

In: Wolfgang Wildgen and Barend van Heusden (eds.): *Metarepresentation, Self-Organization and Art*. Frankfurt am Main: Lang, 2009, 233-264.

## On the metascientific representation of inconsistency in linguistic theories<sup>1</sup>

András Kertész and Csilla Rákosi

*“Whenever you meet a contradiction, you must make a distinction.” (William James)*

### 1. Introduction

By the *law of non-contradiction*, a statement and its negation cannot be true simultaneously. Ever since its introduction in Aristotle’s *Metaphysics* more than two thousand years ago, it has been commonplace to assume that rationality is incompatible with the maintenance of contradictions and, consequently, the law of non-contradiction has been regarded as one of the pillars of rationality. This attitude has also been adapted in *the standard view of the analytical philosophical science*.<sup>2</sup> For example, one of the most influential representatives of the standard view characterized its significance in the following way:

“For it can easily be shown that if one were to accept contradictions, then one would have to give up any kind of scientific activity: *it would mean a complete breakdown of science*. This can be shown by proving that *if two contradictory statements are admitted, any statement whatever must be admitted; for from a couple of contradictory statements any statement whatever can be validly inferred.*” (Popper 1962: 313; emphasis as in the original)

However, according to Kuhn (1970) the history of science has witnessed it many times that even successful and acknowledged theories *coexisted with contradictions* without being dysfunctional, chaotic or trivial. They do not show the disastrous symptoms predicted by the standard view of the analytical philosophy of science and they must not be regarded as completely irrational enterprises at the outset. These observations boil down to the fact that

---

<sup>1</sup> Our work on the present paper was supported by the Research Group for Theoretical Linguistics of the Hungarian Academy of Sciences at the Universities of Debrecen, Pécs and Szeged, and by the project OTKA T049139. Our thanks are due to György Rákosi for improving our English.

<sup>2</sup> The following quotation is a brief characterization of how the standard view of the analytical philosophy of science is applied to mainstream linguistic theories:

“While the assumption is not always explicit, linguists apparently take for granted the standard view of the structure, function, and methods for evaluation of explanatory theories in empirical science. [Footnote 4: “For elaborations and defense of the standard view of scientific theories see Braithwaite 1953, Hempel 1952, 1965, 1966, Nagel 1961, Popper 1959.”]

On the standard view, the *structure* of an ideally explicit empirical theory is that of a set of abstract principles relating the hypothetical constructs of the theory to each other and to descriptions of observed phenomena. It is suggested that such a system can be construed as an axiomatic system. [Footnote 5: “Sometimes (see Braithwaite, 1953; Carnap, 1956; Hempel, 1952, 1958) but not always, the structure of an ideally explicit empirical theory is represented as that of a partially interpreted formal system.”] The basic general principles (the axioms) of such a system and their consequences (the theorems of the system) constitute the general laws alleged to be true of the entities constituting the domain of the theory. In a correct scientific theory, the general laws must be true.” (Ringen 1975: 3)

the standard view of the analytical philosophy of science is not suitable for tackling the presence of inconsistency in scientific theories.

Recent developments in the philosophy of science questioned several assumptions of the standard view and tried to arrive at a new understanding of scientific theorizing. Inconsistency, among other topics, belongs to a domain that has attracted increased attention. There have been serious attempts at its re-evaluation:

“Within traditional philosophy of science, the role of inconsistencies has largely been ignored. At best, inconsistencies were seen as a hindrance for good scientific reasoning. Until very recently, rationality has been identified with reasoning according to Classical Logic. And, as is well known, Classical Logic does not allow one to reason sensibly in the presence of inconsistencies.

Today, it is generally recognised that almost all scientific theories at some point in their development were either inconsistent or incompatible with other accepted findings (empirical or theoretical). A growing number of scholars moreover recognises that inconsistencies need not be disastrous for good reasoning. (Meheus 2002: VII)”

Against the background of this development, Priest (2002a: 122 f.) argues that there are three basic types of inconsistency that have to be recognized and accounted for by approaches to the philosophy of science. The most obvious type is inconsistency between theory and data. For example, one has a certain well-established theory *T* at one’s disposal. Then, novel data are encountered which seem to contradict the hypotheses of *T*. Naive falsificationism would suggest, of course, to discard *T* as wrong. However, actual scientific practice witnesses that this rarely happens. Rather, *T* is maintained at least until a better theory is found, and so the contradiction between the hypotheses and the data prevails.

