not be immediately contained in a phasal projection, and would not present any empirical challenge to the Edge Constraint.

Furthermore, there is syntactic evidence to suggest that the inverted auxiliary is contained within a lower peripheral projection than the constituent preceding it in sentences like (71). This can be illustrated for wh-questions by sentences such as those below (73a being from Hudson 2003, and 73b-c from Haegeman 2012):

- (73) a. **Why**, *in Scotland*, do they eat haggis? (Hudson 2003)

b. So **how**, *from this*, does the team conclude that risks to mothers who have Caesareans are actually 2.7 times greater? (*Independent*, 30.01.2010, p. 26 col 2)

c. **In what circumstances**, *during the exam*, do you allow students to use notes?

In (73a-c), the bold-printed wh-phrase is separated from the underlined inverted auxiliary by an intervening (italicised) PP which Haegeman (2012) takes to be the specifier of a separate Topic Phrase projection. Indeed, several different peripheral projections can intervene between a fronted wh-constituent and an inverted auxiliary, as below:

(74) **Where**, *Steve, in your view, in his team selection*, did Capello get things wrong? This suggests that the auxiliary in such structures is contained in a much lower projection than the wh-phrase (e.g. in terms of the template in Rizzi 1997, it is the head of FinP).

Borsley (pc) further suggests that that *wh+that* strings such as those italicised below also violate the Edge Constraint:

(75) a. [_{CP} *What a mine of useless information* [_C **that**] I am!] (Terry Wogan, BBC Radio 2; Radford 1988:501)

b. People can see [_{CP} *how successful* [_C **that**] they've been] (Anonymous extortionist, BBC World Service)

c. It's quite clear [_{CP} *on which side of the Blair-Brown divide* [_C **that**] Alistair Campbell comes down on (Political correspondent, BBC Radio 5)

d. I'm aware of the speed [_{CP} *with which* [_C **that**] they work] (Tim Vickery, BBC Radio 5)

e. People aren't told [_{CP} *how* [_C **that**] every single family in Britain is safer (Liberal Democrat spokesman, BBC Radio 5)

This type of structure is frequently encountered in spoken English, and the BBE corpus contains 76 examples of them. However, it should be noted that other constituents can intervene between the wh-constituent and *that*, like those underlined below:

(76) a. I wonder *why*, like women's football, **that** we haven't seen it so often (Listener, BBC Radio 5)

b. I asked her *how*, as a 20-year old girl really, **that** she'd managed to cope with his death (News reporter, BBC Radio 5)

c. Sometimes we lose sight of *how*, in the very recent past, **that** this has come about (John Cross, Talk Sport Radio)

d. Capello has to know *who*, when the chips are down, **that** he can trust to do a job for the team (Graham Taylor, BBC Radio 5)

This suggests that the *wh*-constituent and *that* are contained within separate projections in such structures, e.g. with *wh* being the only overt constituent on the edge of ForceP and *that* being the only overt constituent on the edge of FinP. Furthermore, Zwicky (2002) has argued that exclamatives like (75a) are reduced cleft sentences, so that (75a) has a structure paraphraseable as 'What a mine of useless information *it is* that I am!' If so, the wh-phrase and the complementiser are contained in separate projections, and such sentences do not violate the Edge Constraint¹⁵.

A further type of structure which poses a potential threat to the Edge Constraint is that bracketed below (where *e* denotes an empty TP):

(77) He bought a present, but I have no idea [_{CP} [_{PP} *who* [_P **for**] <who>] [_C \emptyset] *e*]

The bracketed clause in (77) represents a type of Ellipsis termed *Swiping* by Merchant (2001, 2002, 2008): if the non-ellipsed string *who for* is a PP which has undergone

Prepositional Inversion (with *who* moving from complement to specifier position within PP), the relevant PP will violate the Edge Constraint. However, a number of recent analyses have argued that *who* (in such structures) occupies a position outside the PP containing *for*. For example, Culicover and Jackendoff (2005:272) maintain that *who* is positioned on the edge of the clause, and that *for* is stranded internally within an in situ PP. Working within a very different framework, Richards (1997, 2001), van Craenenbroeck (2004, 2010), Hartman and Ai (2009) and Radford and Iwasaki (2012) argue that *who* is positioned on the edge of a CP/ForceP projection, and *for* on the edge of a lower FocP projection. Under either type of analysis, structures like (77) do not violate the Edge Constraint.

