ON TEMPORARY SYNTACTIC AMBIGUITY

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ABSTRACT. Syntactic ambiguity is a feature displayed by a complex expression which may have more than one meaning, due to the possibility of interpreting its grammatical structure (at one point or another in the sentence) in more than one way. An instance of syntactic ambiguity leads to a network of alternative attachments, and temporary ambiguity occurs when there may be more than one possible syntactic structure for one part of a sentence. Sentences marked by temporary ambiguity cause the human sentence processor to construct an initial syntactic structure which turns out to be incorrect and, consequently, they require, at a certain point, both syntactic and semantic reanalysis.

Key-words: syntactic ambiguity, temporary syntactic ambiguity, the Garden Path Effect, syntactic reanalysis, semantic reanalysis.

INTRODUCTION

Ambiguity is a feature that can be displayed not only by linguistic expressions, but by photographs, paintings, drawings, and other art forms as well. Therefore, it can be defined as a word, phrase, sentence, term, notation, drawing, sign, symbol, or any other form used for communication that admits at least two different interpretations. ***Linguistic ambiguity*** is an extremely pervasive feature of natural language, and, consequently, it has enjoyed the attention of researchers specialising in various fields, such as syntax, semantics and pragmatics, or literature, psychology, philosophy and law (Preda, 2009: 107-108). Hoefler (2005) offers a classification of linguistic ambiguity by distinguishing between ***structural*** (or compositional) ***ambiguity***, which includes **syntactic** and **semantic** types and ***non-structural ambiguity***, which comprises **pragmatic** and **lexical** types. **Syntactic ambiguity** is a feature displayed by a complex expression which may have more than one meaning, due to the possibility of interpreting its grammatical structure (at one point or another in the sentence) in more than one way. Although a given sentence normally consists of a single set of unambiguous words, that string of words may have more than one well-formed set of groupings, thus giving rise to syntactic ambiguity (Preda and Coman, 2008: 16).

Temporary syntactic ambiguity is a linguistic phenomenon also known under the name of "The Garden Path Effect": one is led down the garden path by

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the structure of the sentence, as the first syntactic parsing will not fit the rest of the sentence. Garden Path Sentences are sentences that may cause an ambiguity in interpretation, which, however, is resolved at the point where a disambiguating element occurs. These sentences lead one down the garden path in a quest for proper understanding. For example, the utterance *'While Don was reading the newspaper ...'* could be continued in at least two different ways:

{{While [Don [was reading [the newspaper]]] [his sister knocked on the door]]}.
*{{While [Don [was reading]]] [**the newspaper [lay unnoticed on the floor**]]]}.*

When a reader or, especially, a listener is confronted with a sentence like this, s/he cannot be certain from the start which the right structural analysis is, so *'the newspaper'* may get an initially incorrect analysis. This noun phrase could be either the Direct Object of the verb phrase *'was reading'* or the Subject of the main clause verb *'lay'*. Until reaching the noun phrase *'the newspaper'*, which can have the syntactic function of Subject or, respectively, Direct Object of a verb, the parser may go either way, so the sentence is marked by temporary syntactic ambiguity .

There are several types of sentences that create difficulties for the parser due to the fact that they contain elements compatible with two different syntactic structures (Grant, 2005: 41-49). Such instances of temporary ambiguity may occur when the listeners or readers are confronted with a choice: Direct Object Nominal Clause versus Defining Relative Clause, Direct Object of Subordinate Clause versus Subject of Main Clause, Direct Object of Main Clause versus Subject of Embedded Clause, and Main Clause versus Reduced Relative Clause. Another problematic situation is the presence of two prepositional phrases placed one after the other in one sentence: the issue known as Prepositional Phrase Attachment.

Direct Object Nominal Clause versus Defining Relative Clause

The fact that both nominal clauses and defining relative clauses can be introduced by the word "that" often causes temporary ambiguity to appear in certain linguistic contexts. Thus, after the sequence *'The teacher told the man that the boy hit ...'* the reader's syntactic analysis is expecting a pronoun such as "him" or some sort of noun, such as "the girl", to follow the verb "hit" and complete the whole sentence analysis, as in (1)*'The teacher told the man that the boy hit the girl on a regular basis'*. However, as the sentence reads (2)*'The teacher told the man that the boy hit that he should be more tolerant with children'* there is a point where the readers unwarily pause for an instant due to the appearance of temporary ambiguity. This point is precisely at the moment when the word "that" appears again, causing the human processor to perform a new analysis of the sentence.