The second type emerges between two, otherwise well-accepted theories whose hypotheses nevertheless contradict each other. As Priest emphasizes, this situation is retained until at least one of the contradicting theories is replaced by another one compatible with the remaining theory.

The third type is the internal inconsistency of a particular theory. Priest (2002a) mentions Newtonian dynamics and Bohr’s theory of the atom as well-known examples of contradictions within a theory.

We, as linguists, might be tempted, of course, to ask the question as to what extent theories are affected in our own discipline by these three basic types of inconsistency. Type one clearly applies to linguistic theories: think, for example, of the well-known phenomenon of ‘exceptions’. For a long time, mainstream theoretical linguistics dominated by generative grammar had implicitly presupposed Popperian *falsificationism* within the standard view of the analytical philosophy of science also with respect to the handling of counter-examples (cf. Allan 2003, Penke & Rosenbach 2004 for a relatively detailed discussion). It seemed to be natural to accept the view according to which “[...] data can be fruitfully used as evidence for strengthening or refuting hypotheses” (Kepser & Reis 2005: 3). However, as Penke and Rosenbach (2004: 482ff.) pointed out, we can observe a gradual weakening of *strong falsificationism*, which holds that one counter-example is enough to refute a hypothesis. Many linguists follow a *weaker version of falsificationism*, which maintains that statistically rare counter-examples do not force us to give up our claims. There is an even looser attitude that was labelled as *the Galilean style of science* by Chomsky. According to this view, it may sometimes be reasonable to disregard certain data deliberately, hoping that in later stages of the development of the theory their anomalous behaviour can be explained (cf. e.g. Chomsky 2002 and Penke & Rosenbach 2004: 484). It is not clear, however, whether and to what

extent this gradual loosening of the principle of strong falsificationism, that is, the (at least temporary) toleration of exceptions can be legitimized and in what metascientific framework it can be represented.

The second main type of inconsistency mentioned by Priest is also familiar to every linguist: no doubt, we live with a complicated network of mutually incompatible theories.

At first sight, it is the third type – namely, the internal inconsistency of a given theory – that strikes every scholar, and among them, linguists as well, as untenable, and even scandalous, on the basis of the Aristotelian tradition and the methodological norms of the standard view of the analytical philosophy of science. Indeed, presupposing this methodological background, no linguist would admit that his or her theory is substantially inconsistent in that it simultaneously maintains generalizations contradicting each other. However, if it is not the methodological *prejudices* that we have in mind, but we take a closer look at linguistic *practice*, then we can realize that this kind of internal inconsistency is inevitably part of linguistic research as well.<sup>3</sup> Let us mention three typical sources of the internal inconsistency in linguistic theories. First, there are cases when two *contradictory generalizations* are upheld simultaneously in a theory because both of them have been supported by a series of data and applied successfully to the explanation of various linguistic phenomena (see e.g. Kertész & Rákosi 2006). Second, as new developments in the methodology of linguistics concerning the structure and function of linguistic data (see Kepser & Reis (eds.) 2005, Penke & Rosenbach (eds.) 2004, Borsley (ed.) 2005, Schütze 1996 etc.) have shown, linguistic theories use data of various types which were formerly not licensed by the methodology of the given theory but which they now consider in order to arrive at more complex hypotheses. However, different data types may lead not only to conflicting results but also to conflicts between the methodological background assumptions about the applied data types (see Kepser & Reis 2005: 1, 3). The third source of the internal inconsistency of linguistic theories may be that

“[...] there are conflicts among the goals that syntacticians adopt in analysing sentences. As we attempt descriptions that are both true and general, we lose out on simplicity or consistency. These conflicts may be dealt with in various ways and this is one reason for the multiplicity of approaches to syntactic description.” (Moravcsik 2006: 32)<sup>4</sup>

