

Factivity and complementizer omission in English embedded gapping¹

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(Received 6 December 2020; revised 16 September 2022)

Taking as a starting point the variation in introspective judgments on embedded gapping in English in the literature, the main goal of this paper is to test the ‘No Embedding Constraint’ experimentally. Building on a first experimental study designed to measure the interaction between THAT-omission and factivity in English embedded complement clauses, we conducted two experiments testing the role of the complementizer in embedded gapping, paying special attention to the semantic nature of the matrix predicates (non-factives vs semi-factives vs true factives). Our results show, on the one hand, that the ‘No Embedding Constraint’ makes two strong claims that are not backed up by our experimental findings, and, on the other hand, that embedded gapping is affected by both the presence/absence of THAT and by the semantic class of the matrix predicate in English. In particular, embedded gapping seems to be more acceptable under non-factive verbs, especially in the absence of a complementizer. Both constraints (THAT-omission and factivity) can be accounted for by a constructionist fragment-based analysis, where the gapped clause is a non-finite phrase that has to address the same Question Under Discussion as its source. This explains, in turn, why embedded gapping under true factive predicates is considered significantly less acceptable. We show that the acceptable cases of embedded gapping involve true syntactic embedding (so, the matrix clause has no parenthetical use). We conclude that English has the same sensitivity to the semantic class of the matrix predicate as other languages, but that the requirements on the presence/absence of THAT are English specific.

KEYWORDS: complementizer, ellipsis, embedding, English, experimental syntax, factivity, gapping

[1] We are extremely grateful to the three anonymous reviewers for all the hard and thorough work they put into the reviewing process of our manuscript. This research was supported by the Laboratoire d’Excellence (LabEx) Empirical Foundations of Linguistics (EFL) project, strand 2 *Experimental grammar from a cross-linguistic perspective*, operation *Experimental syntax* (Laboratoire de Linguistique Formelle & Université Paris Cité).

1. INTRODUCTION

Gapping, unlike most elliptical constructions (such as pseudogapping, verb phrase ellipsis, sluicing, etc.), is usually assumed to be ruled out in embedded contexts (Hankamer 1979; Sag 1976; Johnson 2009, 2014, 2018, among others). See, in this respect, the contrast in Example (1): the pseudogapped clause *OTHERS HAD SHRIMP* (containing two remnants surrounding the auxiliary) allows embedding under *SHE CLAIMS THAT* in Example (1a)², whereas the gapped clause *OTHERS SHRIMP* (only containing two remnants, in the absence of the main verb) in Example (1b) is disallowed across the embedded clause boundary. The same constraint is typically assumed to apply to stripping constructions, cf. Johnson (2018): in Example (1c), the remnant *JONES TOO* cannot be embedded, as is the case for gapped clauses.

- (1) (a) Some had eaten mussels and **she claims that** others had shrimp.
 (b) *Some had eaten mussels and **she claims that** others shrimp. (Johnson 2009: 293, (15))
 (c) *Smith left and **everyone thought that** Jones too. (Johnson 2018: 579, (68a))

Hankamer (1979: 20) formalises this constraint on gapping as the ‘Downward Bounding’ constraint, according to which, gapping “does not go down into subordinate clauses”, operating “strictly in structures directly conjoined with each other”. The Downward Bounding Constraint is further discussed in detail by Johnson (1996/2004, 2009, 2014, 2018), who dubs it the ‘No Embedding Constraint’.³ Its general formulation (applying to gapping as well as stripping) is given in Example (2). This constraint accounts for the ungrammaticality of Examples (1b) and (1c) above since the embedding verb is not included in the ellipsis.

[2] As the Example (1a) is ambiguous (i.e. *HAD* could be interpreted as a full verb, and on that reading, the sentence is not elliptical), we provide in Example (i) below an attested example with embedded pseudogapping (cf. Miller 2014).

(i) [...] we want to treat your POWs [prisoners of war] with dignity and **we hope that** you do ours as well. (*CORPUS OF CONTEMPORARY AMERICAN ENGLISH, COCA*, spoken, 2008–)

[3] In this paper, for the sake of readability, we use the label ‘No Embedding Constraint’ instead of ‘Downward Bounding Constraint’. Note, however, that the ‘No Embedding Constraint’ in Johnson (2014) has two parts: (a) it is impossible to embed the gapped conjunct (cf. Hankamer’s Downward Bounding Constraint, defined in Example (2) above), and (b) it is impossible to embed the antecedent to a gap in the first clause (cf. Hankamer’s Upward Bounding Constraint, defined in Example (i) below). In this paper, we focus on the Downward Bounding Constraint. For a discussion on the Upward Bounding Constraint, see Bonke & Repp (2022).

(i) *Upward Bounding Constraint* (Johnson 2018: 590, (102))
 ‘The antecedent for a Gap must include the highest term in the verbal sequence of the first conjunct’.

(2) *Downward Bounding* (Johnson 2018: 579, (70))

“Let α be some member of the verbal sequence of the right conjunct, and β be the set of elements in the sequence that c-command α . If Gapping or Stripping includes α then it must include β .”

The ‘No Embedding Constraint’ is considered by Johnson as strong evidence for a ‘low’/subclausal coordination analysis of gapping (also called ‘Small Conjunct Analysis’; see Section 2 for other arguments). Under this approach, gapping involves a coordination of small verb phrases (v Ps), under a single Tense head shared across conjuncts, and not a coordination of clauses. Moreover, it is assumed that a Tense Phrase (TP) from a matrix clause may not dominate a v P from an embedded one; therefore, the low coordination account of gapping automatically rules out violations of the ‘No Embedding Constraint.’

However, the ban on embedded gapping does not seem to be a strong constraint, as shown by the empirical evidence from other languages, such as Persian (Farudi 2013, Bîlbîie & Faghiri 2022), Spanish (Bîlbîie & de la Fuente 2019) and Romanian (Bîlbîie *et al.* 2021), where the gapped clause can appear in an embedded configuration, violating the ‘No Embedding Constraint’ (see Section 5.3).

Though gapping is found more often than not in coordination structures, it may also occur in some ‘oppositive’ structures, such as Example (3), and in some temporal or causal clauses, as illustrated in Example (4) with parallel remnants (and prosodic stress), which are usually considered subordinate.

- (3) (a) Men are valued for their economic status, **whereas** women for their appearance. (Izutsu 2008: 654)
 (b) Boys are encouraged to go out for work, **while** girls to stay at home. (Izutsu 2008: 654)
- (4) (a) Truth is YOU will be in a position to hire ME, before I, YOU. (Park 2016: 300)
 (b) As for me all a little pup has to do is give me one of those sad, entreating looks and I am his prisoner, his pal, his confidant, and slave... Maybe WE love THEM, because THEY, US. (Park 2016: 300)

In the theoretical literature, embedded gapping is controversial in English. According to Weir (2014), fragments in general can be embedded in English in some very restricted cases. First, they become acceptable if the complementizer is absent (Morgan 1973), cf. Examples (5) and (6); in Example (6), the fragment NP BOB can be embedded under I THINK only without THAT.

- (5) Q: What does Nixon want for breakfast?
 A: Kissinger says eggs. (Morgan 1973)
- (6) Q: Who is going to receive a stipend?
 A: I think (*that) Bob. (Weir 2014: 305, (633))

The same constraint is discussed for embedded stripping by Wurmbrand (2017), who proposes the generalisation in Example (7).

(7) *Embedded Stripping Generalisation* (Wurmbrand 2017: 345)

“Stripping of embedded clauses is only possible when the embedded clause lacks a [Complementizer Phrase] CP.”

Both Weir (2014) and Wurmbrand (2017) suggest that similar restrictions apply to gapping, the omission of the complementizer showing ‘an ameliorating effect in gapping’ (Wurmbrand 2017: 361), as observed in Examples (8) and (9): in both sets of examples, without *THAT*, embedded gapping improves significantly. Park (2019) provides similar attested embedded occurrences, found on the Internet, as illustrated in Example (10).

- (8) (a) *John ate oysters and **I think that** Mary swordfish.
 (b) ?John ate oysters and **I think** Mary swordfish. (Weir 2014: 332, (678a–679))
- (9) (a) *Some will eat mussels and **she claims that** others shrimp.
 (b) %Some will eat mussels and **she claims** others shrimp. (Wurmbrand 2017: 361, (43e–f))
- (10) (a) As time progressed, the more comfortable I got with him and **I think** him with me. (Park 2019: 38, (83b))
 (b) When we talk music, I don’t have any trouble with him at all, and **I don’t think** him with me either. (Park 2019: 38, (83c))

However, these observations stand in sharp contrast with Hankamer (1979), Sag (1976) and Johnson (1996/2004), who claim embedded gapping to be ungrammatical, with or without a complementizer, as shown in Example (11).

- (11) (a) *Alfonso stole the emeralds, and **I think (that)** Mugsy the pearls. (Hankamer 1979: 19, (23))
 (b) *Alan went to New York, and **I know (that)** Betsy to Boston. (Sag 1976: 190, (3.1.3))
 (c) *Alan went to New York, and **it seems (that)** Betsy to Boston. (Sag 1976: 190, (3.1.3))
 (d) *Mittie ate nattoo, and **I thought** Sam rice. (Johnson 1996/2004: (60b))

Moreover, for Johnson (1996/2004), gapping and answer fragments differ: according to him, answer fragments allow embedding under *I THINK* in Example (12a), while gapping does not in Example (12b).

- (12) (a) Q: Who married who? A: **I think** Sam, Mittie and Liz, Vinnie.
 (b) *Sam married Mittie and **I think** Liz Vinnie. (Johnson 1996/2004: 102)

Second, beyond the restriction related to the absence of the complementizer, Weir (2014) observes that embedding predicates do not seem to behave the same:

some verbs seem to embed more easily than others. According to Weir (2014), only ‘bridge’ verbs (e.g. non-factive predicates, such as BELIEVE, THINK, SUPPOSE, SUSPECT, IMAGINE) allow fragment embedding, as opposed to ‘non-bridge’ verbs (e.g. factives, such as KNOW, REMEMBER, REALIZE, FIND OUT, BE SURPRISED, as previously proposed by de Cuba & MacDonald 2013 for Spanish). This suggests that there is a correlation between fragment embedding and extraction: predicates which do not allow extraction from their complements, do not allow fragment embedding either. However, his intuitions, given in Example (13), reflect gradient acceptability rather than binary categorical judgments. Being aware of the heterogeneous behaviour of factive verbs, he notes: “it is not clear that extraction of the object from a verb like *find out* [...] is degraded at all; the literature reports varying judgments on such cases” (Weir 2014: 235). He extends his observations to gapping, suggesting that the verbs which allow embedded fragments in English would allow embedded gapping as well, as illustrated in Example (14). Though not all ‘bridge’ verbs seem to be equally appropriate in Example (14a), he postulates a clear contrast between Examples (14a) and (14b, c).