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TP
- DP
  - The teacher₁
- T'
  - T
    - told₂
  - VP
    - t₁
    - V'
      - V
        - t₂
        - DP
          - the man
      - IP
        - that the boy hit the girl on a regular basis

TP
- DP
  - The
- T
  - T
    - told₂
  - VP
    - t₁
    - V'
      - V
        - t₂
        - DP
          - the man that the boy hit
      - IP
   - that he should be more tolerant with children
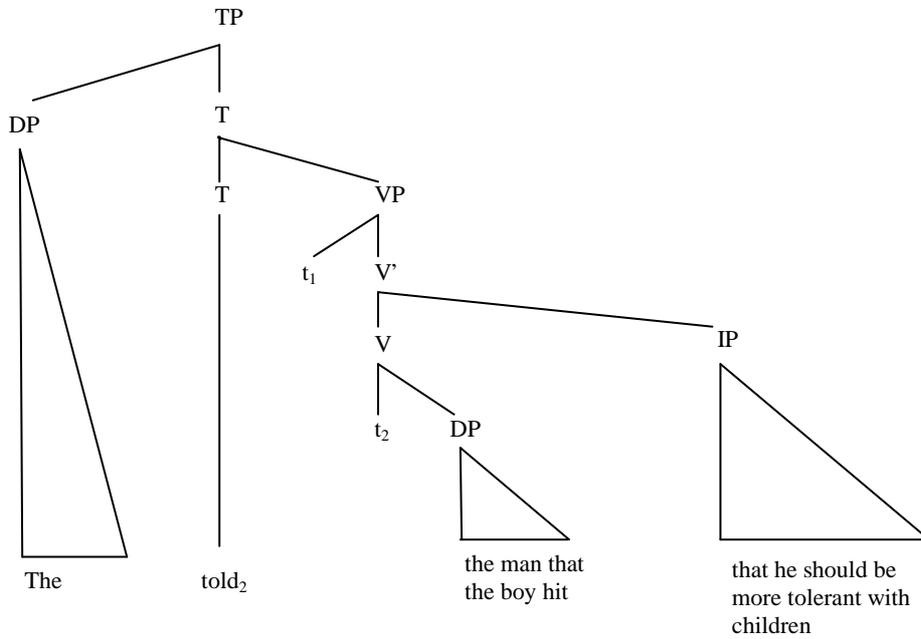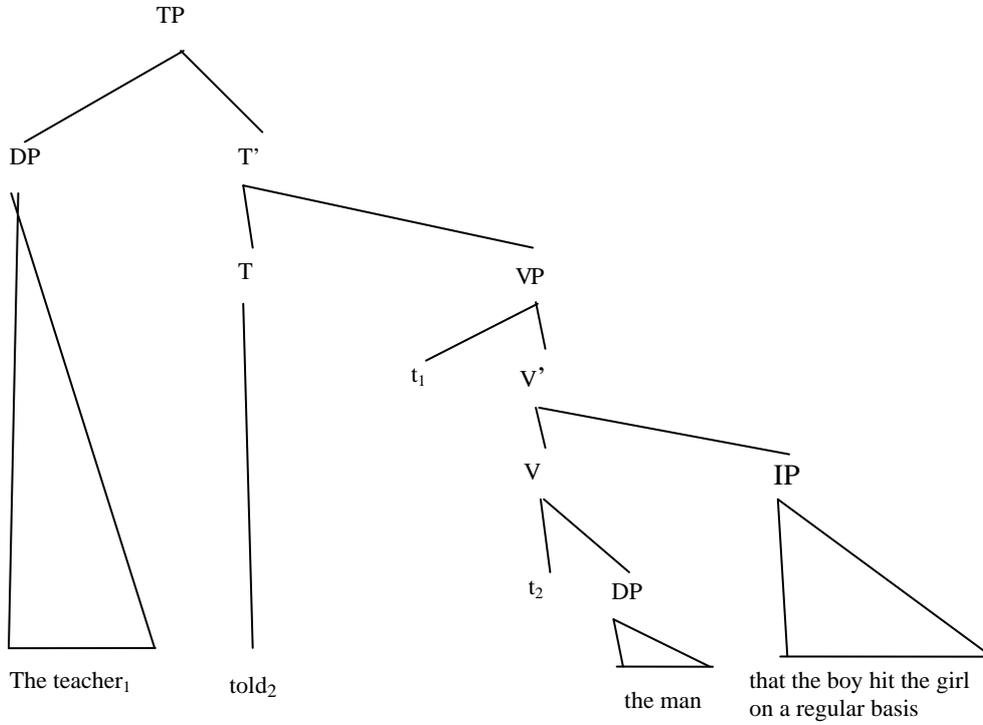
As they read through the sentence, the readers construct a certain pattern of syntactic analysis; but, when they stumble upon a linguistic unit that does not belong to that particular pattern, their brain needs a split second to perform a re-analysis solving the temporary ambiguity and reaching the correct interpretation. This type of ambiguity arises due to the fact that, while we process the sentence, we expect *'that the boy'* to be the beginning of a Nominal Clause with the syntactic function of Direct Object. But this is not the case, since it should actually be read as a Defining Relative Clause.