Thus, with respect to the internal inconsistency of theories, there is a central methodological problem in linguistics. On the one hand, there is a gradually growing interest in the metascientific reflection on the nature and function of inconsistencies in linguistic theories; on the other hand, however, the methodological tools with the help of which the internal inconsistency of linguistic theories can be handled are missing. Therefore, questions of fundamental importance remain unanswered. For example: What kinds of contradictions can be revealed within linguistic theories? Which of them are tolerable and which are destructive? How do they emerge and how can they be resolved? Due to the highly complex nature of these and similar problems, it is not easy to find an appropriate methodological framework for capturing them. Accordingly, it is a challenging and attractive task to make first attempts at the development of such a methodological framework. It is this task that the present paper centres on. We suggest the following two starting points.

---

<sup>3</sup> Nevertheless, there is no clear dividing line between the inconsistency types 1 and 3: conflicts between data and the hypotheses of the theory may be interpreted as conflicts between hypotheses as well. That is, these two groups can be unified as cases of intra-theoretical contradictions. See also Section 4.

<sup>4</sup> Although Moravcsik's claim concerns syntactic theories, it can easily be extended to other fields of linguistics as well.

First, it is a precondition for tackling the issues just mentioned that a system of logic is elaborated which is capable of transgressing the limits of the law of non-contradiction in the classical sense. These limits can be transgressed if, on the one hand, the logic permits the truth of both a particular statement and its negation, but on the other hand, it does not permit to infer any arbitrary statement from this contradiction. Since our object of investigation is not logic itself, but scientific theories, this task has to be relativized to the latter, and, consequently, it is located on the *metascientific* level. Therefore, we obtain the following problem:

(P) What is the metascientific representation of inconsistency in linguistic theories?

The second starting point is the fact that the answers to the questions we mentioned cannot be inferred mechanically from a possible solution to the general problem (P). Rather, they should be tackled by relativizing them to particular linguistic theories. Therefore, we will restrict our attention to a *case study*. To motivate the case study, let us review briefly the present state of the art of inconsistency research in linguistics. As far as we know, there are only two systematic approaches. One of them was put forward in Moravcsik (1993) and continued in Moravcsik (2006). Moravcsik outlined a comprehensive typology of inconsistencies and their resolution in syntax by analyzing a great number of examples. Her main hypothesis is that the differences between syntactic theories are due to different strategies of inconsistency-resolution. Another approach is our own one as put forward in, among others, Kertész (2004), Kertész & Rákosi (2006). There we traced back the emergence and resolution of inconsistencies in linguistics to the mechanism of plausible reasoning. In addition, we also discussed a series of case studies bearing witness to the fact that there are linguistic theories which are well-working in spite of the fact that they contain irresolvable contradictions. In the present paper we want to relate the two approaches in the following way: the starting point for our case study will be one of Moravcsik's (2006: 47 ff.) central examples, namely, Baltin's (1987) account of discontinuous constituents, and we will present a detailed metascientific analysis of this example by making use of the framework we developed elsewhere. Accordingly, we reduce (P) to (P')

(P') What is the metascientific representation of Baltin's account of discontinuous constituents in generative syntax?

The structure of the paper is as follows. In section 2, we will elucidate the notions 'representation' and 'metascientific representation' against a semiotic background. Section 3 will be devoted to a particular metascientific representation of Baltin's approach, which is intended to account for its internal inconsistency. In section 4, we will raise a couple of unsolved problems concerning the nature of the metascientific representation of inconsistency in linguistics. Finally, section 5 will pave the way for the further elaboration of our present considerations.