- (13) What did John eat?
- (a) Mary {**thinks** / **believes** / **was told** / **suspects** / **said** / **hopes** / **supposed**} the cookies.
 - (b) ??Mary {**found out** / **confirmed** / **remembered** / **realized**} the cookies.
 - (c) *Mary {**is proud** / **is surprised**} the cookies. (Weir 2014: 235, (484))
- (14) John ate oysters...
- (a) and I {**?think** / **?believe** / **?hope** / **suspect** / **?was told** / **imagine**} Mary swordfish.
 - (b) and I {**?*found out** / ***remember** / ***deny** / **?*know**} Mary swordfish.
 - (c) and I {***am proud** / ***am angry** / ***am surprised**} Mary swordfish. (Weir 2014: 333, (680))

The main goal of this paper is to gather experimental data to obtain a deeper insight into embedded gapping in English. It is important to note, however, that the kind of behavioural data that will be gathered is based on the notion of ‘acceptability’, which refers to whether a sentence sounds more or less acceptable in a particular context. Acceptability is, thus, a gradable notion (i.e. sentences can be fully acceptable or partially acceptable, all the way down to completely unacceptable). Acceptability is not the same as the theoretical notion of ‘grammaticality’, which refers to the hypothesis of a given sentence possibly being generated by the grammar of the language or not. Grammaticality is usually considered not to be gradable, but rather binary (i.e. sentences are either grammatical or ungrammatical). There is, however, a relation between acceptability and grammaticality, where ungrammatical sentences tend to be judged as unacceptable. Although this is not necessarily always the case: grammatical sentences can be judged as unacceptable (e.g. because they are hard to process) and, likewise, ungrammatical sentences can

be judged as acceptable (e.g. because of ‘good enough processing’, cf. Ferreira et al. 2002; Ferreira & Patson 2007). In order to test the grammaticality of embedded gapping, the accounts presented above rely either on production (corpus) data or on introspective judgments, leading to significant variation in the judgments and even to contradictory data (compare Examples (8–9) with Examples (11–12)). We argue, therefore, that only an approach based on the acceptability judgments of naive participants can provide a more fine-grained insight into the phenomenon of embedded gapping in English (i.e. the ‘No Embedding Constraint’), in general, and into the factors that might render embedded gapping more or less acceptable (e.g. the semantic class of the embedding predicate and the presence/absence of the complementizer), in particular. More specifically, if the ‘No Embedding Constraint’ is indeed a purely grammatical constraint, one would expect a very low acceptability of gapping in all environments irrespective of these factors.

The present paper is structured as follows: In [Section 2](#), we spell out our research questions and predictions, followed by [Section 3](#), where we present a first experiment, testing factivity in relation to complementizer omission in embedded complement clauses in English, outside coordination and ellipsis. Subsequently, in [Section 4](#), we present two experiments testing the ‘No Embedding Constraint’ in gapping, in order to observe the role of the complementizer across different semantic types of predicates. Finally, [Section 5](#) provides a general discussion of our experimental results, and focuses, *inter alia*, on the consequences on the syntactic analysis of gapping in English.

2. THE PRESENT STUDY

Before spelling out our research questions, we briefly present the main syntactic accounts of gapping and the predictions they make with respect to embedded gapping.

2.1 *Syntactic accounts of gapping*

Depending on the size of the gapped material, two configurations have been proposed: Small Conjunct Gapping (henceforth, SCG), involving roughly VP-sized conjuncts (subclausal/‘low’ coordination), and Large Conjunct Gapping (henceforth, LCG), involving clause-sized conjuncts (clausal/‘high’ coordination). Each of them comes in various versions. However, listing all of them lies beyond the scope of this paper. Within SCG approaches, we discuss the movement-based analysis of gapping (involving either across-the-board movement of the shared verb out of each conjunct, cf. Johnson 1996/2004, 2009, or sideward movement, cf. Winkler 2005), illustrated in Example (15a). Within LCG approaches, we discuss the classical deletion-based analysis (Ross 1970; Kuno 1976; Sag 1976), involving deletion of a Tense Phrase (TP) or Complementizer Phrase (CP), as illustrated in Example (15b), and the competing construction-based analysis in

terms of fragments (Culicover & Jackendoff 2005; Abeillé et al. 2014; Bîlbîie 2017), which appeals to a dedicated meaning-form rule mapping a headless structure to a clausal meaning, as shown in Example (15c).⁴

- (15) (a) Paul₁ TP[ordered₂ [_{vP}[t₁ t₂ a beer] and _{vP}[John t₂ a whisky]]].
 (b) Paul ordered a beer and TOPP[John₁ FocP[a whisky₂ TP[t₁ ~~ordered~~ t₂]]].
 (c) Paul ordered a beer and S[NP[John] NP[a whisky]].

The main argument for an SCG analysis of gapping is semantic: as observed by Siegel (1984, 1987), McCawley (1993) and Johnson (1996/2004, 2009), gapping allows cross-conjunct binding and wide scope of some operators, such as modals, negation or quantifiers. Example (16a) illustrates this for modals and negation: the negated modal CAN'T in the first conjunct yields a wide scope above the coordination, incompatible with the interpretation in Example (16b).⁵

- (16) (a) John can't eat steak and Mary just spam (it's not fair).
 (b) ≠ John can't eat steak and Mary can't eat just spam. (adapted from Culicover & Jackendoff 2005: 278, (78))

But, as pointed out by Kubota & Levine (2016) and Park (2019), the SCG approach is challenged by cases involving topicalised elements in Example (17a) or fronted WH-words in Example (17b), which are assumed to be above the TP projection.

- (17) (a) At our house we play poker, and at Betsy's house, bridge. (Sag 1976: 265)
 (b) Why did John go by train and why Mary by car? (Repp 2009: 34)

As mentioned in Section 1 SUPRA, the main syntactic motivation for an SCG account of gapping is precisely the 'No Embedding Constraint', postulated by Johnson (1996/2004, 2009, 2014, 2018). In such an approach, two vPs are shared by a unique Tense (T) node in a subclausal coordination, as in Example (15a). Cases where the gapped clause is embedded within the conjunct it belongs to, as in Example (1b) above, are problematic under this account, as the unique T head cannot be shared by two vPs if one of them is embedded under another T head. Therefore, SCG automatically rules out embedded gapping, with or without a complementizer.

[4] Both the movement-based account and the deletion-based account (in its recent versions) consider remnants to be extracted in some functional (topic/focus) projections in the left periphery (Sag 1976; Coppock 2001; Winkler 2005, etc.).

[5] While SCG approaches account for the wide scope reading of some operators, such as negation, they cannot account for the narrow scope reading of such operators in contexts such as Example (i) with contrastive BUT, which are very natural in German (Repp 2009), or even in English if RATHER is added, as illustrated in Example (ii) (cf. personal comment of a reviewer).

(i) Pete wasn't called by Vanessa but John by Jessie. (Repp 2009: 2)
 = Pete wasn't called by Vanessa but John was called by Jessie.
 (ii) Pete wasn't called by Vanessa but rather John by Jessie.

As for the LCG approaches in terms of ellipsis, as in Example (15b), they usually appeal to remnant movement operations to the left periphery (topic/focus projections), followed by clausal ellipsis (deletion at the level of Phonological Form or ‘PF-deletion’). However, remnants may occur in what would be an island for extraction (see Culicover & Jackendoff 2005).⁶ An attested challenging example with the gapped material in a syntactic island, i.e. a relative clause, while CANNOT has wide scope, is the following:

- (18) [*The first sentence is the character’s internal monologue, the second sentence is the narrator’s voice*]. That’s not how I remember it at all. And yet he cannot be the one who’s correct, and everyone else – millennia of people – wrong. (Hanya Yanagihara, *A Little Life*, p. 321-322; Philip Miller personal comment (p.c.)).

If one maintains such an analysis for gapping, an approach involving leftward movement of remnants predicts embedding only under non-factive predicates (such as THINK) and only with THAT. As observed by Hooper & Thompson (1973), operations targeting the left periphery, e.g. topicalisation of the NP given in italics in Example (19), cannot occur with factive predicates (such as REGRET; compare Examples (19a) and (19b)). Moreover, activation of the left periphery of the clause for a topic or focus constituent seems to force the presence of a complementizer (Grimshaw 1997; Doherty 2000).

- (19) (a) The inspector **explained that** *each part* he had examined carefully. (Hooper & Thompson 1973: 474)
 (b) ?*I **regret that** *Mary* my antics upset as much as they did. (Alrenga 2005: 179)

So, the LCG approach in terms of ellipsis in Example (15b) predicts that gapping can only be embedded in the presence of THAT, in conflict with the Embedded Stripping Generalisation, postulated by Wurmbrand (2017), which admits embedding only without a complementizer. So, though the deletion-based LCG account may allow embedded gapping, it does not fit the intuitive data about THAT-omission from the literature (e.g. Weir 2014).

[6] Gapping remnants do not obey island constraints in English, cf. data in Examples (i) and (ii). To the extent that some island effects do arise, they may be due to other factors, such as discourse infelicity, given the focus status of the remnants (Abeillé *et al.* 2020).

- (i) (a) Robin knows a lot of reasons why dogs are good pets, and Leslie cats. (Culicover & Jackendoff 2005: 273)
 (b) *[Which animals]_i does Robin know a lot of reasons why _i are good pets?
 (ii) (a) Robin believes that everyone pays attention to you when you speak French, and Leslie, German. (Culicover & Jackendoff 2005: 273)
 (b) *[Which language]_i does Robin believe that everyone pays attention to you when you speak _i?

As for the construction-based version of LCG approaches, in terms of fragments, as in Example (15c), it assumes that there is no head verb in the gapped clause (Culicover & Jackendoff 2005; Abeillé et al. 2014; Bîlbîie 2017). It is inspired by Ginzburg & Sag (2000)'s analysis of English fragments, which are assumed to be non-finite but verbal, thus allowing in principle for fragment embedding.⁷ The various restrictions on embedding are dealt with by means of a Boolean feature independent clause (IC):⁸ therefore, a [IC+] constraint on short answers ensures that declarative fragments (=fragment answers) cannot function as an embedded declarative clause. This blocks ellipsis in configurations other than independent clauses, as in Example (20). In contrast, interrogative fragments (=short questions) may be underspecified for the feature IC, allowing for the possibility of ellipsis in both matrix and embedded environments, as in Example (21).