Here is one more example of ambiguity due to the double use of the word "that": *'The boy told the girl that he was envious of to leave'* is an example where temporary ambiguity arises after reading the preposition "of", the readers expecting a pronoun like "her" or a proper noun like "John" to follow, in order to finish what they believe to be a Nominal Clause. However, the "that"-clause is, in this case, a Defining Relative Clause and, thus, reanalysis is required.

(3) {[The boy told the girl] [that [he was in envious of her]]}. – Nominal Clause, Direct Object

(4) {*[The boy] [told [the girl **[that he was envious of]**] to leave]]}.* – Defining Relative Clause

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                              TP
                         /         \
                      DP            T'
                     /|           /    \
                    / |          T        VP
                   /  |                  / \
                  /   |                 t₁    V
                 /    |                     /        \
                /     |                    V            IP
               /      |                   / \          /|
              /       |                  t₂    DP      / |
             /        |                       /|      /  |
            /         |                      / |     /   |
       The boy₁    told₂                the girl   that he was envious of
                                                   her
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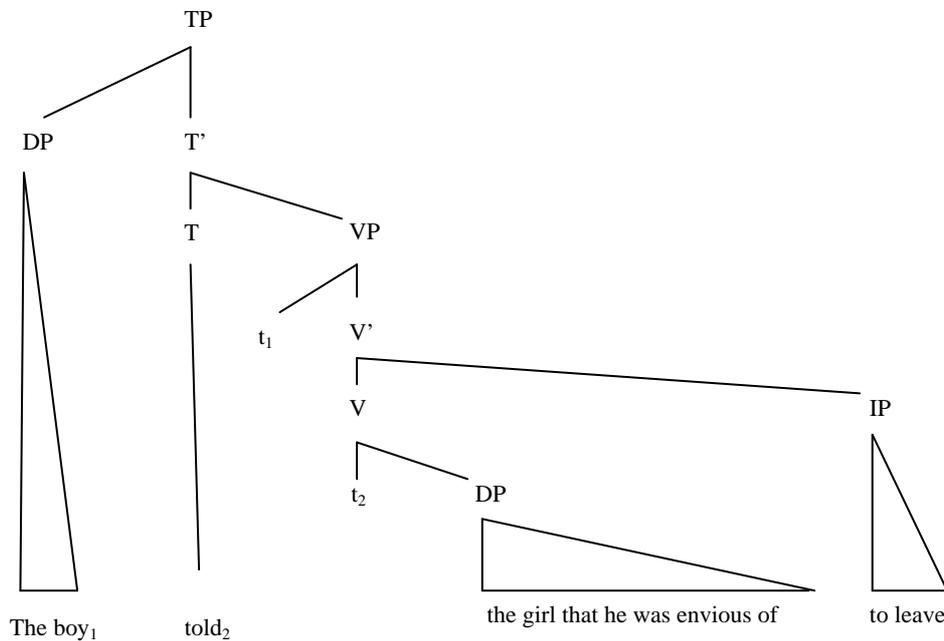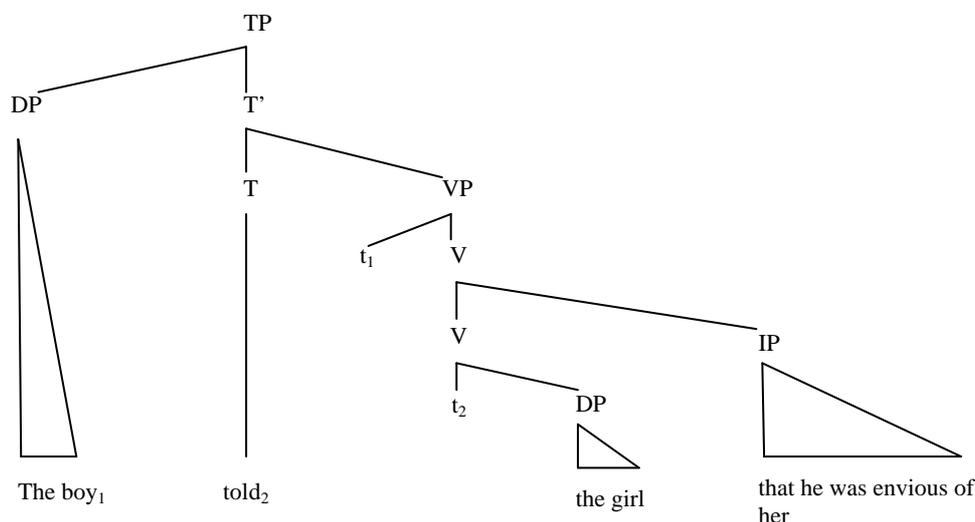
This type of temporary ambiguity is neither very strong, nor long-lasting, but both listeners and readers fall into the trap of expecting the wrong syntactic structure to follow, having, thus, to start again the analysis of such sentences in order to access the correct interpretation (Grant, 2005: 42-43).
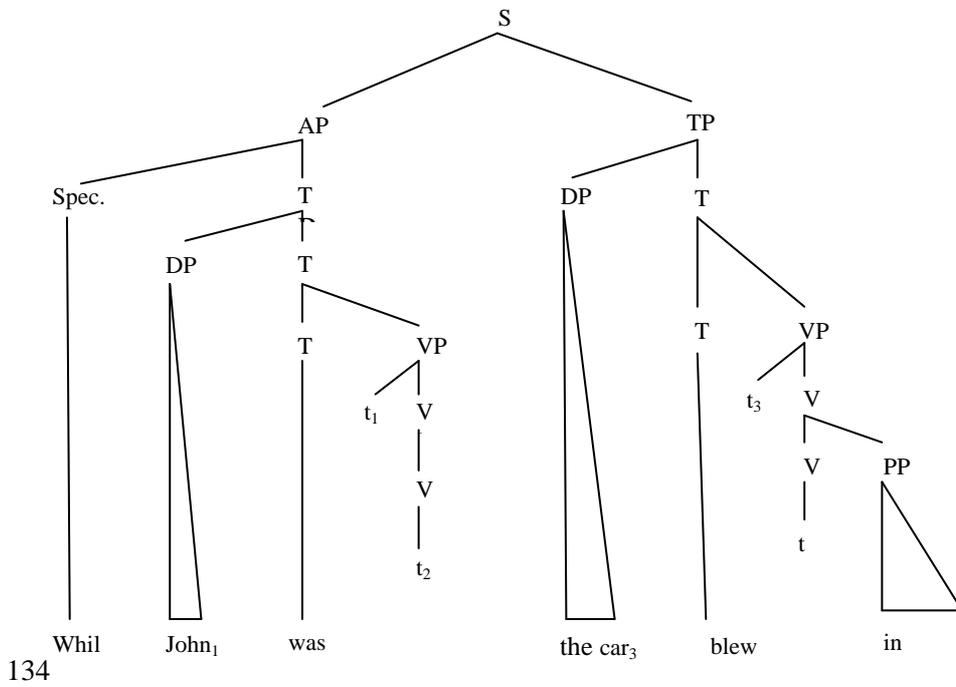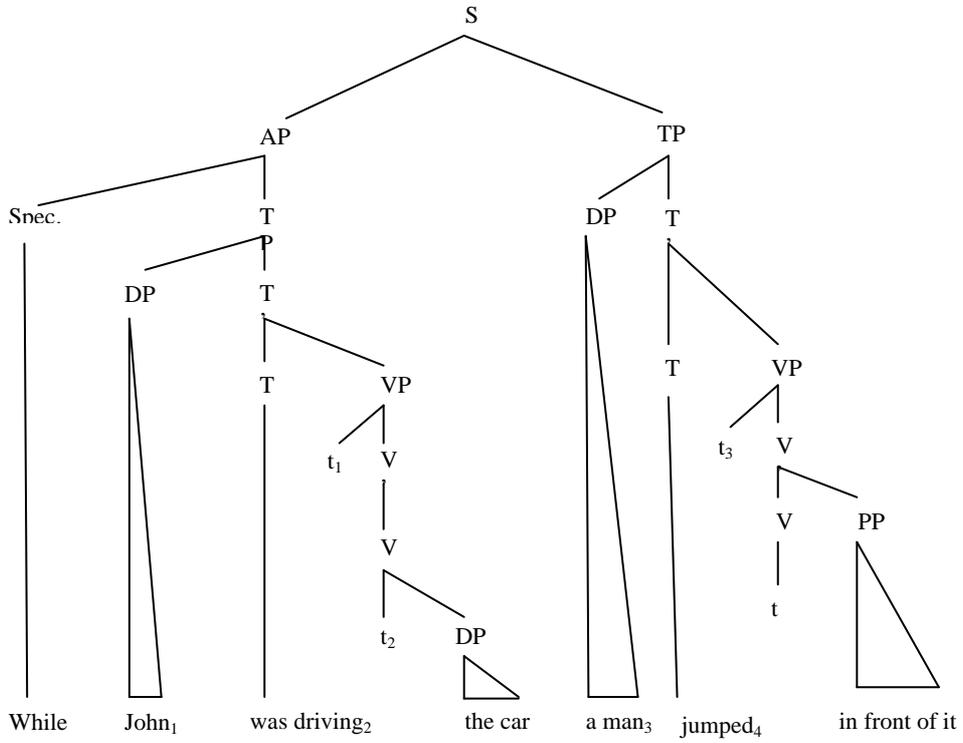
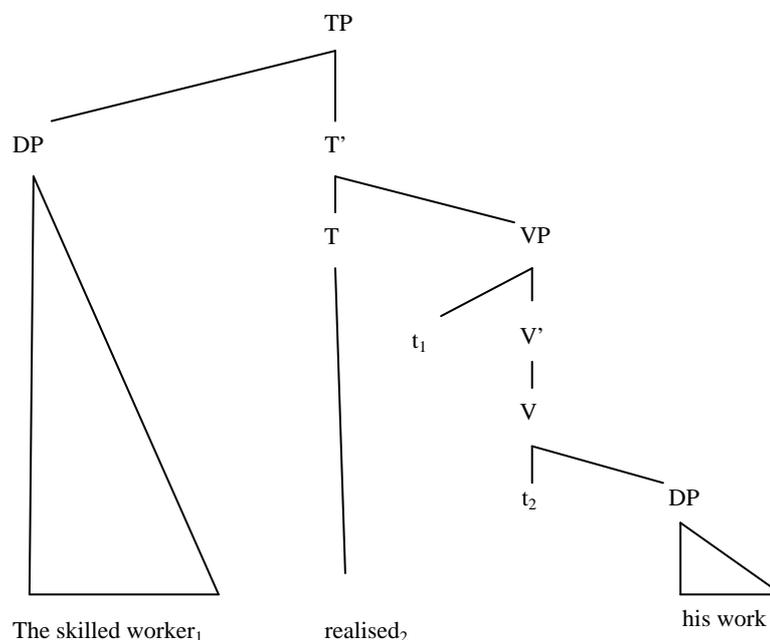### Direct Object of Subordinate Clause versus Subject of Main Clause