## **2. The semiotic background**

Before proceeding, it is in order to clarify the notions 'representation' and 'metascientific representation' in linguistics. Let us refer to Lehmann (2004: 204 ff.), who points out that the ultimate substrate of linguistics is speech events, which are directly observable and can be recorded. However, the data which linguistic theories deal with are in most cases not tokens, but representations of the ultimate substrate. As Lehmann (2004: 204f.) emphasizes,

“[...] data are representations of the epistemic object, and consequently they are *signs*. Linguistics differs from other disciplines in that its epistemic object itself is *semiotic* in nature, so that the *object* and *representations* of it may become indistinguishable. [...] As a consequence of this situation of the data, linguists have worried very little about whether a particular datum was *an original or a derived representation*.” (emphasis added)

Therefore, it is crucial to clarify the relationship of the various representations to each other. What matters from the point of view of the problems raised in the previous section is, first, that linguistic data are not physical entities ‘given’ at the outset, but semiotic objects produced by the researcher. These semiotic objects are *symbolic representations*. Second, data are necessarily theory-dependent, that is, they are interpreted and represented with the help of a linguistic theory. This means that they are not theory-independent facts, but become hypotheses of the theory, which may be questioned like any other hypothesis.

The theory-dependent processing of linguistic data yields their representation at different symbolic levels, depending on the particular properties of the theory at issue. As examples, Lehmann (2004: 206) mentions the following levels, each of which is associated with specific kinds of *symbolic representation*:

No.	Level of representation	Code and symbols of representation
1	segmental phonetic	IPA
2	prosodic phonetic	intonation curves, stress levels etc.
3	lexical- phonological	morphophonemes, morpheme boundaries
4	orthographic	standard orthography
5	morphological	interlinear gloss with vocables of background language
6	grammatical	grammatical categories and relations
7	semantic	translations in various languages

Table 1

According to Lehmann, these symbolic representations rest on two operations: *abstraction* and the *semiotic operation of coupling a significans with its significatum*.

However, although there may be complex hierarchical relations among the symbolic levels mentioned, they have in common that all the symbolic representations at these levels belong to the *metalanguage* whose object is natural language (in whatever sense) and that they are part of linguistic theories. Now, the linguistic theories themselves may be regarded as epistemic objects investigated by another discipline, namely, by the *metascience of linguistics* (also called ‘the philosophy of linguistics’). Just as in the case of linguistic theories, these higher order representations may also be associated with different levels.<sup>5</sup>

<sup>5</sup> That the structure of scientific theories can in general be represented at different levels is in fact nothing new, but one of the basic assumptions of the standard view of the analytical philosophy of science. This view elaborated sophisticated formal means to represent the logical structure of scientific theories which was further decomposed into their semantic and syntactic representation. As the paradigm example of the metascientific representation of the syntactic level of scientific theories Carnap’s early work may be mentioned. A clear case of the semantic representation of the structure of scientific theories is the so-called ‘structuralist view of theories’ as developed by Sneed and Stegmüller.

This means that we obtain higher order symbolic representations, namely those which represent certain aspects of linguistic theories within a metascientific framework. All these higher order representations are analogous to those we mentioned above, the main difference being that they belong not to the language of linguistic theories, but to the language of *metascience*. Therefore, if we regard the symbolic representations exemplified by Lehmann as part of the metalanguage of natural language, then these higher order representations are *meta-representations* in the sense that they are part of the meta-metalanguage. Accordingly, by *metascientific representations* we mean the symbolic representations with the help of which metascientific theories represent the symbolic representations put forward within object-scientific – in our case, linguistic – theories.

Against this background, in the case study to be discussed, we will consider *phrase structure trees* in generative grammar as symbolic *object-scientific representations* within the linguistic theory Baltin presupposed. Then, we will reconstruct the structure of this linguistic theory with the help of *metascientific symbolic representations* within a particular metascientific framework. These metascientific symbolic representations will be expected to capture the inconsistencies rooted in the nature of Baltin's object-scientific symbolic representations, i.e. phrase structure trees.

### 3. Case study

#### 3.1. Baltin's argumentation

Baltin (1987) raises the problem of discontinuous constituents in generative grammar by investigating sentences containing degree words and complement clauses such as

- (1) (a) *John was so tall that he hit his head on the overhead lamp.*  
 (b) *John worked on the problem too much to give up.*

For lack of space, we will discuss only those aspects of his account which are relevant for the solution of (P'), without following his line of argumentation mechanically. For similar reasons, we cannot discuss to what extent and how his theoretical assumptions and his argumentation might be criticized.