The final problem which we will consider here arises in relation to a possibility which we earlier skipped over in relation to how Ghosting can apply to a structure such as the following:

(43) [CP [PP which [P in] <which>] [C that] the Scotland players will raise their
game <PP>]

We considered three well-formed outcomes which Ghosting can give rise to in (43), but overlooked a fourth alternative. Suppose that the complementiser *that* is ghosted (in order to ensure that CP doesn't violate the Edge Constraint 31), and that the wh-pronoun *which* is also ghosted, in order to ensure that the fronted PP does not violate the constraint either. The structure resulting from this double application of Ghosting will be:

(78) [CP [PP <which> [P in] <which>] [C <that>] the Scotland players will raise their
game <PP>]

However, the resulting structure (which contains a preposition stranded in spec-PP at the beginning of a clause) is ungrammatical (cf. *'This is a match *in the Scotland players will raise their game*'). This would seem to mean that the Ghosting analysis wrongly predicts that we should find gapless relatives like (78) with a preposition stranded at the *beginning* of a relative clause. Since structures like (78) are unattested in spoken or written English, they provide a strong counterexample to the Ghosting analysis, do they not?

The answer is 'Not if the ungrammaticality of structures like (78) can be attributed to violation of an independent constraint.' One possibility along these lines is that (78) is ruled out by the same constraint that rules out what Postal (1972) called *preposition dangling* in structures like (79b,c) below:

(79) a. Max is the only person [CP *who* I believe [CP Mary thinks [CP John talked **to**]]]
b. *Max is the only person [CP *who* I believe [CP Mary thinks [CP **to** John talked]]]
c. *Max is the only person [CP *who* I believe [CP **to** Mary thinks [CP John talked]]]

In all three sentences in (79), the italicised relative pronoun *who* originates as the object of the bold-printed preposition *to*. In (79a), *who* undergoes wh-movement on its own, leaving the preposition *to* stranded in situ. In (79b), the preposition *to* is pied-piped along with *who* to the edge of the most deeply embedded CP, but then is left stranded in spec-CP in the innermost clause when *who* subsequently moves on its own to the edge of the other two bracketed CPs. In (79c), *to* is pied-piped along with *who* to the edge of the inner and intermediate CPs, but then is left stranded on the edge of the intermediate CP when *who* subsequently moves on its own to the edge of the outer CP. This raises the question of whether structures like (78) are ruled out by the same constraint which bars structures like (79b, c). But what kind of constraint might be involved?

One possible candidate is the following:

(80) **Preposition Dangling Constraint/PDC**

No preposition can be left dangling inside a PP on the edge of a phase

PDC would rule out structures like (79b,c), since in both cases a preposition is left dangling inside a PP on the edge of a CP phase. On the other hand, it would (quite correctly) not rule out structures such as (59a) in which a preposition is left stranded on the edge of a non-phasal VP, nor would it rule out structures such as the following (from Chaves, forthcoming, brought to our attention by Bob Borsley) in which a preposition is stranded inside an in situ PP adjunct:

- (81)(a) *What* did he fall asleep complaining *about*?
(b) *Who* would you rather sing *with*?

More importantly for present purposes, however, PDC would rule out structures like (78), and so overcome what would otherwise have been a problematic example for our analysis.

7. Summary

This paper began by looking at gapless appositive relatives like *And she decided to move out, which I think she's crazy*, and considering the claim made by Loock (2007) and others that *which* in this kind of structure cannot be a relative pronoun because it has no antecedent, and instead should be analysed as a subordinating conjunction which connects a subordinate clause to a main clause. In §2, we argued against the subordinating conjunction analysis by showing that *which* behaves differently from typical subordinating conjunctions like *although* in that (e.g.) the clause it introduces cannot precede the main clause. We further argued that *which* can have an inanimate nominal antecedent in gapless appositives, and that *who* is used in place of *which* in gapless appositives with a human antecedent: we concluded from this that the wh-word in gapless appositives is indeed a relative pronoun. We went on to show that free and restrictive relative clauses can also be gapless. In §3, we considered whether Caponigro and Pearl's analysis of silent prepositions in free relatives, interrogatives and adverbial nominals could be extended to handle gapless relatives in spoken English, but argued against this on the grounds (inter alia) that any such analysis would wrongly predict that gapless relative clauses cannot relativise the object of an unstrandable preposition. In §4, we proposed an alternative analysis of gapless relatives under which the wh-pronoun functions as the object of a preposition which is given a null spellout as a result of the *Ghosting* of the preposition or of the PP it heads. We argued that gapless relatives have arisen because colloquial English has developed caseless light-pronoun counterparts of relative *which/who*, and that these obligatorily move to their criterial position in spec-PP (outside the case domain of the preposition) by Prepositional Inversion and are thereafter frozen in place. Consequently, the inverted wh-pronoun obligatorily pied-pipes the preposition along with it under wh-movement, and the preposition must be ghosted in order to avoid violation of the Edge Constraint. In §5, we looked at gapless relatives which have a topic-comment interpretation, and proposed that they involve a ghosted topical preposition like *about* which in turn serves as the argument of a ghosted verb of SAYING (akin to the ghost verb assumed by Ross 1970 in declarative root clauses); we argued that in such extended cases of Ghosting, all the constituents intervening between relativizer and gap are ghosted. In §6, we went on to argue Ghosting

(like other deletion operations such as VP Ellipsis and Sluicing) can serve to repair structures which would otherwise induce constraint violations. In §7, we considered (but argued against) a range of potential objections to the Ghosting analysis.