This type of temporary ambiguity occurs when the sentence begins with a word such as "while" or "when". It can be contrasted with its unambiguous counterpart, which, in writing, includes a comma mid-way through the sentence. The misinterpretation of the sentence is caused by the supposition that the expression which is, actually, the subject of the sentence (of the main clause, that is) should be the object of the subordinate clause introduced by the relative adverbs "while" or "when". For instance, a sentence that begins with: *'While John was driving the car ...'* is more likely to receive an interpretation similar to

(5) {While [John [was driving [the car]]], [a man jumped in front of it]}.
 But a reanalysis will be required if the sentence is actually of the type:
*(6) {While [John [was driving]], **[the car [blew up in flames]]**}.*

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S

AP
TP

Spec.
T

DP
T

T
VP

t_1
V

V

t_2
DP

DP
T

T
VP

t_3
V

V
PP

t

While
John$_1$
was driving$_2$
the car
a man$_3$
jumped$_4$
in front of it

S

AP
TP

Spec.
T

DP
T

T
VP

t_1
V

V

t_2

DP
T

T
VP

t_3
V

V
PP

t

Whil
John$_1$
was
the car$_3$
blew
in

TP
DP
T'
T
VP
t_1
V'
V
t_2
DP
The skilled worker$_1$
realised$_2$
his work

The noun phrase *'the car'* is not the object of the clause introduced by *'while'*; it is the subject of the main clause's verb phrase *'blew up in flames'*. When processing this sentence, the listener/reader comes to up to a certain point of the syntactic analysis where *'the car'* is perceived as being Noun Phrase, Direct Object, and, when the phrasal verb *'blew up'* appears, a reanalysis is required to dissipate the ambiguity: *'the car'* is, then, correctly interpreted as being the Subject of the Main Clause and not the Direct Object of the Subordinate Clause that begins with the relative adverb *'while'*. As Grant (2005: 44) points out, this type of temporary syntactic ambiguity that may arise between these two concepts "is extremely slight but can cause all sorts of semantic pitfalls".
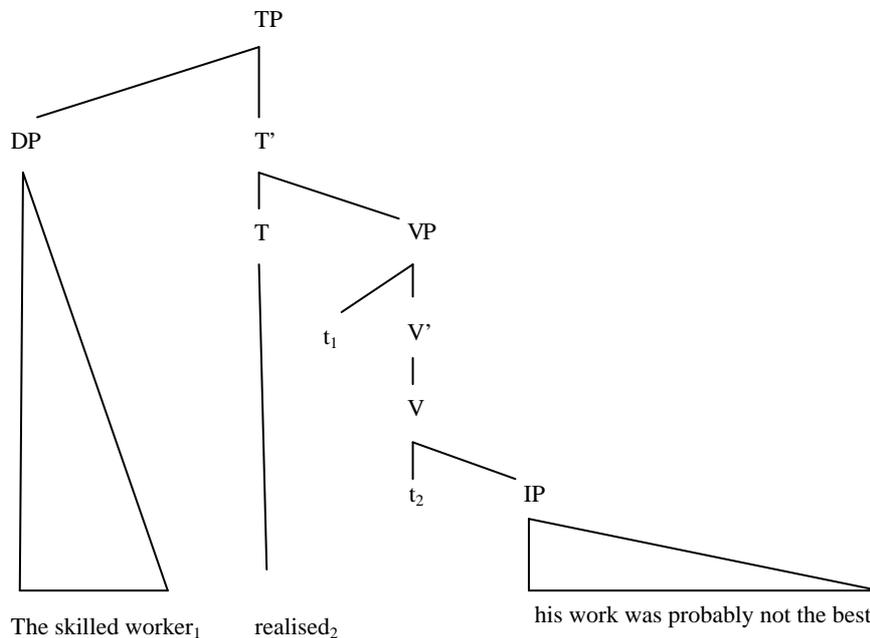
Direct Object of Main Clause versus Subject of Embedded Clause