- (20) (a) [What do they like?] *I **doubt** bagels. (Ginzburg & Sag 2000: 305, (19a))
 (b) [What do they like?] *I **doubt that** bagels. (Ginzburg & Sag 2000: 305, (20b))
- (21) (a) A: A student phoned. B: Who? (Ginzburg & Sag 2000: 326, (61))
 (b) A: A student phoned. B: I **wonder** who. (Ginzburg & Sag 2000: 326, (60))

Coming back to gapping constructions, the predictions for embedding are different according to the type of the fragment involved. For Culicover & Jackendoff (2005) and Abeillé et al. (2014), fragments are non-finite and non-verbal: they are neither Verb Phrases (VP) nor Inflectional Phrases (IP). This automatically excludes embedded gapping. On the other hand, if one assumes that fragments are non-finite but verbal (à la Ginzburg & Sag 2000), this kind of fragment-based analysis predicts that embedding will be possible in gapping but only in the absence of the complementizer (as THAT requires a finite clause).⁹

2.2 Research questions and hypotheses

We have contradictory claims in the literature (no embedding gapping for Johnson 2018, limited embedded gapping for Weir 2014), and contradictory structures making different predictions: no embedding for the SCG analysis in Example (15a), embedding under non-factive verbs with complementizer for the LCG analysis with deletion in Example (15b) and embedding without complementizer for LCG analysis with fragments in Example (15c).

[7] In this kind of approach, complementizers, as well as verbs, are subtypes of a common supertype called VERBAL (Ginzburg & Sag 2000).

[8] As Ginzburg & Sag (2000) note, the feature IC is a variant of Uszkoreit's (1987) MAIN-CLAUSE feature.

[9] By finite, we mean indicative or subjunctive (see Huddleston & Pullum 2002).

In light of the above, the present study addresses the following research questions: Is embedded gapping acceptable in English, contrary to the predictions of the ‘No Embedding Constraint’? What role does matrix verb factivity play (if any)? What role does complementizer omission play (if any)? More generally, is embedded gapping constrained by syntax (presence or absence of a complementizer), by semantics (class of embedding predicate) or by both?

Given the lack of consensus in the theoretical literature, we ran three acceptability judgment tasks (AJT), following formal methods for judgment collection (Gibson & Fedorenko 2013).

Since factivity and THAT-omission may be related, we ran a first experiment testing the interaction between THAT-omission and factivity in embedded complement clauses in English without gapping. We follow Karttunen (1971, 1973), Kiparsky & Kiparsky (1971), Hooper & Thompson (1973) and Hooper (1975), who distinguish between non-factives and factives, on the one hand, and between semi-factives and true factives, on the other hand. Therefore, we make use of three classes of predicates:

- non-factives: epistemic and communication predicates (cf. class B in Hooper & Thompson 1973, e.g. THINK), which have been traditionally analysed as expressions that do not presuppose the truth of their complement clause;
- semi-factives: cognitive predicates (cf. class E in Hooper & Thompson 1973, e.g. DISCOVER), which concern knowledge of facts, and are ‘soft’/‘weak’ presupposition triggers (Abusch 2002, 2010; Jayez et al. 2015), i.e. they presuppose the truth of their complement clause, but presupposition can be easily suspended;
- true factives: emotive predicates (cf. class D in Hooper & Thompson 1973, e.g. REGRET), which concern emotional attitudes towards facts, and are ‘hard’/‘strong’ presupposition triggers (Abusch 2002, 2010; Jayez et al. 2015), i.e. they presuppose the truth of their complement clause, and this presupposition cannot be suspended as easily.

Assuming this tripartition, and based on previous theoretical accounts, we expect THAT-omission to be more acceptable under non-factive verbs than under factive verbs, and within factives, THAT-omission should be more acceptable under semi-factive verbs than under true factive verbs.

We subsequently ran two experiments, comparing gapping and non-gapping, one with non-factive verbs, and one with factive predicates in order to test the predictions above but this time with respect to embedded gapping.

The three experiments were administered on Ibex Farm (Drummond 2013). For each, we recruited participants from the United States via an online market place for work (Mechanical Turk, Amazon, United States) in 2019. Each experiment lasted 10 to 15 minutes, and participants received \$1.25.

3. TESTING THE INTERACTION BETWEEN FACTIVITY AND COMPLEMENTIZER: EXPERIMENT 1

Complementizer omission in embedded complement clauses in English has been extensively studied from different perspectives, and by taking into account various linguistic and non-linguistic (cognitive, social) factors (for an overview, see Jaeger 2006, 2010). In Experiment 1, we explore the semantic factor factivity, which, to our knowledge, has never been investigated in relation to THAT-omission in English.¹⁰

While the judgments seem to be clear for non-factives and true factives (i.e. non-factives easily allow THAT-omission, as in Example (22a), true factives disfavor complementizer omission, as in Example (22c)), there is no consensus with respect to semi-factives (Kiparsky & Kiparsky 1971; Hooper & Thompson 1973, etc.).¹¹ As illustrated in Example (22b), complementizer drop under the semi-factive DISCOVERED is supposed to be ungrammatical, as is the case with other factive predicates in Example (22c). However, for de Cuba (2018: 11), some semi-factives, such as NOTICE, KNOW, DISCOVERED, seem to allow THAT-omission in Example (23). The same observation comes from Shim & Ihsane (2017), based on an informal survey from 10 native speakers of various varieties of English: THAT can be optional under semi-factive verbs (24).

- (22) (a) I **thought** (**that**) he would leave.
 (b) He **discovered** *(**that**) she had done it.
 (c) He **regretted** *(**that**) he had done it. (de Cuba 2018: 11)
- (23) (a) I **notice** (**that**) you are wearing your class ring today.
 (b) You **know** (**that**) I always like to wake up early.
 (c) I was in my bedroom when I **discovered** (**that**) my wallet was gone.
 (de Cuba 2018: 11)
- (24) Dean **knows/realizes** (**that**) Lili doesn't eat vegetables. (Shim & Ihsane 2017: 2)

3.1 Participants

A total of 51 English native speakers participated in Experiment 1 (20 female and 31 male; mean age: 43.4; range: 25–69).

3.2 Materials

We built 20 experimental items following a 2x2 factorial design with COMPLEMENTIZER (+THAT vs -THAT) and FACTIVITY (Factive vs Non-factive) as independent

[10] Dor (2005) takes into account the lexical semantics of the embedding predicates.

[11] As observed by a reviewer, some examples of THAT-omission after a factive verb can be found in corpora:

(i) Edwin started to regret he'd volunteered to help. (COCA, 2008–)

variables. This yielded the four experimental conditions in Example (25). As a reminder, we predict that the condition where the complementizer is dropped after a factive predicate, i.e. [–THAT, +factive], will be significantly less acceptable than the other conditions.

- (25) (a) [+THAT, +factive] **I regret that** John ordered a whisky at the bar.
 (b) [–THAT, +factive] **I regret** John ordered a whisky at the bar.
 (c) [+THAT, –factive] **I suspect that** John ordered a whisky at the bar.
 (d) [–THAT, –factive] **I suspect** John ordered a whisky at the bar.

All experimental items were complex sentences with 20 embedding predicates: 10 non-factives (epistemic and communication verbs, repeated in two different items: I THINK, I SUPPOSE, I SUSPECT, I IMAGINE, I BELIEVE, IT SEEMS, I FIGURE, I EXPECT, I GUESS, IT APPEARS), five true factives (emotion verbs, repeated in two different items: I'M SURPRISED, I'M BOTHERED, I LOVE, I LIKE, I REGRET) and five semi-factives (knowledge verbs, repeated in two different items: I NOTICE, I KNOW, I OBSERVE, I SEE, I REALIZE).¹² The embedded verb was always transitive and past tense indicative, with a proper name or a definite NP subject.¹³

In order to control for frequency effects, we also took into account the matrix verb's frame frequency since both the verb's frequency (Bolinger 1972; Elsness 1984; Roland et al. 2007) and its bias for a sentential complement (Jaeger 2006, 2010; Kothary 2008; Liu et al. 2019; Richter & Chaves 2020) have been shown to play a role: THAT is more frequent after less frequent matrix verbs and after less S-biased verbs.¹⁴ For our experiment, the prediction is that matrix verbs with a lower S-complement verb-frame frequency will be rated lower without THAT. Moreover, Jaeger (2010) showed that the probability of the embedded clause (based on verb's subcategorisation frequency) seems to be involved in explaining THAT-omission in English:¹⁵ the higher a verb's bias for the complement clause frame, the higher rate for the complementizer drop.¹⁶ Following Liu et al. (2022), we

[12] Roland et al. (2007) report a rate of THAT-omission in written English from 56% (in British National Corpus) to 65% (Wall Street Journal). In both corpora, the four top THAT-less verbs for each corpus were three non-factives: SAY, THINK (86% in the BNC, 88% in WSJ), BELIEVE, and one semi-factive: KNOW (66% in the BNC), which are also the most frequent verbs with a sentential complement.

[13] We chose simple embedded subjects since their complexity is assumed to play a role (cf. Jaeger 2010's study on Switchboard corpus). As our matrix subjects are mostly I-subjects (first-person), and the embedded subjects are not I-subjects, our materials should favor THAT-omission, according to Ferreira & Hudson (2011), who observed a preference for I as main subject and a dispreference for I as embedded subject without THAT.

[14] For a more general discussion on the correlation between frequency and acceptability, see, a.o., Ambridge & Goldberg (2008), Lau et al. (2017), etc. As Ambridge & Goldberg (2008: 362) write: 'We know that strings that contain more frequent words tend to be judged as more acceptable, all other things being equal.'

[15] The same observation is made by Kothary (2008), Richter & Chaves (2020) and Liu et al. (2022) to explain the acceptability of long-distance dependencies in some syntactic islands.

[16] If a nominal complement is possible too, the lack of complementizer leads to a local ambiguity in an incremental processing model (Bolinger 1972; Hawkins 2004): therefore, in Example (i) with the verb KNOW, there is a syntactic ambiguity in the absence of THAT (the NP MARY could be either

Verb	Factive Type	Frequency	Verb	Factive Type	Frequency
I figure	Non-factive	0.00095	I see	Semi-factive	0.035652
I guess	Non-factive	0.003524	I know	Semi-factive	0.11153
I expect	Non-factive	0.004853	I observe	Semi-factive	0.000893
it seems	Non-factive	0.009667	I notice	Semi-factive	0.006234
I think	Non-factive	0.113493	I realize	Semi-factive	0.024109
I imagine	Non-factive	0.006996	I like	True factive	0.006996
I suppose	Non-factive	0.003365	I'm bothered	True factive	0.000097
it appears	Non-factive	0.00648	I love	True factive	0.003454
I believe	Non-factive	0.071352	I'm surprised	True factive	0.005269
I suspect	Non-factive	0.005879	I regret	True factive	0.001272

Table 1

Summary of predicates used in our experiments and verb-frame frequencies.

calculated the verb-frame frequency for all our verbs by multiplying the frequency of the matrix verb by the frequency of the verb in a THAT-clause, i.e. $P(\text{matrix verb, sentence complement}) = P(\text{matrix verb}) * P(\text{sentence complement} | \text{matrix verb})$, based on the number of occurrences in the *CORPUS OF CONTEMPORARY AMERICAN ENGLISH (COCA)*, searching for V and V+THAT (Complementizer) frequencies.