Our research has led to important descriptive and theoretical conclusions. The main descriptive conclusion to be drawn from it is that gapless relatives are not in fact gapless, but rather the relative pronoun in such structures serves as the complement of a ghosted preposition.

At a theoretical level, we have provided a new source of evidence for a deletion operation called *Ghosting* which is defined as deletion not requiring the presence of an antecedent. In Collins and Postal (2012), all the evidence for ghosting was given in terms of syntactic conditions on pronominal agreement. In this paper, we provide independent evidence for ghosting in terms of gapless relatives in spoken English.

To the extent that Ghosting (i.e. deletion in the absence of an antecedent) is possible, many issues in the syntax-semantics interface (such as interpreting “begin the book” as “begin reading the book”) will have to be rethought. In considering cases where some constituent is understood to be present semantically, we cannot automatically infer from the mere absence of an antecedent that deletion has not taken place.

References

- AOUN, J. & LI, Y.A. 2003. *Essays on the Representational and Derivational Nature of Grammar*. Cambridge, MA: MIT Press.
- BENINCÀ, P. 2001 The position of Topic and Focus in the left periphery. *Current Studies in Italian Syntax: Essays Offered to Lorenzo Renzi*, ed. G. Cinque & G. Salvi, 39 - 64. Amsterdam: Elsevier-North Holland.
- BENINCÀ, P. 2001. A detailed map of the Left Periphery of Medieval Romance. *Crosslinguistic Research in Syntax and Semantics*, ed. R. Zanuttini et al., 53 - 86. Washington: Georgetown University Press.
- BENINCÀ, P. 2010a. Lexical complementisers and headless relatives. Draft paper, University of Padova. (To appear in *Functional Heads*, ed. L. Brugè et al. Oxford: Oxford University Press).
- BENINCÀ, P. 2010b. La periferia sinistra. *Grammatica dell'italiano antico*, ed. G. Salvi & L. Renzi, 27 - 59. Bologna: Il Mulino.
- BENINCÀ, P. & POLETTI, C. 2004. Topic, focus and V2: Defining the CP sublayers. *The structure of CP and IP*, ed. L. Rizzi, 52-75. Oxford: Oxford University Press.
- BIANCHI, V. 1995. *Consequences of Antisymmetry for the Syntax of Headed Relative Clauses*. PhD dissertation, Scuola Normale Superiore, Pisa.
- BIANCHI, V. 1999 *Consequences of Anti-symmetry: Headed Relative Clauses*. Berlin: Mouton de Guyter.
- BIANCHI, V. 2000. The raising analysis of relative clauses: A reply to Borsley. *Linguistic Inquiry* 31, 123 - 40.
- BOCCI, G. 2004. Contrastive Focalisation on Topics and Preverbal Subjects in Italian. *Rivista di Grammatica Generativa* 29, 3 - 60.
- BOECKX, C. & LASNIK, H. 2006. Intervention and Repair. *Linguistic Inquiry* 37, 150 - 155.