This type of ambiguity appears in sentences containing verbs such as "to suggest" or "to believe", which can be analysed syntactically in more than one way. The noun phrase that follows such a verb is often expected to be its very own direct object but, in the end, it turns out to be the subject of the embedded clause. The unambiguous sentences feature the word "that" immediately after the verb, making it clear that the reader should not expect an object to immediately follow. In a sentence like *'The skilled worker realised his work was probably not the best'*,

the listener's/reader's syntactic construction normally combines the noun phrase *'the skilled worker'* and the verb *'realised'*, so that the noun phrase *'his work'* is perceived as being the Direct Object of this verb, in the very common word order pattern S + V + DO. The reanalysis of the sentence is required by the appearance of the auxiliary verb *'was'*, so that a new, this time correct, structure of the sentence can be provided:

(7) {[The skilled worker [realised [his work]]]}.
*(8) {[The skilled worker [realised [[**his work [was probably not the best]]]]**}.*

The ambiguity in such cases arises when the Subject of an Embedded Clause is misinterpreted, on the first syntactic analysis, as being the Direct Object of the Main Clause. However, since the re-analysis in such linguistic situations is easily performed, this kind of temporary ambiguity is quickly solved (Grant, 2005: 45-47).
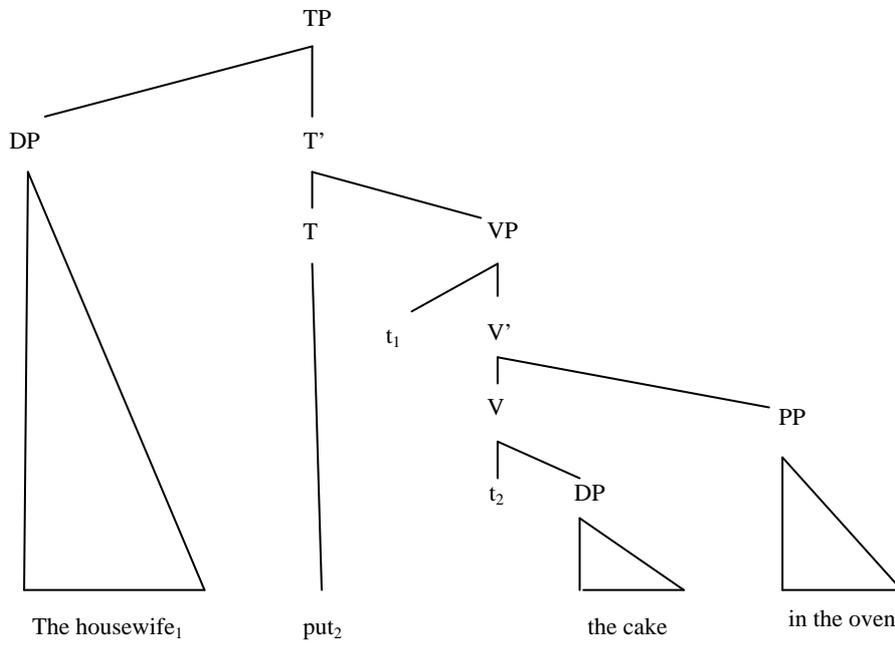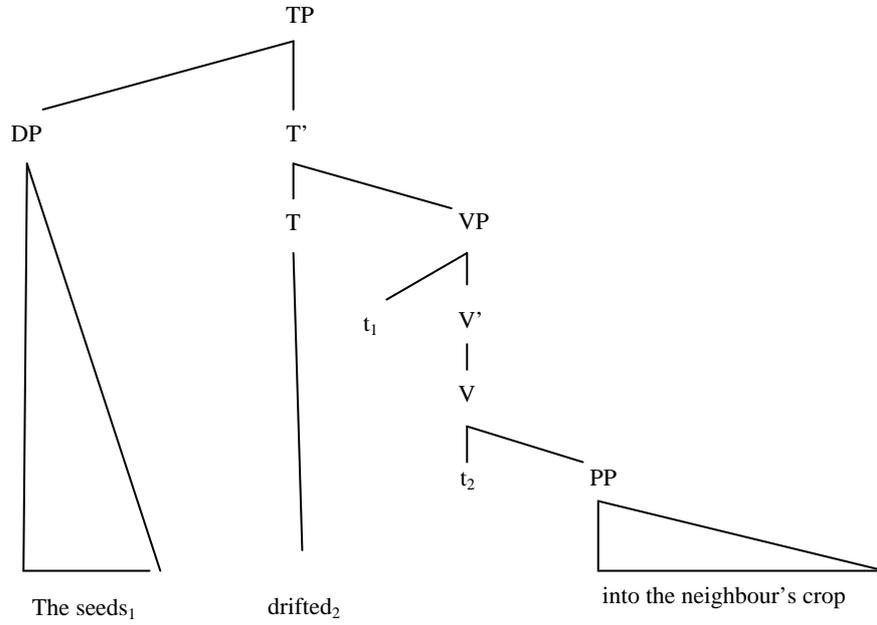
Main Clause versus Reduced Relative Clause