Table 1 lists all the predicates used in Experiment 1, along with their corresponding S-complement verb-frame frequencies. It is to be noted that our matrix predicates have different verb-frame frequencies: the mean frequency of non-factive verbs (0.023) is higher than that of true factive ones (0.0034).

In addition to the 20 experimental items, 20 filler items from an unrelated experiment were included. They tested preposition (mis-)matching in comparative sentences (Poppels & Miller 2022). In order to make sure that participants were reading the sentences carefully, we also included 16 control items, which present ungrammatical constructions due to subject-verb agreement mismatches, as in Example (26). Half of the experimental and filler items were followed by a ‘yes/no’ comprehension question, which was introduced as a further control measure.

(26) John’s grandma always cook fresh pasta for dinner.

3.3 Procedure

Sentences were presented in a Latin Square within-subjects design, so that participants were exposed to experimental items in all four conditions but never to the same item in more than one condition. After reading the instructions and answering

the object of KNOW or the subject of the following clause), whereas in Example (ii) there is no such ambiguity (the NP MARY could be analysed only as subject of the following clause).

- (i) I know (that) Mary...
- (ii) I say (that) Mary...

some background questions, participants judged the acceptability of a set of practice items. They were instructed to read the sentences carefully and to judge their acceptability by using a Likert scale, from 1 (completely unacceptable) to 7 (completely acceptable). The Ibx software did not allow participants to go back to change a previous judgment.

3.4 Analyses and results

Only participants who answered at least 75% of the comprehension questions correctly were considered for subsequent analyses. Accordingly, one participant was excluded, and the data from the remaining 50 participants were subsequently analysed.

The participants' acceptability ratings (ranging from 1 to 7) were entered into a mixed-effect linear regression analysis using the `lme4` package (Bates et al. 2015) in R (R Development Core Team 2008). We entered Factivity (Factive vs Non-factive), Complementizer (Complementizer vs No Complementizer) and their interaction as the predictors. The model was fitted with the maximum random effect structure which contained random intercepts for Subjects and Items and by-subject and by-item slopes for the Factivity*Complementizer interaction. We also entered the log-transformed verb-frame frequencies (Liu et al. 2022) as an additional fixed predictor.

The analyses revealed, first of all, a significant main effect of Complementizer ($p < .01$), as participants rated the $-$ THAT conditions significantly lower than the $+$ THAT conditions. In addition to the main effect of Complementizer, the analyses revealed a significant main effect of Factivity ($p < .01$), as participants rated significantly lower the Factive conditions than the Non-factive conditions (5.49 vs 6.33) and a significant interaction between the factors Complementizer and Factivity ($p < .01$), as the difference in ratings between factive and non-factive predicates was bigger in the $-$ THAT than in the $+$ THAT conditions. The verb-frame frequency was also highly significant ($p < .001$) and was motivated by the fact that items containing predicates with a higher verb-frame frequency were rated as more acceptable than those containing predicates with a lower-frame frequency. This was especially the case in the $-$ THAT conditions. The mean acceptability judgments for Experiment 1 are given in Table 2 and plotted in Figure 1. We observe that there are no differences in judgments with non-factive verbs with or without THAT, unlike with factive verbs. Moreover, bare clauses (i.e. without THAT) embedded under a factive verb (mean rating: 4.81) are more acceptable than the ungrammatical controls (mean rating: 3.64).

In order to further explore the attested sensitivity to the factive nature of the predicates, we ran additional linear regression analyses on the $+$ factive conditions data only, distinguishing between true factive (emotive) verbs from semi-factive (cognitive) verbs. The new model was identical to the one previously used but now included Factive Type (True factive vs Semi-factive), Complementizer (Complementizer vs No Complementizer) and their interaction as the fixed

Matrix verb	+ <i>that</i>	- <i>that</i>
Factive	6.17 (1.27)	4.81 (2.30)
Non-factive	6.37 (1.14)	6.30 (1.26)

Table 2
Mean acceptability judgments for Experiment 1 (SD in parentheses).

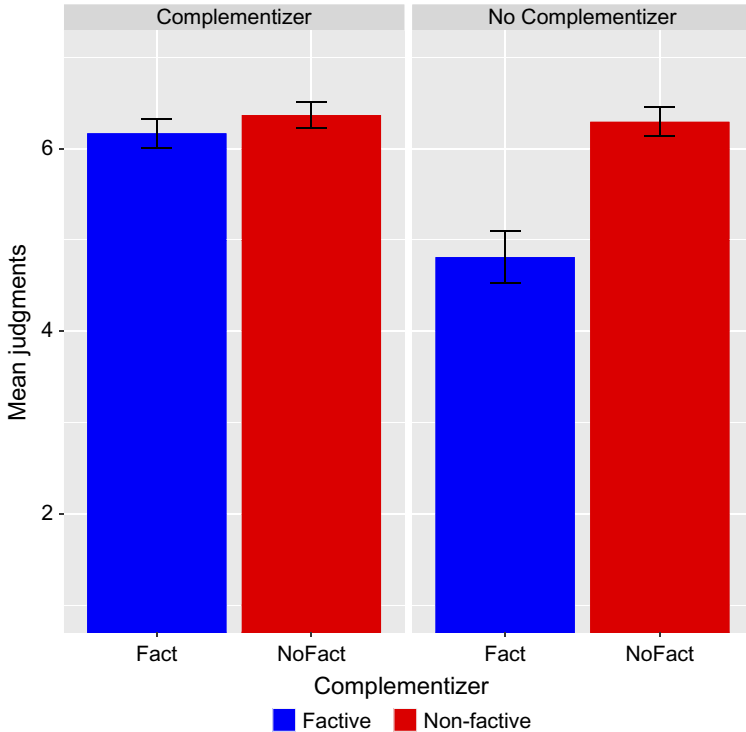


Figure 1
(Colour online) Mean acceptability judgments for Experiment 1.

predictors. These analyses revealed a significant main effect of Complementizer ($p < .001$), given that the participants rated the *-THAT* conditions significantly lower than those *+THAT* (4.79 vs 6.17). The factor Factive Type did not come as significant. However, the model revealed a significant interaction ($p < .001$) between Complementizer and Factive Type, as the difference in ratings between semi- and true factives is significantly bigger in the *-THAT* conditions, compared to the *+THAT* conditions. The factor verb-frame frequency did not come out as significant this time. [Table 3](#) gives the mean acceptability judgments for the two kinds of factive predicates. [Figure 2](#) illustrates these findings. We observe, therefore, that semi- and true factives do not give rise to exactly the same acceptability judgments, with

Matrix verb	+ <i>that</i>	- <i>that</i>
Semi-factive	6.02 (1.39)	5.68 (1.84)
True factive	6.32 (1.12)	3.90 (2.39)

Table 3

Mean acceptability judgments for factives in Experiment 1 (SD in parentheses).

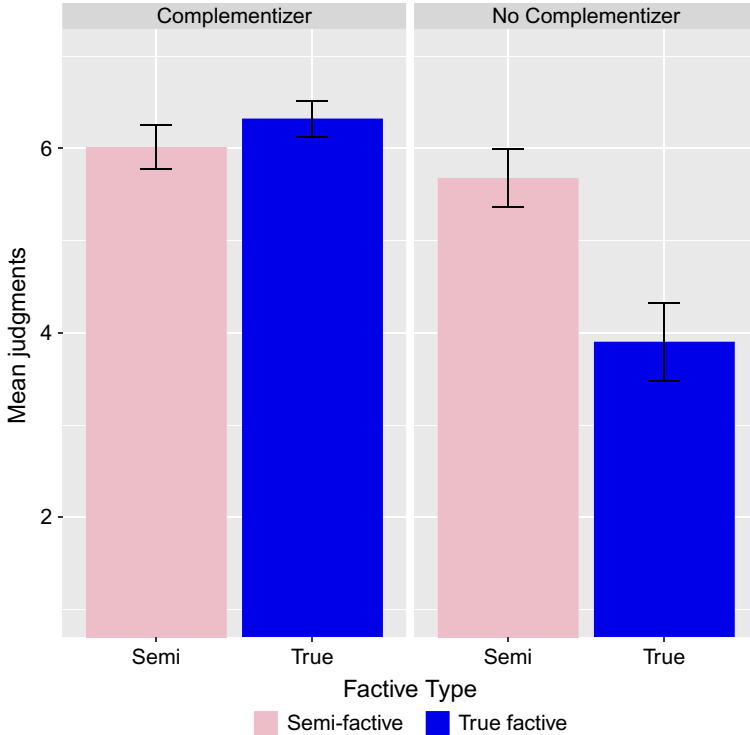


Figure 2

(Colour online) Zoom into factive predicates in Experiment 1.

respect to *THAT*-omission. Bare clauses embedded under a semi-factive verb are more acceptable than under a true factive verb.

Given the fact that both non-factives and semi-factives allow the absence of the complementizer, one could say that there are only two categories: non-factives and semi-factives together versus true factives. Non-factives and semi-factives seem to share various properties: not only the possibility to embed a bare clause (in the absence of the complementizer) but also the possibility to have a parenthetical use (Hooper & Thompson 1973), as in Example (27). In order to test this possibility, we performed an additional statistical analysis to measure the difference between non-factives and semi-factives only (irrespective of true factives), in order to see if there

is indeed a tripartite distinction. The analyses revealed a significant main effect of Complementizer ($p < .01$), a significant main effect of Factivity ($p < .001$) and a marginally significant interaction between the factors Complementizer and Factivity ($p < .1$). The factor frequency was also highly significant ($p < .001$).

(27) Paul ordered a beer, {I think / I notice / *I regret}.

3.5 Discussion

The results of Experiment 1 show that THAT-omission is significantly less acceptable with factive predicates than with non-factive predicates, and significantly lower with true factive predicates than with semi-factive predicates. They confirm that factive verbs do not display a homogenous behaviour when it comes to the presence/absence of THAT, as evidenced by the gradience in acceptability judgments: non-factives > semi-factives > true factives.

Our experimental results clearly show that semi-factive and true factive verbs are two distinct classes, as initially observed by Karttunen (1971). They do not have the same behaviour with respect to THAT-omission, as well as with respect to other phenomena (e.g. island constraints, cf. Ambridge & Goldberg 2008, a.o.).

Additionally, positing a semantic tripartition challenges some syntactic analyses which try to account for the distinction between non-factive and factive predicates in the syntax. Kiparsky & Kiparsky (1971)'s analysis assumes a more complex structure for factive clausal complements than for non-factive clausal complements. More recent studies (Haegeman 2006; de Cuba 2007; de Cuba & Ürögdi 2010) propose the opposite view, namely, the structure of factive complements is simpler than that of non-factive complements. However, none of these proposals easily accounts for the 'hybrid' semantic class of semi-factives. We will come back to these syntactic issues in Section 5.1.

As shown by our results, there is a clear graded acceptability across the three types of predicates. Therefore, in what follows, we will build on this semantic tripartition to test the acceptability of embedded gapping in English.