The syntactic analysis of examples like (1)(a) and (b) must account for two things: First, sentential complements are selected by the degree word, i.e., they are complements of the degree word.<sup>6</sup> One of the principles of generative grammar says that complements have to be generated within the phrase whose head is their selector. The adjective, however, is not complement of the degree word (because it can occur in a sentence without degree word but not vice versa). From this we obtain the following structure:

- (2) [NP        Infl        [V        [Q        **complement clause**] A]]

Second, sentential complements always appear in clause-final position, i.e. we have the order:

- (3) NP    Infl    V        Q        A        **complement clause**

---

<sup>6</sup> That is, without the degree word, sentential clauses cannot appear in the sentence. Moreover, the finiteness of the complement clause depends on the choice of the degree word (*so + that ...*, *too + to ...*, *enough + that/to...*).

Thus, in representing the structure of this sentence, both the *linear separation* of the degree word and the sentential clause and their *syntactic relatedness* should be accounted for. That is, one has to resolve the following inconsistency which is one particular manifestation of the general problem of discontinuous constituents:

- (IS) (a) Sentential complements of *too*, *so*, etc. have to be located between the degree word and the adjective.<sup>7</sup>  
 (b) Sentential complements may appear only in clause-final position.<sup>8</sup>

Bresnan's proposal to handle (IS) is based on the operation of *extraction* (cf. Baltin 1987: 12f.):

- (RE) Sentential complements appear in the deep structure between the degree word and the adjective in the case of *too*, *so* and after the degree word in the case of *enough*, but then they get moved in the surface structure into clause-final position and adjoined to the sentence, that is, to S' (i.e., they are 'extraposed').

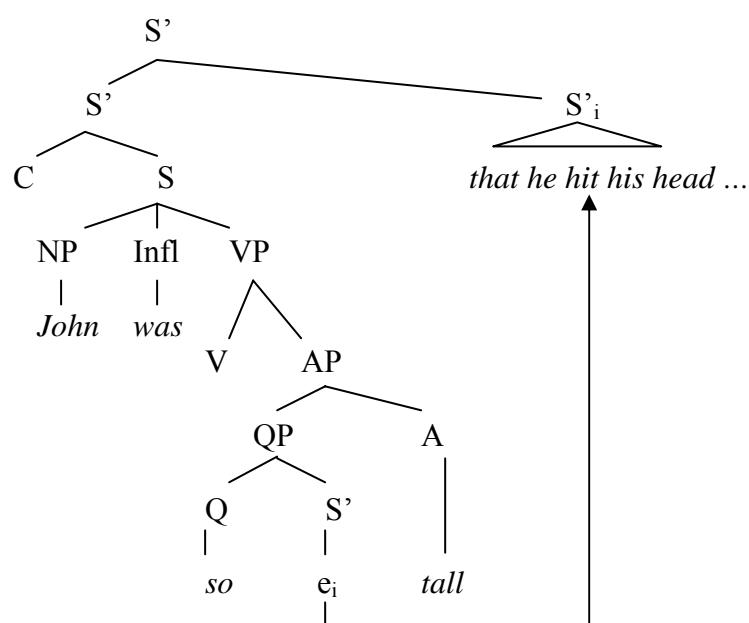


Figure 1

Thus, the symbolic representation of the sentence in (1)(a) is as in Figure 1. According to (RE), (IS)(a) refers to the deep structure and (IS)(b) to the surface structure.

However, Baltin criticizes this solution, showing that it is still inconsistent in three respects.

First, Ross's Right Roof Constraint requires that elements moving rightward cannot be moved out of the clause in which they originate. However, Guéron and May (1984) presented evidence that extraposed degree complement clauses are adjoined from outside to the sentence (cf. Baltin 1987: 13f.). This leads to the contradiction (IE1):

<sup>7</sup> In the case of *enough*, the adjective precedes the degree word.

<sup>8</sup> This formulation is vague because it does not specify in what kind of position the sentential complement appears at the end of the clause. For example, it leaves open the question of whether we have to deal with a position adjoined to S' from outside of S or with a position within S, that is, within the internal structure of the clause.