This type of temporary ambiguity is characterised by the presence of an *-ed* verb form + a Prepositional Phrase immediately following the Subject of the Main Clause. While this *-ed* verb form is first perceived as a past tense verb, namely the verb of the Main Clause, followed by a Prepositional Phrase, it is actually a past

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participle, part of a Defining Relative Clause that has been subject to reduction. The Relative Clause, if present in its entirety, would have been introduced by the relative pronoun "that", accompanied by the auxiliary "had". The presence of these two words marks an unambiguous sentence, as they signal the beginning of the Relative Clause to the listener/reader. However, in the reduced version, these two disambiguators are missing, giving rise to ambiguity. Thus, when confronted with a sentence like *'The seeds drifted into the neighbour's crop were a surprise for Jane'*, the reader is certain to construct a Main Clause, in light of the information contained in the first part of the sentence, but the appearance of the auxiliary *'were'* signals the need for re-interpretation: (9) *{[The seeds][drifted [into the neighbour's crop]]}* is a structure that does not fit the initial analysis, and the listener/reader finally arrives at the correct syntactic structure, namely (10) *{[The seeds [drifted [into the neighbour's crop]]][were a surprise for Jane.]}*.
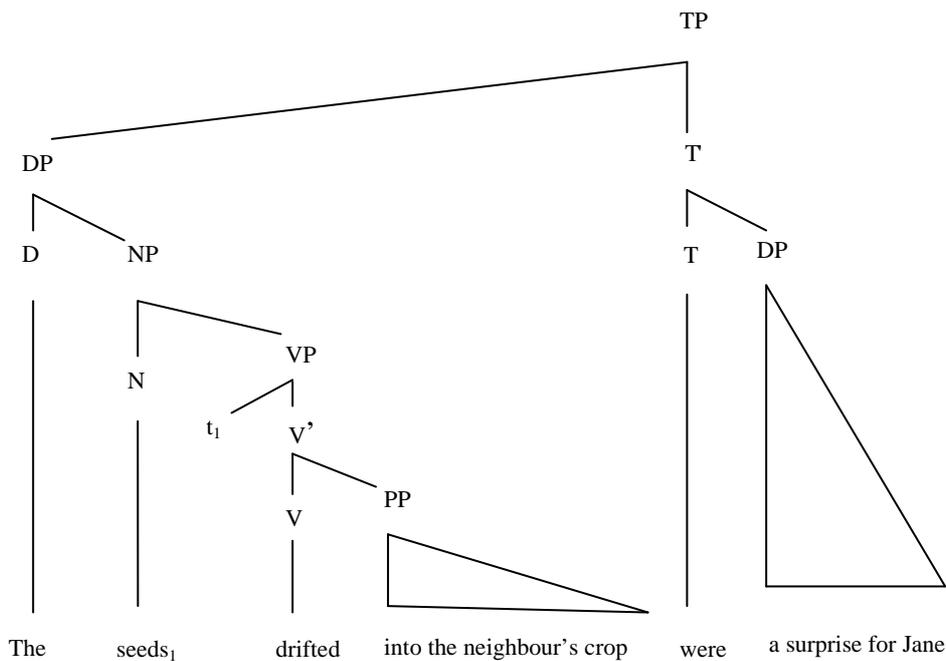

This occurs because, upon reaching the end of the sentence, the listener/reader realises that, in fact, *'drifted'* is a past participle, part of a Reduced Relative Clause, not the main verb of the Main Clause. This type of sentence structure is rather rare in the English language, and, thus, more difficult to process than almost all the other possible instances of temporary ambiguity (Grant, 2005: 48-49).

TP

DP   T'

              T   VP

                    t₁   V'

                           V

                        t₂   PP

The seeds₁   drifted₂   into the neighbour's crop

TP

DP   T'

              T   VP

                    t₁   V'