- BORSLEY, R. 1997. Relative clauses and the theory of phrase structure. *Linguistic Inquiry*, 28, 629 - 647.
- BORSLEY, R. 2001. More on the raising analysis of relative clauses. Unpublished paper, University of Essex, <http://privatewww.essex.ac.uk/~rborsley/relatives.pdf>.
- BOŠKOVIĆ, Ž. 2002. On multiple wh-fronting. *Linguistic Inquiry* 33, 351 - 383.
- BOŠKOVIĆ, Ž. 2011. Rescue by PF Deletion, Traces as (Non)interveners, and the *That-Trace Effect*. *Linguistic Inquiry* 42, 1 - 44.
- BOŠKOVIĆ, Ž. & LASNIK, H. 2003. On the distribution of null complementisers. *Linguistic Inquiry* 34, 527 - 46.
- BRITAIN, D. 2008. Grammatical variation in England. *Language in the British Isles*, ed. D. Britain, 75 - 104. Cambridge: Cambridge University Press.
- CAPONIGRO, I. & PEARL, L. 2008. Silent prepositions: Evidence from free relatives. *The Syntax and Semantics of Spatial P*, ed. A. Asbury, J. Dotlačil, B. Gehrke & R. Nouwen, 365 - 385. Amsterdam: Benjamins.
- CAPONIGRO, I. & PEARL, L. 2010. The nominal nature of *where*, *when* and *how*: Evidence from free relatives. *Linguistic Inquiry* 40, 155 - 164.
- CARDINALETTI, A. 2004. Towards a Cartography of Syntactic Positions. *The Structure of CP and IP: The Cartography of Syntactic Structures, vol.2*, ed. L.Rizzi, 115 - 165. Oxford: Oxford University Press.
- CHAVES, R. P. (in press). On the grammar of extraction and coordination. To appear in *Natural Language and Linguistic Theory*.
- CHESHIRE, J., ADGER, D. & FOX, S. 2010. Relative *who* and the actuation problem. Ms. Queen Mary University of London.
- CHOMSKY, N. 1972. Some empirical issues in the theory of transformational grammar. *Goals of Linguistic Theory*, ed. P.S. Peters, 63 - 130. Englewood Cliffs: Prentice Hall Inc.
- CHOMSKY, N. 1973. Conditions on transformations. *A Festschrift for Morris Halle*, ed. S.R. Anderson & P.Kiparsky, 232 - 286. New York: Holt, Rinehart and Winston.
- CHOMSKY, N. 1977. On wh-movement. *Formal Syntax*, ed. P.W. Culicover, T. Wasow & A. Akmajian, 71 - 132. New York: Academic Press.
- CHOMSKY, N. 1986. *Barriers*. Cambridge, MA: MIT Press.
- CHOMSKY, N. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.
- CHOMSKY, N. & LASNIK, H. 1977. Filters and Control. *Linguistic Inquiry* 8, 425 - 504.
- CINQUE, G. 1990. *Types of \bar{A} -Dependencies*. Cambridge, MA: MIT Press.
- CINQUE, G. & RIZZI, L. 2010. The cartography of syntactic structures. *The Oxford Handbook of Grammatical Analysis*, ed. B. Heine & H. Narrog, 51 - 65. Oxford: Oxford University Press.
- COLLINS, C. 2007. Home sweet home. *NYU Working Papers in Linguistics* 1, 1 - 34.
- COLLINS, C. & POSTAL, P.M. (2012) *Imposters: A Study of Pronominal Agreement*. Cambridge, MA: MIT Press.
- CRAENENBROECK, J. VAN. 2004 *Ellipsis in Dutch Dialects*. PhD diss., Leiden University.
- CRAENENBROECK, J. VAN. 2010. *The syntax of Ellipsis: Evidence from Dutch Dialects*. Oxford: Oxford University Press.
- CRUSCHINA, S. 2006. Informational focus in Sicilian and the left periphery. *Phases of Interpretation*, ed. M. Frascarelli, 363 - 385. Berlin: Mouton de Gruyter.

- CULICOVER, P.W. & JACKENDOFF, R. 1999. The view from the periphery: The English comparative correlative. *Linguistic Inquiry* 30, 543 - 571.
- DEMONTE, V. & FERNÁNDEZ SORIANO, O. 2009. Force and finiteness in the Spanish complementizer system. *Probus* 21, 23 - 49.
- EMONDS, J.E. 1976. *A transformational approach to English syntax*. New York: Academic Press.
- EMONDS, J.E. 1987. The Invisible Category Principle. *Linguistic Inquiry* 18, 613 - 632.
- EPSTEIN, S.D., PIRES A., & SEELY, T.D. 2005. EPP in T: More controversial subjects. *Syntax* 8, 65 - 80.
- FOX, D. & LASNIK, H. 2003. Successive-Cyclic Movement and Island Repair: The Difference between Sluicing and VP-Ellipsis. *Linguistic Inquiry* 34, 143 - 154.
- FRASCARELLI, M. & HINTERHÖLZL, R. 2007. Types of topics in German and Italian. *On Information Structure, Meaning and Form*, ed. S. Winkler & K. Schwabe, 87 - 116. Amsterdam: John Benjamins.
- GELDEREN, E. VAN. 2009. Renewal in the left periphery: Economy and the complementiser layer. *Transactions of the Philological Society* 107, 131 - 195.
- HAEGEMAN, L. 1994. *Introduction to Government and Binding Theory: Second Edition*. Oxford: Blackwell.
- HAEGEMAN, L. 2000. Inversion, non-adjacent inversion and adjuncts in CP. *Transactions of the Philological Society* 98, 121 - 160.
- HAEGEMAN, L. 2003. Notes on long adverbial fronting in English and the left periphery. *Linguistic Inquiry* 31, 640 - 649.
- HAEGEMAN, L. 2006a. Argument Fronting in English, Romance CLLD and the Left Periphery. *Negation, Tense and Clausal Architecture: Cross-linguistic Investigations*, ed. R. Zanuttini, H. Campos, E. Herburger, & P. Portner, 27 - 52. Georgetown: Georgetown University Press.
- HAEGEMAN, L. 2006b. Conditionals, factives and the left periphery. *Lingua* 116, 1651 - 1669.
- HAEGEMAN, L. 2007. Operator movement and topicalization in adverbial clauses. *Folia Linguistica* 18, 485 - 502.
- HAEGEMAN, L. 2009. The movement analysis of temporal adverbial clauses. *English Language and Linguistics* 13, 385-408.
- HAEGEMAN, L. (2010) The internal syntax of adverbial clauses. *Lingua* 120: 628-648.
- HAEGEMAN, L. 2011. The movement derivation of conditional clauses. *Linguistic Inquiry* 41, 595 - 621.
- HAEGEMAN, L. (in press). *Main Clause Phenomena and the Clause Periphery*. Oxford: Oxford University Press.
- HARTMAN, J. & AI, R.R. 2009. A Focus account of Swiping', Ms. MIT and Harvard.
- HAWKINS, J.A. 2001. Why are categories adjacent? *Journal of Linguistics* 37, 1 - 34.
- HORNSTEIN, N., LASNIK, H. & URIAGEREKA, J. 2003. The dynamics of islands: Speculations on the locality of movement. *Linguistic Analysis* 33, 149 - 175.
- Hudson, Richard. 2003. Trouble on the left periphery. *Lingua* 113: 607 - 642.
- KATZ, J.J. & POSTAL, P.M. (1964) *An Integrated Theory of Linguistic Descriptions*. Cambridge, MA: MIT Press.
- KAYNE, R.S. 1994. *The Antisymmetry of Syntax*. Cambridge, MA: MIT Press.