- (IE1) (a) Elements moving rightward cannot be moved out of the clause in which they originate.  
 (b) Extraposition moves the degree word complement clause rightward out of the given clause.

Second, if degree word complements would be moved out of the QP to the end of the whole sentence, then every complement clause should be related to exactly one degree word, and there should be as many complement clauses possible in a given sentence as many degree words are present (cf. Baltin 1987: 15). However, (4)(a) is grammatical, although the complement clause is associated with three degree words, and (4)(b) is ungrammatical, although the number of the degree words and the number of the complement clauses are equal:

- (4) (a) *So many people have read so many books so often that it's hard to keep up with them.*  
 (b) *\*So many people have read so many books so often that they outnumbered us that the library was practically empty.*

This yields the inconsistency in (IE2):

- (IE2) (a) If degree word complements are moved from QP to the final position of the whole sentence, then each complement clause can be related to exactly one Q. That is, a 1:1-relation between degree words and sentential complements is possible.  
 (b) There are cases where multiple association between degree words and sentential complements is possible and cases where 1:1-relation results in ungrammaticality.<sup>9</sup>

Third, one consequence of a principle of generative grammar, the Condition on Extraction Domains, is that extraction is allowed only if the complement clause is within the degree word's maximal projection, that is, if it is contained by the QP (see Baltin 1987: 17f.). Therefore, in the sentence

- (5) *Who was he too angry to visit \_\_\_\_\_?*

extraction should be forbidden because the complement clause has been moved out from the QP on the strength of (RE). However, this sentence is grammatical. That is, we encounter the following contradiction:

- (IE3) (a) Extraction is not allowed from the sentential complement of a degree word because the complement clause has been moved out of the QP, thus it is not contained by it.  
 (b) In the case of sentential complements of degree words, extraction is possible.

Baltin (1987: 20) remarks that adherents of (RE) tried to resolve only (IE1); from this he concludes that (RE) is insufficient and he raises another solution to (IS):

---

<sup>9</sup> More precisely: only one degree word complement clause is possible in a sentence, independently of the number of the degree words included by the clause.



(RD) Degree-word complements form deep- and surface structure discontinuous constituents with degree words. That is, they are thematically linked to Q but in the linear ordering of the words they are separated.

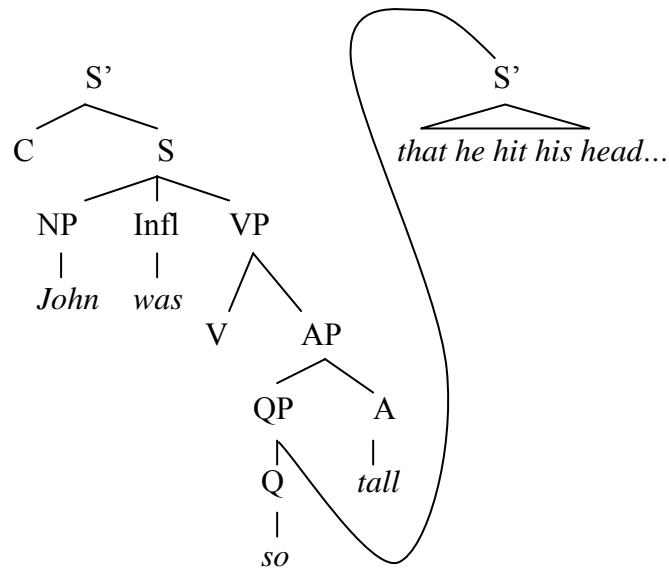


Figure 2

(RD) resolves (IS) because degree-word complements are within QP but they allow the adjective to take up its position between them and make the QP discontinuous. This means that *both of* their syntactic relatedness *and* their linear separation are accounted for, as witnessed by their symbolic representation in Figure 2. However, we can realize that (RD) does not work in two cases.