                           V   PP

                        t₂   DP

The housewife₁   put₂   the cake   in the oven

Prepositional Phrase Attachment

This type of ambiguity arises when there are more Prepositional Phrases occurring one after another in a sentence and when, therefore, their **attachment to referent objects is temporarily unclear**. The ambiguity lies in the unfamiliarity of such a construction. It may be disambiguated by resorting to unambiguous sentences, which contain the additional **that + auxiliary: is/was/etc**. before the first prepositional phrase. Upon hearing/reading an example like *'The housewife put the cake in the oven on the table'*, the addressee assumes that *'The housewife put the cake in the oven'* is the complete sentence, an independent clause, but when the preposition *'on'* is perceived, a reanalysis of the syntactic structure is required, the initial interpretation failing to function. On the first reading, the reader assumes that the housewife put the cake in the oven but, after performing a new syntactic analysis, s/he realises that the housewife put the cake (that had been in the oven) on the table. The prepositional phrase which seemed, at first, to refer to **where the cake was placed** eventually refers to the place **where the cake had been** before it was moved (in the oven). The provisional structure (11) *{The housewife [put [the cake][in the oven]]}* is abandoned in favour of the correct (12) *{The housewife [put [the cake [in the oven]] [on the table]]}*.
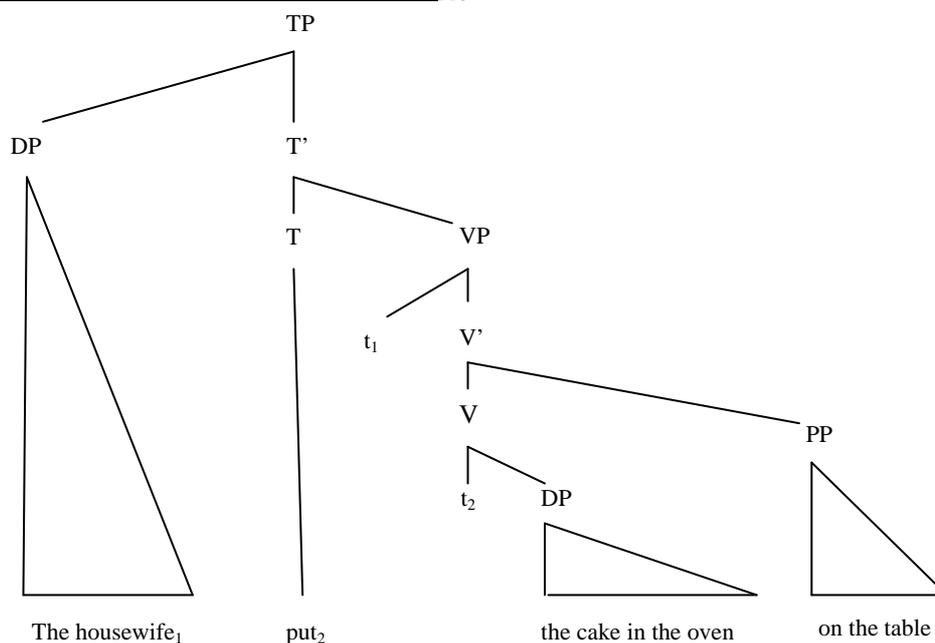
The unfamiliar syntactic construction featuring two prepositional phrases side by side in a sentence causes processing difficulties because of the temporary ambiguity pertaining to prepositional phrase attachment. This type of temporary ambiguity

appears to be the most challenging of all, given the relatively low frequency of sequential prepositional phrases in the English language, which renders the addressee's horizon of expectations rather opaque to such occurrences (Grant, 2005: 47-48).

CONCLUSIONS

It might, quite reasonably, be argued that most, if not all, types of ambiguity can be assigned to the category of temporary ambiguity, given that the insertion of a disambiguator (a piece of either semantic or pragmatic information) would lead to ambiguity resolution in the case of virtually any linguistic context. However, the distinctive feature of temporary syntactic ambiguity lies in the possibility of identifying the true meaning on the basis of the sentence's constituents only, no additional information being required. Temporary ambiguity is a form of syntactic ambiguity that can be gradually solved upon hearing/reading the entire sentence, by taking into account all the individual constituents of that particular sentence. An instance of syntactic ambiguity leads to a network of alternative attachments, and temporary ambiguity occurs when there may be more than one possible syntactic structure for one part of a sentence. Sentences marked by temporary ambiguity cause the human sentence processor to construct an initial syntactic structure which turns out to be incorrect and, consequently, they require, at a certain point, both syntactic and semantic reanalysis. All the examples mentioned above constitute fully grammatical sentences, and unambiguous ones at that, if taken as a whole, since there is only one possible parsing that fits each sentence in its entirety. Nevertheless, due to the fact that the information processing procedure is, necessarily, marked by temporality, some readers/listeners may find themselves being "led up the garden path", as, up to a point, the initially perceived structure of the sentence allows for two different parsings. However, if the first syntactic parsing does not fit the rest of the sentence, the human processor will ultimately re-evaluate the whole in light of the new information, thus successfully reaching a state of ambiguity resolution.

Abbreviations
The following abbreviations were used in the representation of the parsing trees:
S – sentence
IP – inflection phrase
AP – adverbial phrase
DP – determiner phrase
NP – noun phrase
TP – tense phrase
VP – verb phrase
PP – prepositional phrase
D – determiner
N – noun
V – verb
t – trace
Spec. – specifier

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