- KAYNE, R.S. 2005. *Movement and Silence*. Oxford: Oxford University Press.
- KJELLMER, G. 1988. Conjunctive/adverbial *which* in substandard English. *Studia Anglica Posnaniensa* 21, 125 - 37.
- KJELLMER, G. 2010. And which: A note on (more or less) coordinated relatives. *English Studies* 91, 457 - 466.
- KOOPMAN, H. 2000. *The Syntax of Specifiers and Heads*. New York: Routledge.
- KOOPMAN, H. & SZABOLSCSI, A. 2000. *Verbal complexes*. Cambridge, MA: MIT Press.
- KUHA, M. 1994. Attitudes towards users of co-ordinate *which*. Unpublished paper, Indiana University, Bloomington.
- LASNIK, H. 2001. When Can You Save a Structure by Destroying It? *Proceedings of the North East Linguistic Society* 31, 301 - 320.
- LOOCK, R. 2005 *Appositive Relative Clauses in Contemporary Written and Spoken English: Discourse Functions and Competitive Structures*, PhD diss., University of Lille III (UMR 8528 SILEX, CNRS).
- LOOCK, R. 2007. Are you a good *which* or a bad *which*? The relative pronoun as a plain connective. *Connectives as Discourse Landmarks*, ed. A. Celle & R. Huart, 71-87. Amsterdam: Benjamins.
- LOOCK, R. 2010. *Appositive Relative Clauses in English: Discourse Functions and Competing Structures*. Amsterdam: John Benjamins.
- MCCAWLEY, J. 1988. Adverbial NPs: Bare or clad in see-through garb? *Language* 64, 583 - 590.
- MERCHANT, J. 2001. *The Syntax of Silence: Sluicing, Islands, and the Theory of Ellipsis*. Oxford: Oxford University Press.
- MERCHANT, J. 2002. Swiping in Germanic. *Studies in Comparative Germanic Syntax*, ed. W. Abraham and J.-W. Zwart, 295-321. Amsterdam: John Benjamins.
- MERCHANT, J. 2008. Variable island repair under ellipsis. *Topics in Ellipsis*, ed. K. Johnson, 132-153. Cambridge: Cambridge University Press.
- MILLER, J. 1988. *That*: A relative pronoun? *Edinburgh Studies in the English Language*, ed. J.M. Anderson & M. Macleod, 113 - 119. Edinburgh: John Donald.
- MILLER, J. 1993. The grammar of Scottish English. *Real English*, ed. J. Milroy & L. Milroy, 99-138. London: Longman.
- NAKAO, C. 2009. *Island Repair and Non-Repair by PF Strategies*. PhD diss., University of Maryland.
- NOMURA, T. 2006. *ModalP and Subjunctive Present*. Tokyo: Hituzi Syobo.
- ORMAZABAL, J. (1995) *The Syntax of Complementation*. PhD diss., University of Connecticut.
- POLETTI, C. 2000. *The Higher Functional Field. Evidence from Northern Italian Dialects*. Oxford: Oxford University Press.
- POLLARD, C. & SAG, I. (1994) *Head-Drive Phrase Structure Grammar*. Chicago: University of Chicago Press.
- POSTAL, P.M. 1972. On Some Rules that Are Not Successive Cyclic. *Linguistic Inquiry* 3, 211 - 222.
- POSTAL, P. 1998. *Three studies of extraction*. Cambridge, MA: MIT Press.
- RADFORD, A. 1979. The functional basis of transformations. *Transactions of the*

Philological Society, 77, 1 - 42

RADFORD, A. 1997. *Syntactic Theory and the Structure of English*. Cambridge: Cambridge University Press.

RADFORD, A. & IWASAKI, K. 2012. Swiping in English: Construction or Derivation? Ms., University of Essex and Waseda University.