4. TESTING EMBEDDED GAPPING CONSTRUCTIONS: EXPERIMENTS 2 AND 3

Experiments 2 and 3 tested the role of the complementizer in embedded gapping, with the same embedding predicates as in Experiment 1: non-factive predicates were investigated in Experiment 2, while factive predicates were looked into in Experiment 3. Given the contradictory judgments in the literature (see Example (28)), and the different syntactic analyses proposed, we want to test: (i) which role THAT-omission plays, if any, and (ii) which role verb factivity plays (if any). Our hypothesis is that a similar generalisation to that proposed by Wurmbrand (2017: 345) for embedded stripping in English would apply to embedded gapping configurations, namely, the complementizer omission should show an ameliorating effect in embedded gapping.

- (28) (a) ?John ate oysters and **I think** Mary swordfish. (Weir 2014: 332, (679))
 (b) %Some will eat mussels and **she claims** others shrimp. (Wurmbrand 2017: 361, (43f))
 (c) *Sam married Mittie and **I think** Liz Vinnie. (Johnson 1996/2004: (260))

Furthermore, because, as shown in Experiment 1, non-factive predicates allow THAT-omission more easily than factive predicates, the type of embedding predicate should have an effect on embedded gapping. Given that Experiments 2 and 3 were very similar, we present them together in the following sections.

4.1 Participants

Experiment 2 had 47 English native speakers who participated (33 female and 14 male; mean age: 46.9; range: 22–72) and Experiment 3 had 50 (24 female and 26 male; mean age: 40.9; range: 27–66).

4.2 Materials

We built 20 experimental items following a 2x2 factorial design with GAPPING (Gapping vs No Gapping) and COMPLEMENTIZER (Complementizer vs No Complementizer) as independent variables. Using the same verbs as in Experiment 1 (Table 1), we had 10 non-factive verbs (each repeated twice) in Experiment 2, see Example (29), and 10 factive verbs, i.e. true factive (each repeated twice) and semi-factive predicates (each repeated twice) in Experiment 3, see Example (30).

(29) Experiment 2

- (a) [+gapping, +THAT]
 At the bar, Paul ordered a beer and **I suspect that** John a whisky.
 (b) [+gapping, –THAT]
 At the bar, Paul ordered a beer and **I suspect** John a whisky.
 (c) [–gapping, +THAT]
 At the bar, Paul ordered a beer and **I suspect that** John ordered a whisky.
 (d) [–gapping, –THAT]
 At the bar, Paul ordered a beer and **I suspect** John ordered a whisky.

(30) Experiment 3

- (a) [+gapping, +THAT]
 At the bar, Paul ordered a beer and **I regret that** John a whisky.
 (b) [+gapping, –THAT]
 At the bar, Paul ordered a beer and **I regret** John a whisky.
 (c) [–gapping, +THAT]
 At the bar, Paul ordered a beer and **I regret that** John ordered a whisky.
 (d) [–gapping, –THAT]
 At the bar, Paul ordered a beer and **I regret** John ordered a whisky.

In order to facilitate gapping, each experimental item was introduced by an initial adjunct, which sets the background in discourse (i.e. a circumstantial frame setter, that limits the applicability of the main predication to a certain restricted domain, cf. Chafe 1976).¹⁷ The experimental items were all coordinated sentences with *AND*. Each of the two conjuncts introduced a character by means of a proper name or a definite NP. The main verb was always a transitive verb in the past tense indicative, as in Experiment 1.

Beside the 20 experimental items, we used 28 filler items from unrelated experiments, which were different from the ones used in Experiment 1. Two of the filler item conditions tested ungrammatical subject- and object-extracted relative clauses in *IT-CLEFT* constructions, as in Example (31), and were used as control conditions. As in Experiment 1, half of the items were followed by a ‘yes/no’ comprehension question.

- (31) (a) It is this company that the carelessness may endanger the employees’ health.
 (b) It is this company that many employees disdained the carelessness.

4.3 Procedure

Experiments 2 and 3 follow the same procedure described for Experiment 1.

4.4 Analyses and results

Only participants who answered at least 75% of the comprehension questions correctly were considered for subsequent analyses. Accordingly, one participant was excluded from Experiment 2 and four from Experiment 3. The data from the remaining 46 participants, in each experiment, were subsequently analysed.

As in Experiment 1, the participants’ acceptability judgments (ranging from 1 to 7) were entered into a mixed-effect linear regression analysis using the *lme4* package (Bates et al. 2015) in R (R Development Core Team 2008). We entered Gapping (Gapping vs No Gapping), Complementizer (Complementizer vs No Complementizer) and their interaction as fixed predictors. The model was fitted with the maximum random effect structure which contained random intercepts for Subjects and Items as well as by-subject and by-items slopes for the Gapping*Complementizer interaction. We also entered verb-frame frequency as an additional fixed predictor.

The mean acceptability judgments for Experiment 2 are given in Table 4 and plotted in Figure 3.

[17] We consider that these Preposition Phrases (PP) that behave as frame setters adjoin to the whole coordination (assuming left peripheral adjunction, cf. Haegeman 2012). As noted by a reviewer, one may also postulate a left-movement analysis from each conjunct (across the board). This may cause a penalty for factive verbs, which are supposed to be islands for extraction (cf. Ambridge & Goldberg 2008). This penalty would hold across all conditions, with and without gapping, with and without complementizer. So, we disregard this issue in what follows.

	Gapping	No Gapping
+ <i>that</i>	4.60 (1.77)	6.33 (1.06)
- <i>that</i>	5.31 (1.53)	6.38 (1.10)

Table 4
Mean acceptability judgments for Experiment 2 (SD in parentheses).

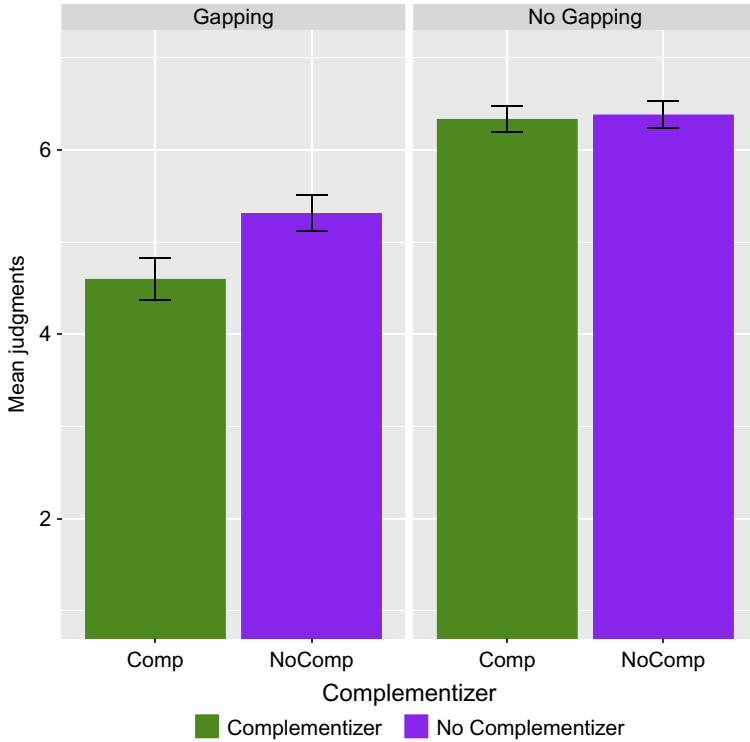


Figure 3
(Colour online) Mean acceptability judgments for Experiment 2 (non-factive verbs).

The analyses of Experiment 2 revealed a significant main effect of Gapping ($p < .001$), as the No Gapping conditions were rated significantly higher than the Gapping conditions (6.35 vs 4.95), and a significant main effect of Complementizer ($p < .001$), as the conditions without *THAT* were rated significantly higher than the conditions where it was present (5.84 vs 5.46). Moreover, the interaction between Gapping and Complementizer was also significant ($p < .01$), as the difference in ratings regarding the presence/absence of the complementizer was stronger in the Gapping conditions. In the No Gapping conditions, the difference in ratings between +*THAT* and -*THAT* conditions was not significant, suggesting that there is

	Gapping	No Gapping
+ <i>that</i>	2.73 (1.59)	5.30 (1.52)
- <i>that</i>	2.76 (1.61)	4.46 (1.89)

Table 5

Mean acceptability judgments for Experiment 3 (SD in parentheses).

no effect of the complementizer when there is no gapping (despite a higher frequency of *THAT*-omission in corpora, see Roland et al. 2007). To conclude, *THAT*-omission has an ameliorating effect on embedded gapping; interestingly, embedded gapping under a complementizer is more acceptable than ungrammatical controls (mean rating: 2.86). To conclude, the factor verb-frame frequency was also significant ($p < .05$).

The mean acceptability judgments for Experiment 3 are given in Table 5 and plotted in Figure 4. Interestingly, embedded gapping (with or without *THAT*) is less acceptable than ungrammatical controls (mean rating: 3.24).

The analyses of Experiment 3 revealed a significant main effect of Gapping ($p < .001$), motivated by the fact that the No Gapping conditions were rated significantly higher than Gapping conditions (4.88 vs 2.74), and a significant main effect of Complementizer ($p < .01$), as the +*THAT* conditions were rated higher than the -*THAT* conditions (4.01 vs 3.61). Moreover, we found a significant interaction between Gapping and Complementizer ($p < .001$), given that, in the No Gapping conditions, participants rated the +*THAT* condition significantly higher than the -*THAT* condition. The effect of the verb-frame frequency was marginally significant ($p < .1$).

We conducted some additional analyses by distinguishing between semi-factive and true factive verbs. The new linear-mixed model included Gapping, Complementizer, Factive Type, and their interaction as fixed predictors, and random intercepts for Subjects and Items. In addition to this, verb-frame frequency was also included as a fixed predictor. The mean acceptability judgments from these analyses are given in Table 6 and illustrated in Figure 5.