RADFORD, A., FELSER, C. AND BOXELL, O. in press. Preposition copying and pruning in present-day English. To appear in *English Language and Linguistics*.

RICHARDS, N. 1997. *What moves where when in which language?* PhD diss., MIT.

RICHARDS, N. 2001. *Movement in Language: Interactions and Architectures*. Oxford: Oxford University Press.

RIEMSDIJK, H. VAN. 1978. *A Case Study in Syntactic Markedness: The Binding Nature of Prepositional Phrases*. Dordrecht: Foris Publications.

RIZZI, L. 1990. *Relativised Minimality*. Cambridge, MA: MIT Press.

RIZZI, L. 1996. Residual verb second and the *wh*-criterion'. *Parameters and Functional Heads*, ed. A. Belletti & L. Rizzi, 63 - 90. Oxford: Oxford University Press.

RIZZI, L. 1997. The fine structure of the left periphery. *Elements of Grammar*, ed. L. Haegeman, 281 - 337. Dordrecht: Kluwer.

RIZZI, L. 2001. On the position "Int(errogative)" in the left periphery of the clause. *Current Issues in Italian Syntax*, ed. G. Cinque & G. Salvi, 287-296. Amsterdam: Elsevier.

RIZZI, L. 2004. Locality and Left Periphery. *Structures and Beyond: The Cartography of Syntactic Structures*, vol.3, ed. A. Belletti, 223 - 251. Oxford: Oxford University Press.

RIZZI, L. 2006. On the form of chains: Criterial positions and ECP effects. *Wh-Movement: Moving On*, ed. L. Cheng & N. Corver, 97 - 133. Cambridge, MA: MIT Press.

RIZZI, L. & SHLONSKY, U. 2005. Strategies of subject extraction. Ms., Universities of Siena and Geneva.

ROBERTS, I. 2004. The C-system in Brythonic Celtic languages and the EPP. *The Structure of CP and IP. The Cartography of Syntactic Structures*, vol. 2, ed. L. Rizzi, 297 - 328. Oxford: Oxford University Press.

ROBERTS, I. & ROUSSOU, A. 2002. The extended projection principle as a condition on the tense dependency. *Subjects, Expletives and the EPP*, ed. P. Svenonius, 125-155. Oxford: Oxford University Press.

ROSS, J.R. 1967. *Constraints on Variables in Syntax*. PhD diss., MIT.

ROSS, J.R. 1969. Guess Who? *Chicago Linguistic Society Papers* 5, 252 - 286.

ROSS, J.R. 1970. On declarative sentences. *Readings in English Transformational Grammar*, ed. R. Jacobs & P.S. Rosenbaum, 222-272. Waltham, MA: Ginn.

ROSS, J.R. 1986 *Infinite Syntax*. Norwood, NJ: Ablex Publishing Corporation.

SAFIR, K. 1986. *Syntactic Chains*. Cambridge: Cambridge University Press.

SCHÜTZE, C. 2001. On the nature of default case. *Syntax* 4, 205 - 38.

TAGLIAMONTE, S. 2002. Variation and change in the British relative marker system. *Relativisation on the North Sea Littoral*, ed. P. Poussa 117-134. Munich: Lincom Europa.

TERZI, A. 2008. Locative prepositions as modifiers of an unpronounced noun. *Proceedings of WCCFL* 26, 471 - 480.

TERZI, A. 2010a. On null spatial Ps and their arguments. *Catalan Journal of Linguistics* 9, 167 - 187.

- TERZI, A. 2010b. Locative Prepositions and *Place*. *Mapping Spatial PPs. The Cartography of Syntactic Structures, volume 6*, ed. G. Cinque & L. Rizzi, 196 - 224. Oxford: Oxford University Press.
- TOTTIE, G. 1997. Relatively speaking: Relative marker usage in the British National Corpus. *To Explain the Present: Studies in the Changing English Language in Honour of Matti Rissanen*, ed. T. Nevalainen & L. Kahlas-Tarkka, 465 - 481. Helsinki: Société Néophilologique.
- TSAI, WEI-TIEN DYLAN. 1997. On the absence of island effects. *Tsing Hua Journal of Chinese Studies* 27, 125 - 149.
- VERGNAUD, J.-R. 1974. *French Relative Clauses*. PhD diss., MIT.
- ZHANG, N. 2008. Gapless relative clauses as clausal licensors of relational nouns. *Language and Linguistics* 9, 1005 - 1028.
- ZWICKY, A.M. 2002. I wonder what kind of construction that this example illustrates. *The Construction of Meaning*, ed. D. Beaver, L.D. Casillas Martínez, B.Z. Clark & S. Kaufmann 219-248. Stanford: CSLI Publications.
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Footnotes

1. Earlier versions of this paper were presented by Anonymous at the Guangdong University of Foreign Studies in December 2011, the Autonomous University of Barcelona in May 2012, and the University of Sevilla in May 2012. We are grateful to the audiences there and to Bob Borsley, Mai Kuha, Kristy Liu, Rudy Loock, Javier Martín-González, Jason Merchant, Paul Postal, Arhonto Terzi and Niina Zhang for helpful observations. Structural representations are simplified in various ways, including by showing only those parts of the structure relevant to the discussion at hand and by not showing intermediate projections in labelled bracketings; <angle brackets> are used to mark silent constituents. Authors' names are listed in alphabetical order; please send correspondence to both authors.