These additional analyses revealed a significant main effect of Gapping ($p < .001$), as the Gapping conditions were rated significantly lower than the No Gapping conditions (2.75 vs 4.89). The statistical analyses also showed a significant main effect of Complementizer ($p < .001$), given that the +*THAT* conditions were rated significantly better than those -*THAT* (3.99 vs 3.64), and a significant main effect of Factive Type ($p < .05$), motivated by the fact that semi-factive predicates were rated significantly higher than true factive predicates (4.16 vs 3.48). In addition to these main effects, the model yielded significant Gapping*Complementizer ($p < .001$) and Complementizer*Factivity ($p < .001$) interactions. This was driven, on the one hand, by the fact that the -*THAT* conditions were rated significantly lower than the +*THAT* conditions when there was no gapping, with respect to the conditions with gapping; and, on the other hand, by the fact that items with true

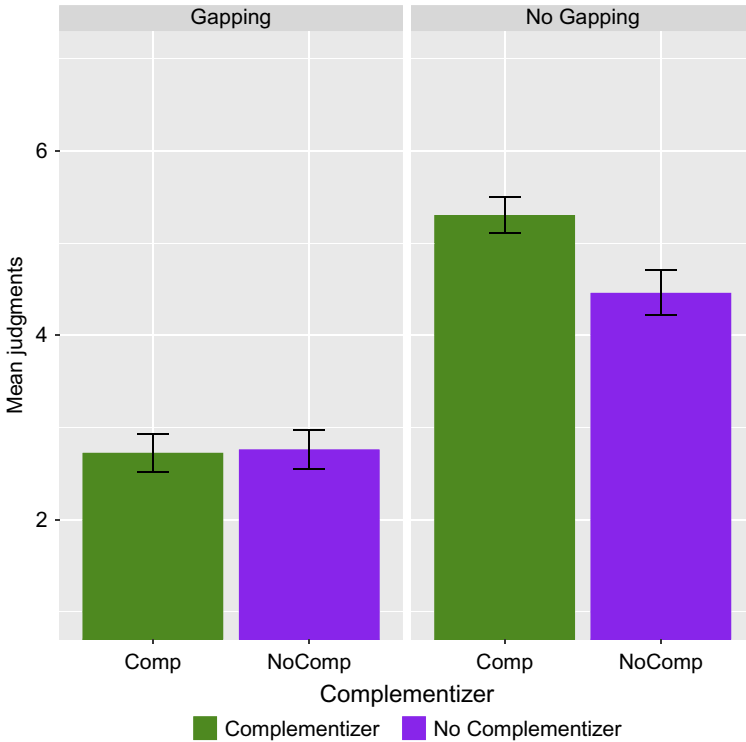


Figure 4

(Colour online) Mean acceptability judgments for Experiment 3 (factive verbs).

Matrix verb	Gapping		No Gapping	
	Semi-factive	True factive	Semi-factive	True factive
+that	2.74 (1.51)	2.71 (1.68)	5.58 (1.30)	4.94 (1.69)
-that	3.26 (1.66)	2.29 (1.41)	5.06 (1.78)	3.98 (1.85)

Table 6

Mean acceptability judgments as a function of the type of factive verb for Experiment 3.

factive predicates were rated significantly lower than with semi-factive predicates, especially in the -THAT conditions. The effect of verb-frame frequency and the Gapping*Factive Type and the Gapping*Complementizer *Factive Type interactions were not significant. Crucially, all these results suggest that THAT-omission has an ameliorating effect on embedded gapping under semi-factive verbs with respect to true factive verbs and confirm the results from Experiment 1: bare clauses embedded under a semi-factive verb are more acceptable than under a true factive verb.

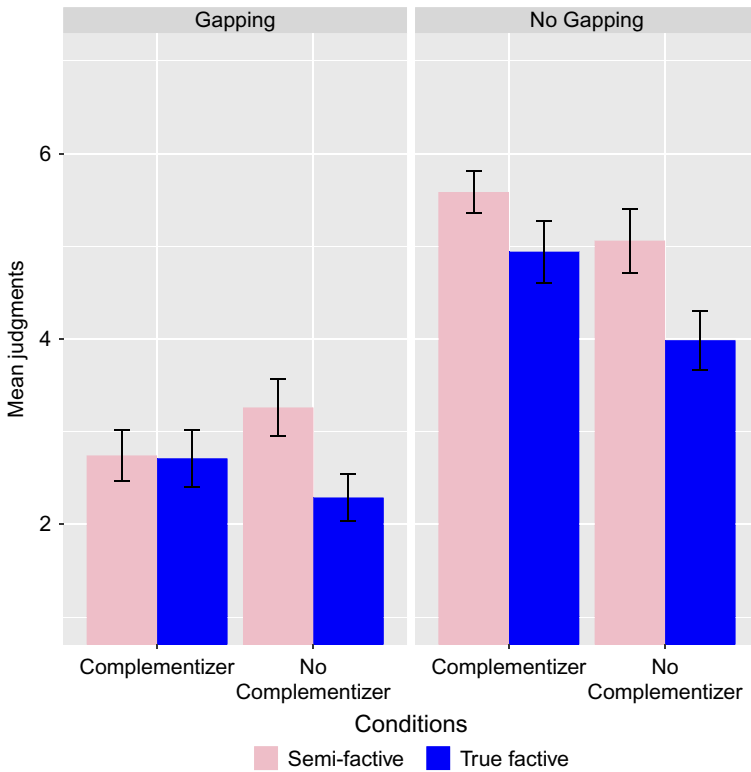


Figure 5

(Colour online) Zoom into the different kinds of factive predicates in Experiment 3.

4.5 Discussion

First, we found an ellipsis penalty, since participants rated the No Gapping conditions significantly higher than the Gapping conditions, in line with what has been previously reported in the literature for English: Carlson (2001) shows, based on two experimental studies (a written questionnaire and an auditory comprehension study), that in English, there is a preference for non-gapping over gapping structures.¹⁸

Second, the combined results of Experiments 2 and 3 show that THAT-omission has an ameliorating effect on embedded gapping. Crucially, however, this ameliorating effect for gapping was, once again, modulated by the semantics of the embedding predicates. Our hypothesis was that embedding under non-factive verbs should be more acceptable than under factive ones, and, within factive predicates,

[18] Previous corpus studies on English gapping (Meyer 1995; Tao & Meyer 2006) observe that gapping has a very low frequency and occurs much more often in written than spoken language; in particular, it is restricted to formal registers (see also Goldberg & Perek 2018).

embedding under semi-factive verbs should be more acceptable than under true factive ones. These hypotheses were all borne out by the results of Experiment 2 and 3. THAT-omission clearly shows an ameliorating effect with non-factive predicates compared to factive predicates, but this ameliorating effect arises again when we compare semi-factive to true factive predicates.

Moreover, in order to assess the semantic tripartition, we ran an additional statistical analysis to measure the difference between non-factives (Experiment 2) and semi-factives (Experiment 3) only (irrespective of true factives), as we did in Experiment 1. The analyses revealed a main effect of Gapping ($p < .001$), of Complementizer ($p < .001$) and of Factivity ($p < .001$), as well as a significant interaction between the factors Gapping and Complementizer ($p < .001$), and Gapping and Factivity ($p < .001$). This shows that non-factives and semi-factives behave indeed as two distinct classes.

To summarise, our experimental results show that the ‘No Embedding Constraint’ in English is affected by the presence/absence of THAT, as well as by the semantic class of the embedding predicate. We observed that factivity plays a role in embedded gapping (as it does with THAT-omission in general); the same semantic tripartition revealed by our Experiment 1 is at work in embedded gapping (cf. Experiments 2 and 3). An approach based on gradient acceptability (and not on categorical grammaticality) seems to be a better fit to capture these effects. Specifically, if the ‘No embedding Constraint’ was a purely grammatical constraint, we would have expected to see very low acceptability ratings of gapping constructions across the board. The combined results of Experiments 1–3 go against this assumption.

5. GENERAL DISCUSSION

We explain why our results are problematic for the ‘No Embedding Constraint’ and which consequences this has for the syntactic analysis of gapping. We then sketch a construction-based fragment analysis, before turning to some cross-linguistic considerations.

5.1 *Revising the ‘No Embedding Constraint’*

We found that embedded gapping is acceptable in English (contrary to Johnson), but its acceptability is affected by a syntactic and a semantic factor: it suffers from a complementizer penalty (Experiment 2) and from a factive verb penalty (Experiment 3). Embedded gapping is more acceptable under some semantic predicates provided the embedded clause has no complementizer. Gapping is preferably embedded under non-factive (and semi-factive) predicates but not under true factive predicates.

[18] Previous corpus studies on English gapping (Meyer 1995; Tao & Meyer 2006) observe that gapping has a very low frequency and occurs much more often in written than spoken language; in particular, it is restricted to formal registers (see also Goldberg & Perek 2018).

As shown by Experiment 1, these two factors are not independent, since factive verbs do not allow *THAT*-omission as easily as non-factive ones (independently of ellipsis); in particular, we observe a general penalty for *THAT*-omission under true factive predicates. We thus observe a preference clash: gapping prefers a *THAT*-less clause, whereas true factive predicates prefer the presence of the complementizer. This preference clash explains the unacceptability of embedded gapping under true factive predicates in English.

5.2 *True embedding or parenthetical syntax?*

It has been suggested that the availability of embedded gapping in English is due to the parenthetical use of the embedding predicate (Boone 2014)¹⁹, cf. Temmerman (2013) for a similar account of embedded fragments. It may account for the complementizer penalty found in Experiments 2 and 3, since *THAT* is not compatible with a parenthetical use, as in Example (32).

- (32) (a) Harry has invited Sue and **John said** (*that) Bill Mary. (Boone 2014: 89)
 (b) John invited Bill and, **I {reckon / hope / heard}**, Mary Susan. (Boone 2014: 89)
 (c) Harry has invited Sue and Bill Mary, **John said** (*that).

Under a parenthetical analysis, the embedded gapped clause is in fact a matrix fragment (as in regular gapping), so it is not truly embedded.²⁰ In this way, the ‘No Embedding Constraint’ would still apply in gapping constructions.

As appealing as this may be, there are some issues with such proposals. First, in our materials (which are written questionnaires), the embedding predicate is not isolated by commas from the rest of the utterance, so there is no overt indication of a parenthetical reading.

Second, according to Temmerman (2013), both ordinary parentheticals and cases of fragment embedding are restricted to a first-person subject, to a positive verbal form (no negation), to a verb without adverbial modification, etc. In our materials, most matrix predicates were with first-person subject, present tense, without negation, so they could be compatible with a parenthetical use (cf. Urmson 1952). But we also had two cases with *IT*, as in Example (33a, b). In addition, it seems that the verb *APPEARS* is less felicitous as a parenthetical (compare Examples (33c) and (33d)).

[19] Boone (2014) argues that ellipsis under ‘bridge’ verbs, such as *THINK*, without *THAT*, constitutes a separate phenomenon from gapping (what he calls ‘bridge verb ellipsis’), and involves a parenthetical syntax for the ‘bridge’ verb. He rules out embedded gapping under semi-factive verbs (although they might be parenthetical), since they are usually analysed as ‘non-bridge’ predicates.

[20] Cf. Thompson & Mulac (1991): all ‘apparent main clauses’ without *THAT* are in fact rootless.

- (33) (a) At the bar, Paul ordered a beer and **it seems** John a whisky.
 (b) In their garden, mum planted tomatoes and **it appears** dad potatoes.
 (c) John ordered a whisky, it seems.
 (d) ?John ordered a whisky, it appears.

More generally, Weir (2014) adds further evidence in favour of a true syntactic embedding of fragments: the subject may be other than the speaker, as in Example (34); a fragment containing a negative polarity item (NPI) can be licensed, unlike with a parenthetical, as in Example (35); the subject can be negative, unlike in parenthetical contexts, as in Example (36).

- (34) [*Two teams are given a quote and asked to guess who said it*]
 Moderator: Ok, so **you** [*gestures at one team*] **think** Donald Trump. (attested data from Weir 2014: 215)
- (35) Who left?
 (a) **I don't think** anybody.
 (b) *Anybody, **I don't think**. (Weir 2014: 223)
- (36) Who left early?
 (a) Some people say Mary, some people say Sue, but **nobody thinks** John.
 (b) *Some people say Mary, some people say Sue, but John, **nobody thinks**. (adapted from Weir 2014: 225)

Coming back to embedded gapping, a parenthetical analysis makes the wrong predictions with respect to the behaviour of semi-factives, which do not allow embedding as easily as non-factives (Experiment 3). In general, parenthetical insertion is typical of non-factives (see Example (37a)) and semi-factives (see Example (37b)), but it is less felicitous with true factives (see Example (37c)). As observed by Hooper & Thompson (1973) in Example (38), the complement of a semi-factive (but not true factive) verb can be preposed, so it can be raised to the position of a main assertion (as is the case with non-factives). However, our experimental results show that non-factives and semi-factives do not have the same behaviour and constitute two distinct classes, despite their potential parenthetical use.

- (37) (a) Paul ordered a beer and, **I think**, John a whisky.
 (b) Paul ordered a beer and, **I know**, John a whisky.
 (c) ??Paul ordered a beer and, **I worry**, John a whisky.
- (38) Santa has lost a lot of weight, {***I regret** / **I notice**}. (Hooper & Thompson 1973: 481)

Moreover, reducing embedding cases of gapping to parenthetical constructions does not account for more complex cases of embedded gapping, such as the naturalistic data in Examples (39)–(40), pointed out by Wellstood (2015) and discussed in Park (2019), where both the gapped and its source are embedded; in these examples, the gapped clause appears as the complement of the embedding

predicate, and we cannot analyse the embedding clause (marked in bold in these examples) as a parenthetical.

- (39) **Ask them** which boy gave a present to a girl, but **don't ask** which girl to a boy. (... *that's a secret.*) (Wellstood 2015: 7)
- (40) [*My friends John and Bill asked a third friend a question, but the third friend did not hear what John and Bill said. So, the third friend asks me...*]
 Q: What did they ask?
 A: I don't know either, I think **John asked** which book you gave to Mary, and **Bill asked** which magazine to Sue. (Wellstood 2015: 8)

In light of the above, we conclude that there is no evidence in favour of a parenthetical analysis of the embedding predicates.

5.3 Consequences for the syntactic analysis of gapping

What are the consequences for the different syntactic analyses mentioned in Section 2? The SCG approach rules out embedded gapping, as a TP from the matrix clause cannot dominate a vP from an embedded clause; in other words, embedding the gapped clause necessarily implies a TP-coordination. Thus, the SCG analysis is unable to account for the embedding data we observed in Experiment 2: it cannot explain why embedded gapping is possible under non-factive verbs. Therefore, an LCG analysis of gapping seems to be a better fit to account for the embedding facts.

However, the LCG approach with leftward remnant movement and verb deletion predicts that embedded gapping be available only under non-factive predicates and only with an overt complementizer, since it is a topicalised structure. Crucially, our experimental results show that embedded gapping is ameliorated only without *THAT* (as postulated by Wurmbrand 2017 for embedded stripping in English). Moreover, although non-factive predicates are those which get the highest rates, we observe that, within factives, semi-factives get significantly higher rates than true factive predicates. This cannot easily be handled by the deletion-based LCG account, which only accounts for the difference between non-factive and factive verbs (see the classical dichotomy between 'bridge' vs 'non-bridge' verbs) and does not predict gradience across the three semantic classes of matrix predicates (non-factives vs semi-factives vs true factives).

5.4 Towards a construction-based fragment analysis

Since we do not see how an SCG nor an LCG approach with leftward movement could account for our data,²¹ we now turn to a construction-based version of an LCG approach. In a constructionist approach, gapping, like stripping, uses a

[21] The same issues arise with the 'hybrid' approach to gapping, that postulates two syntactic analyses (SCG for simple gapping and LCG with movement for embedded gapping), as proposed by Potter et al. (2017) for English or Fernández-Sánchez (2016) for Spanish.

dedicated rule mapping a headless structure (i.e. a fragment) to a clausal meaning. In this approach, each elliptical construction may have its specific constraints (Ginzburg & Sag 2000; Goldberg & Perek 2018).²²

As an illustration, we present the main ingredients of a syntactic analysis couched within Head-driven Phrase Structure Grammar (HPSG)²³ (cf. Abeillé et al. 2014; Bîlbîie 2017; Park et al. 2019), a constraint-based and surface-oriented framework. In such a fragment-based analysis, the gapped clause receives a clausal interpretation (with semantic reconstruction of the missing material) without having the internal structure of an ordinary clause, as initially proposed by Ginzburg & Sag (2000) to account for short answers and short questions in English.

This fragment-based analysis of gapping has two crucial ingredients to account for the experimental results from Experiments 2 and 3: it assumes that the headless fragment is non-finite, and that the gapped clause must address the same Question Under Discussion (QUD) as the antecedent clause.

This analysis assumes that the gapped clause is non-finite, thus allowing regular gapping, and prohibiting embedding under a complementizer (assuming THAT requires a finite clause in English). Assuming that the gapped clause is a non-finite fragment directly accounts for data, such as Example (41), where gapping occurs in a coordination of embedded clauses: in these contexts, gapping is allowed only in the absence of THAT (Hartmann 2000; Repp 2009; etc.).

- (41) (a) Jim claimed that Alan went to the ballgame and (*that) John to the movies. (Repp 2009: 13)
 (b) I believe that Peter will travel with his wife to India and (*that) Martin with his colleagues to Switzerland. (Repp 2009: 210)

Some further arguments for this analysis are that the gapped clause is also appropriate with non-sentential negation AND NOT in Example (42a) and the non-clausal conjunction AS WELL AS in Example (42b). These constructions are both acceptable with non-finite VPs, as in Example (42c). These kinds of data are problematic under a deletion-based analysis of an LCG account, as they show that gapped clauses may have different syntactic properties compared to those of their full counterparts.

- (42) (a) Robin speaks French, and not Leslie (*speaks) German.
 (b) Robin speaks French, as well as Leslie (*speaks) German. (adapted from Culicover & Jackendoff 2005: 278, (76))
 (c) Robin prefers [not to speak German] / to speak French as well as (to speak) German.

[22] Constructionist approaches of gapping have been proposed in various frameworks: Categorical Grammar (Dowty 1988; Steedman 1990, 2000), Simpler Syntax (Culicover & Jackendoff 2005), Construction Grammar (Goldberg & Perek 2018), Lexical-Functional Grammar (Patejuk & Przepiórkowski 2017), Head-driven Phrase Structure Grammar (Abeillé et al. 2014; Bîlbîie 2017; Park et al. 2019).

[23] For more details, see Ginzburg & Sag (2000), Ginzburg & Miller (2018), and Kim & Nykiel (2021). Park et al. (2019) also explain how to account for scope ambiguity in gapping.

In addition, the fragment-based analysis easily accounts for the attested example in Example (43a) that involves the accusative pronoun *ME*, whereas the full counterpart in Example (43b) involves the nominative case. In the gapped version with accusative case, there is no finite verbal head to assign the nominative case, like in non-finite clauses in Example (43c).²⁴

- (43) (a) So you don't have to trust me or **me**, you. (Goldberg & Perek 2018: 202, (51))
 (b) So you don't have to trust me or **I** don't have to trust you. (Goldberg & Perek 2018: 202, (51))²⁵
 (c) You want (for) **me** to trust you.

At the syntactic level, the fragmentary gapped clause only contains remnants (cf. Example (15c) above); each remnant must be paired with some 'major' correlate in the source clause (cf. Hankamer 1971's Major Constituent Condition) and match its correlate in its HEAD value. The correlates of the remnants are identified via a contextual feature SAL(ient)-UTT(erance) (cf. Ginzburg & Sag 2000). Therefore, each remnant must match a possible subcategorisation of the verbal predicate in the source.

At the semantic level, each remnant must be in a contrastive relation with a correlate in the source; therefore, remnants are contrastive topics and contrastive foci (cf. Rooth 1985; 1992; Winkler 2005), i.e. they evoke alternatives. The content of the gapped clause is built from the meaning of the source, the remnants and their correlates.²⁶

Crucially, our fragment-based analysis includes a discourse component, which makes use of the contextual feature QUD (cf. Roberts 2012; Ginzburg & Sag 2000; Reich 2007; Ginzburg & Miller 2018; Kim & Nykiel 2021). In a QUD-based approach, each utterance is supposed to contribute to the QUD, and can be analysed as an answer to an overt or implicit QUD (Roberts 2012). The most salient question in the discourse is the Maximal Question Under Discussion (MAX-QUD, cf. Ginzburg & Sag 2000). In gapping constructions, the most salient QUD generally corresponds to a multiple WH-question, cf. Steedman (1990: 248): "*Fred ate bread, and Harry, bananas*, is only really felicitous in contexts which support (or can accommodate) the presupposition that the topic under discussion is *Who ate*

[24] As noted by a reviewer, this implies that the coordination of a full clause and a gapped clause is unbalanced (see Abeillé et al. 2014 for a formal analysis). As noted by Abeillé & Chaves (2021: 742), it is possible to coordinate a finite and a non-finite clause under some predicates:

(i) I expect [to be there]_{inf} and [that you will be there too]_{fin}.

[25] As observed by an anonymous reviewer, this non-elliptical version has the wrong scope for modality and negation.

[26] For a formal semantic proposal (accounting for scope ambiguities in gapping), see Park et al. (2019) and Park (2019), who propose an underspecification-based analysis (by using Lexical Resource Semantics) linked to a single, uniform syntactic structure.

what.” Most importantly, the discourse constraint on gapping is that both the gapped and the source clause must answer the same QUD (Reich 2007; Park 2019).

The discourse constraint that requires the gapped clause to address the QUD triggered by its source allows the gapped clause to be embedded, provided the embedding clause does not introduce a new QUD that is different from the one associated with the source clause (Park 2019). This directly predicts a penalty for embedded gapping under factives. As traditionally assumed (Karttunen 1971, 1973; Kiparsky & Kiparsky 1971), non-factive predicates do not presuppose the truth of their complement clause; in these cases, the embedded clause contains the foregrounded information, being the main assertion of the utterance (Hooper & Thompson 1973). In other words, under a non-factive predicate, the embedded gapped clause contributes the main point of the utterance (i.e. ‘at-issue’ content, in the sense of Potts 2005). Therefore, the QUD-based constraint is observed in embedded gapping under a non-factive verb, such as *SUSPECT* in Example (44a): both the gapped and the source clause answer the same QUD (namely, *WHO ORDERED WHAT?*). On the other hand, factive predicates presuppose the truth of their complement, and in these cases, the embedding clause contributes the main point of the utterance, ‘at-issue’ content, whereas the embedded complement contains backgrounded information, ‘non-at-issue’ content (see Ambridge & Goldberg 2008 for experimental evidence). Crucially, this kind of environment violates the QUD-based constraint stipulated above: in contexts such as Example (44b), the embedding clause *I REGRET* involves a new QUD (i.e. *WHAT EFFECT DID IT HAVE ON THE SPEAKER?*), different from the QUD of the source clause (i.e. *WHO ORDERED WHAT?*).