2. Chomsky (1977) takes the null operator in relatives like (1b,c) to be a deleted wh-word, whereas Rizzi (1990), Cinque (1990), Haegeman (1994) and Radford (1997) take it to be an inherently null operator. Different versions of the ANTECEDENT RAISING analysis can be found in Vergnaud (1974), Bianchi (1995, 1999, 2000), Kayne (1994), and Aoun and Li (2003); for a critical perspective, see Pollard and Sag (1994), and Borsley (1997, 2001). For expository purposes, we will assume a WH-MOVEMENT analysis of gap relatives and will set aside the possibility (argued for in Chomsky 1986, 1995) that a fronted wh-constituent moves to the edge of a (transitive) verb phrase before moving to the edge of CP.

3. The data were taken from live unscripted broadcasts in order to avoid possible prescriptive influences from copy editors. The main sources were popular sports broadcasts from BBC Radio 5 Live, BBC Radio 5 Sports Extra, BBC World Service, Talk Sport

Radio, BBC TV, ITV and Sky Sports TV. Programmes recorded included sports discussion forums (like Radio 5's *Monday Night Club* and Sky's *Sunday Supplement*), sports phone-ins (like Radio 5's *World Football Phone-In* and Sky's *You're on Sky Sports*) and live sports commentaries. The data were digitally recorded (and relevant examples transcribed) by Anonymous from May 2010 to May 2012. The recordings comprised around 700 hours and 5 million words.

4. It should be noted, however, that Kjellmer, Kuha and Loock all claim that *which* can function as a co-ordinating conjunction in other uses.

5. Relative pronouns with clausal antecedents generally either follow the antecedent, or are embedded internally within it, as in (i) below:

(i) The Prime Minister (*which* annoyed the opposition) refused to back down
However, Rudy Loock (pc) draws our attention to examples such as the following, where *which* appears to precede the clause which serves as its antecedent (although *which* must follow the *and* introducing the relevant clause):

(ii) He quit his job, and (*which* was really surprising) found another one the next day
It is not entirely clear what is going on in such cases, but one possibility (suggested by the fact that the Italian counterpart of *which* in such sentences is *cosa che* 'thing which') is that *which* has a null antecedent in such cases (e.g. perhaps a null counterpart of *something*).

6. Although (to simplify exposition) we adopt the traditional CP analysis of the clause periphery here, work within the *Cartographic* tradition over the past two decades has argued that CP should be split into a number of distinct peripheral projections: see, for example, Benincà (2001, 2006, 2010a, 2010b), Benincà & Poletto (2004), Bocci (2004), Cardinaletti (2004), Cinque and Rizzi (2010), Cruschina (2006), Frascarelli & Hinterhölzl (2007), Haegeman (2000, 2003, 2006a, 2006b, 2007, 2009, 2010, 2011, in press), Poletto (2000), Rizzi (1997, 2001, 2004, 2006), and Rizzi & Shlonsky (2005). From a Cartographic perspective, the *wh*-pronoun in gapless relatives could be taken to be the specifier of the highest projection in the clause periphery (e.g. Spec-ForceP in the analysis of Rizzi 1997).

7. The only potential example in the BBE corpus of a preposition being silent when it has an interrogative complement is the following (representing the annual British obsession with whether Andy Murray can win the Wimbledon tennis tournament):

(i) What sort of shape is he, going into Wimbledon, then? (Mark Pougatch, BBC Radio 5)

Here it might seem as if *what sort of shape* is the complement of a 'missing' preposition *in*. If so, this may be an example of a *silent* preposition (in the sense of Caponigro and Pearl 2008, 2010) rather than a preposition which is ghosted in *wh*-clauses, since examples like (ii) below suggest that some speakers allow *in* to be silent in nominals as well:

(ii) He's been <in> good shape all weekend (Ross Braun, BBC1 TV)

Alternatively, (i) could be a (prepositionless) question about his physical shape (e.g. whether he is lean and mean). A third possibility is that (in informal rapid speech) the monosyllabic bisegmental preposition *in* at the end of a sentence underwent phonological

reduction/truncation by virtue of being weak and unstressed (the main stress falling on *shape*).

8. On the internal structure of PP, see Terzi (2008, 2010a, 2010b). Bob Borsley (pc) asks why (in standard varieties of English) only *to/at* can be ghosted (and not e.g. *from* in *Where is he coming *(from)?*). Collins (2007) takes *from* to have a null *at*-complement, in which case there is also ghosting of *at* in such sentences. More generally, it may be that *to/at* are relatively ‘light’ prepositions whose locative interpretation can be inferred from their locative complement. In spoken English, it appears (from examples like that below) that a wider range of prepositions can be ghosted with a fronted *r*-pronoun complement:

(i) That’s [*where* people are coming <from> in large numbers] (Interviewee, BBC Radio 5)
Borsley also raises the question of how to deal with standard English “examples like *the day I left*, which appear to involve the deletion of *on* given *the day on which I left*, and *the reason I left*, which presumably involve deletion of *for* given *the reason for which I left*.” However, such examples are unlikely to be wh-ghosted variants of *which* relatives, since structures like **the day/reason which I left* are ungrammatical: it is more likely that they are wh-ghosted variants of *the day when I left* and *the reason why I left*. Hence they can be treated like standard English: *Where did he go? When did he leave? Why did he leave?* We assume that all of these involve ghosted pied-piped prepositions.

9. A possibility which we leave open here is that deletion of the complementiser *that* may be the result of a different type of operation from Ghosting. This is suggested by the fact that *that* can be deleted in cases like *I said (that) I was tired*, where its deletion does not serve to obviate violation of the Edge Constraint, and may be connected to the fact that it has little semantic content if clauses are interpreted as declarative by default (as in Roberts and Roussou 2002 and Roberts 2004). Some have suggested that that null complementisers arise via cliticisation to a higher head (e.g. Ormazabal 1995, Bošković and Lasnik 2003, and Epstein, Pires and Seely 2005); for discussion of further factors governing the null spellout of *that*, see Hawkins (2001) and Nomura (2006). A related question is whether deletion of relative pronouns is the result of Ghosting, or of an alternative deletion operation (permissible where the content of the relative pronoun can be recovered from a locally c-commanding antecedent).

10. Bob Borsley (pc) suggests a simpler Ghosting analysis, under which “Certain prepositions can be deleted in certain registers in their original position before the copy of a moved wh-element.” However, this analysis would wrongly predict (i) that prepositions are deleted when they have an interrogative wh-complement (and yet we have shown that this only happens when they have a relative pronoun complement), and (ii) that unstrandable prepositions cannot be ghosted (contrary to what we find in 20-24).

11. Rudy Loock (pc) asks about the relative frequency of gapless relatives with *which* and *who*. Our recordings contain 118 relative clauses where *which* is the object of a ghosted preposition, and 17 in which *who* is the object of a ghosted preposition. Moreover, if we look at ghosted wh-less relative clauses (i.e. *that* relatives and zero relatives), we find that preposition ghosting occurs in 75 relative clauses with a non-animate antecedent (where, by

hypothesis, *which* has been inverted and ghosted), but only in 8 relative clauses with a human antecedent (where, by hypothesis, *who* has been inverted and ghosted). In our terms, this could mean that for some speakers, only *which* and not *who* has developed a caseless counterpart (and so can undergo Prepositional Inversion and trigger Prepositional Ghosting), whereas for other speakers both *which* and *who* have caseless counterparts.

12. However, Kristy Liu (pc) points out that many of the types of gapless relative discussed in this paper have no immediate counterparts in Chinese, suggesting that any potential parallel is far from exact.

13. A question raised by the analysis in (52, 54) is why the clausal complement of SAY can't be introduced by the overt complementiser *that*: the answer presumably lies in a constraint that the complement of a ghosted predicate cannot be headed by an overt complementiser (an assumption necessary under Ross's analysis in 53b, in order to account for why declarative main clauses are not introduced by *that*). A second question is how Predicate Ghosting can seemingly delete a non-constituent string like I WOULD SAY. The answer may be that the wh-clause *What else could he have done in the circumstances?* is moved to the edge of a peripheral functional projection FP which is above TP but below the CP containing *which*, as in (i) below

(i) [CP *which* [FP *what else could he have done...* [TP I would say about <which> <what else...>]]]

What we have termed *Predicate Ghosting* would then involve deletion of a unitary constituent (i.e. of the whole of TP). Such an analysis would account for the fact that we often find a pause after *which*. Fronting of the italicised clause in (i) may be related to fronting of the italicised clause in structures like:

(ii) '*What else could he have done?*' you might say/ask/wonder.

14. However, a sequence like *for-for* in (60a) can be ameliorated if there is a pause between the two words, or if the first *for* has a full vowel and the second has a reduced vowel. This may be why one of the two authors finds the non-ghosted counterparts of (60) 'awkward' while the other finds them 'unacceptable'.

15. However, if *wh+that* structures in spoken English don't necessarily violate the Edge Constraint, this could be argued to undermine the plausibility of claiming that deletion of the wh-word or complementiser in such structures serves to avoid violation of the constraint. See fn.9 for some relevant discussion.