- (44) (a) At the bar, Paul ordered a beer and **I suspect** John a whisky.
 (b) #At the bar, Paul ordered a beer and **I regret** John a whisky.

However, factive predicates do not behave exactly the same. One has to distinguish between semi-factive (cognitive) predicates and true factive (emotive) predicates (Karttunen 1971; Hooper 1975): with semi-factives, presupposition can be easily suspended, whereas it cannot be suspended as easily with true factives. We expect then a ‘hybrid’ behaviour of semi-factives: they may come closer to non-factives with respect to embedded gapping in cases where presupposition is suspended.²⁷ If embedding under a true factive predicate involves a new QUD in gapping constructions, this is not necessarily the case with semi-factives. This would explain why semi-factives are better at embedding predicates than true factives.

Consequently, our fragment-based analysis can easily handle the gradience we have observed through the three semantic classes of predicates (non-factives vs semi-factives vs true factives).

[27] A similar observation is made in Farkas (2003), who analyses semi-factives as an intermediate semantic class of predicates between non-factives and true factives.

As we do not postulate any other specific syntactic constraint on embedding, we expect embedded gapping to be possible not only in the configurations we have analysed through this paper (when only the gapped clause is embedded) but also in more complex environments, such as Examples (39–40) above, where both the gapped and its source are each embedded.

Moreover, the QUD-based constraint predicts that gapping could occur in syntactic contexts other than coordination, provided the subordinating conjunctions introducing the gapped clause do not trigger the construction of a new QUD. Thus, we could explain the contrast we observe in Example (45) between the subordinating conjunctions *WHILE* and *BECAUSE*. As explained by Park (2019), a *BECAUSE*-clause introduces a new QUD (a *WHY*-question), so we expect Example (45) to be inappropriate with *BECAUSE*, whereas a *WHILE*-clause still answers the same QUD addressed by the main clause, so we expect Example (45) to be acceptable with *WHILE*. Therefore, we observe that the purely syntactic configuration (coordination vs subordination) in which a gapping construction occurs is less important than its discourse functioning.

(45) The first hypothesis is true { **while** / #**because** } the other false. (Park 2019: 63)

We note that this QUD constraint on gapping can subsume another discourse constraint discussed in the literature, namely, the availability of gapping only with symmetric discourse relations (Levin & Prince 1986; Kehler 2002; Culicover & Jackendoff 2005), i.e. resemblance relations (e.g. parallelism or contrast) and unacceptability of gapping with asymmetric discourse relations, e.g. cause-effect relations. We can say that all symmetric discourse relations involve a QUD-identity between the elements involved in this kind of relations, whereas asymmetric discourse relations do not necessarily maintain the same QUD.

The fact that gapping involves a semantic and discourse parallelism is also observed in Example (46), where we have one of some naturally occurring examples of embedded gapping, collected by Park (2019) from Google. In this case, we have some symmetric/reciprocal relation between the remnants and the correlates, cf. the inverted order of pronouns in the contrastive pairs.

(46) The program started, we were assigned to Charles Miller. We immediately hit it off and both of us enjoyed our time with him and **I think** him with us. (Park 2019: 38)

When the semantic and discourse parallelism is accommodated, gapping becomes available even in syntactic environments assumed to disallow gapping, as shown by the occurrences in Example (4) above, from Park (2016), repeated for convenience in Example (47). Therefore, subordinating structures accommodating some kind of semantic and discourse parallelism may allow gapping.

- (47) (a) Truth is YOU will be in a position to hire ME, **before** I, YOU. (Park 2016: 300)
 (b) No doubt THEY will find US, **before** WE, THEM. (Park 2016: 300)
 (c) As for me all a little pup has to do is give me one of those sad, entreating looks and I am his prisoner, his pal, his confidant, and slave... Maybe WE LOVE THEM, **because** THEY, US. (Park 2016: 300)

Based on all these facts, we have to admit that gapping seems to be more constrained by semantic and discourse parallelism than by syntactic parallelism (Culicover & Jackendoff 2005; Abeillé et al. 2014; Bîlbîie 2017; Park 2019).

To conclude, embedded gapping in English is constrained both syntactically and semantically. The syntactic constraint requires the complementizer to be absent. This syntactic constraint is automatically accounted for in a fragment-based analysis, where the fragment is a non-finite phrase. In addition, there is a discourse constraint at work that allows embedded gapping only under some semantic types of predicates. We thus posit a specific QUD constraint, requiring the gapped clause and its source to address the same QUD.

5.5 A cross-linguistic perspective on embedded gapping

Based on our experimental evidence, we concluded that embedded gapping is possible in English, and is affected by both the semantic class of the embedding predicate and the presence/absence of THAT. In all our experiments, there is a significant interaction between the effect of the complementizer and the effect of the semantic class of embedding predicate.

From a cross-linguistic perspective, the semantic factor seems to hold across languages. If the true factive predicate penalty comes from the fact that the gapped clause must address the same QUD as the antecedent clause, we expect it to be universal. Recent experimental work (also based on several acceptability judgments tasks) by Bîlbîie & de la Fuente (2019) for Spanish, Bîlbîie et al. (2021) for Romanian and Bîlbîie & Faghiri (2022) show that embedded gapping is possible in these languages, and that non-factive verbs embed more easily than factive ones; and among factive verbs, semi-factive (e.g. cognitive) predicates embed more easily than true factive (e.g. emotive) ones. In Spanish, as shown in Bîlbîie & de la Fuente (2019), embedded gapping is as acceptable as embedded non-gapping under non-factive verbs, such as CREO ‘I think’ in Example (48).

- (48) Alfonso robó las esmeraldas y **creo** **que** Mugsy (robó) las
 Alfonso stole the emeralds and think.1SG that Mugsy (stole) the
 perlas.
 pearls
 ‘Alfonso stole the emeralds, and I think that Mugsy stole the pearls.’

Instead of stipulating a universal syntactic ‘No Embedding Constraint’ on gapping, we rather propose a generalisation, such as the following: there is a cross-linguistic semantic constraint related to the tripartition non-factives versus semi-factives versus true factives.

On the other hand, the presence versus absence of the complementizer seems to vary across languages: English allows embedded gapping only in the absence of *THAT*, as in Example (49), whereas Spanish (or Romanian) has embedded gapping with an overt complementizer, as in Example (50). So in these languages, either the gapped clause is finite or the complementizer is compatible with a non-finite clause, unlike in English.²⁸ In addition, a language such as Persian allows embedded gapping with both overt and omitted complementizer, as in Example (51), though experimental studies (Bîlbîie & Faghiri 2022) suggest a preference for the absence of complementizer.

- (49) At the bar, Paul ordered a beer and **I suspect** (***that**) John a whisky.
- (50) En el bar, Pablo pidió una cerveza y **sospecho** *(**que**) Juan un whisky.
‘At the bar, Pablo ordered a beer and I suspect that Juan a whisky.’
(Bîlbîie & de la Fuente 2019)
- (51) Šab=e arusi Ava lebās=e sefid mi-puš-ad va
night=EZ²⁹ wedding Ava cloth=EZ white IPFV-wear-3SG and
šenide=am (**ke**) Ali lebās=e mahalli.
heard=COP.1SG that Ali cloth=EZ local
‘On the wedding night, Ava wears a white dress and I have heard (that)
Ali a traditional cloth.’ (Bîlbîie & Faghiri 2022)

If one tries to explain the specific behaviour of embedded gapping in English, this could be related to the availability of competing variants. First, the fact that English has two options for embedding, namely, with and without *THAT*, imposes the selection of one of them for embedded gapping (and fragments in general). This may be a factor that significantly degrades embedded gapping with an overt complementizer. Languages such as Spanish or Romanian, which do not have two variants for embedding, only allow embedded gapping with an overt complementizer. Persian, which allows both of them, still manifests a preference for complementizer drop in such contexts (like English).

Second, the existence of an alternative elliptical construction in English, which is not available in the other languages under discussion, could also explain the specific constraints on embedded gapping in English. In particular, English has an alternative with pseudogapping that Spanish, Romanian or Persian do not have (Farudi

[28] On the basis of corpus data (Garcia-Marchena 2019), Bîlbîie & de la Fuente (2019) suggest the second hypothesis is correct: Spanish *QUE* is compatible with a non-finite clause (a fragment answer, for instance), unlike French *QUE*; French embedded gapping behaves more like English in this respect (Bîlbîie et al. 2021).

[29] The *Ezafe*, realised as an enclitic, links the head noun to its modifiers and to the possessor NP (see Samvelian 2007).

2013; Bîlbîie 2017); whereas one cannot embed gapping under *THAT*, one can easily embed pseudogapping under *THAT*, as illustrated by the attested data in Example (52) from Miller (2014).

- (52) [...] we want to treat your POWs [**prisoners of war**] with dignity and **we hope that** you do ours as well. (COCA, spoken, 2008–)

Third, languages may differ with respect to the preference between an elliptical construction and its non-elliptical counterpart: our experimental results from English show that, without embedding, there is a general preference for non-gapping constructions in English (as observed by Carlson 2001); on the other hand, no clear preference for either gapping or non-gapping construction was attested in Romance languages (Bîlbîie et al. 2021), whereas in Persian, a clear general preference for gapping was observed (Bîlbîie & Faghiri 2022). The fact that gapping has a very low frequency in language use in English (Tao & Meyer 2006) could be related to this ellipsis penalty in this language. This general preference for non-gapping may give rise to a superadditivity effect with embedded gapping: an elliptical construction, such as gapping, which is rare and less preferred compared to other elliptical constructions in English, is moreover constrained when it comes to embedding.

6. CONCLUSION

In this study, we have shown that the ‘No Embedding Constraint’ proposed for gapping in English is not a strong syntactic constraint. Controlled experiments show that embedded gapping is indeed acceptable in English but seems to be modulated by the presence/absence of *THAT*, as well as by a semantic tripartition of the embedding predicates (non-factives vs semi-factives vs true factives). In order to account for these facts, we have proposed a construction-based fragment analysis, where the gapped clause is a non-finite fragment that has to address the same QUD as its source. We conclude that the ‘No Embedding Constraint’ cannot be used as a diagnostic of gapping (pace Johnson 2014: 8). After all, gapping has a similar behaviour as fragments in general, with respect to embedding, as hypothesised by Weir (2014), Boone (2014) and Wurmbrand (2017). The research we presented here shows that an approach that combines theoretical, experimental and cross-linguistic data is optimally suited for the investigation of the constraints applying to ellipsis phenomena.

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