First, as Baltin cites, if a sentence contains both a degree word complement clause and a relative clause extraposed from subject position, then the extraposed relative clause will be adjoined to the sentence, therefore it has to be placed after the degree word complement which is, by virtue of (RD), within the QP, thus is part of the sentence. However, as (6)(a) and (b) show, the extraposed relative clause precedes the degree word complement (cf. Baltin 1987: 14, 20):

- (6) (a) *People were so angry who knew John that they refused to participate.*  
 (b) *\*People were so angry that they refused to participate who knew John.*

From this, one obtains contradictions again:

- (ID1) (a) Since degree word complement clauses are complements of the degree word, extraposed elements have to appear after them, in the final position of the whole sentence.  
 (b) In sentences containing degree word complements, extraposed relative clauses cannot appear in the final position of the sentence.

Second, Chomsky's binding theory requires anaphors to be c-commanded<sup>10</sup> by their antecedents. Thus, if (RD) is true then anaphors within a degree complement should be subject to binding by the matrix subject. But (7) refutes this prediction (cf. Baltin 1987: 20f.):

<sup>10</sup> Node A c-commands node B if the first branching node dominating A also dominates B and neither A nor B dominate each other.

(7) \**They were too partisan for each other to be convinced.*

That is, (RD) causes a further inconsistency as well:

- (ID2) (a) Since degree word complement clauses are complements of the degree word, they are contained by the QP. Therefore, anaphors within a degree complement can be bound by the matrix subject.
- (b) Anaphors within degree complement clauses cannot be bound by the matrix subject.

However, both (6) and (7) seem to be fully compatible with the hypothesis that degree complements are adjoined to the sentence, i.e., this supposition is capable of resolving (ID1)(b) and (ID2)(b). This motivates (RA):

(RA) Degree-word complements are adjoined to the sentence.<sup>11</sup>

Since on the one hand, examples like (4) and (5) can be explained only by (RD), on the other hand, (6) and (7) require (RA), Baltin (1987: 22) suggests *representing both conclusions in a single tree* (Figure 3).

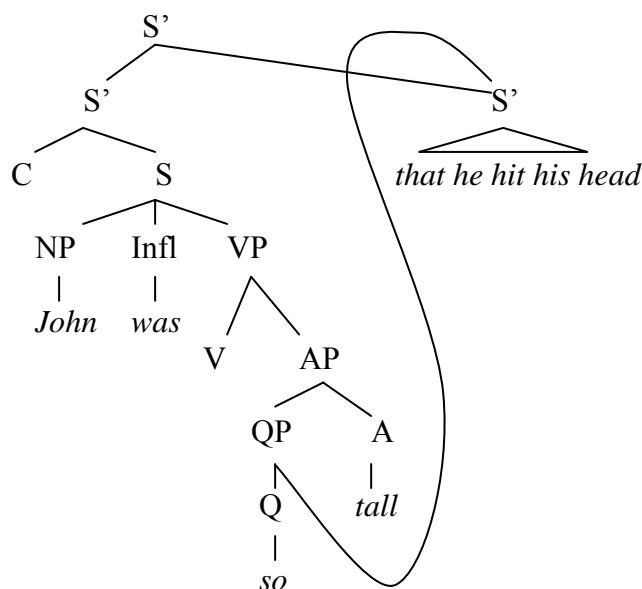


Figure 3

As Figure 3 shows, the complement clause is a sister of the degree word Q and at the same time it is also a sister of S'. Accordingly, the two analyses coexist inseparably and they are maintained for the very *same* entity and at the very *same* time:

- (RM) Degree word complement clauses are multidominated: they constitute discontinuous constituents with the degree word, and at the same time, they are adjoined to the sentence and are dominated only by the whole sentence.

<sup>11</sup> (RA) refers only to the surface structure, therefore – contrary to (RE) – it does not specify the deep structure of sentences containing degree word complement clauses.

(RM) is based on the simultaneous maintenance of (RD) and (RA), and leads to contradictory predictions:

- (IM1) (a) Since degree word complement clauses are complements of the degree word, they are c-commanded by the matrix-subject.  
 (b) Since degree word complement clauses are adjoined from outside to the sentence, they are not c-commanded by the matrix-subject (cf. Baltin 1987: 22f.).

Moreover, (IM1) entails further inconsistencies, for example (IM2):

- (IM2) (a) From (IM1)(a) we obtain that the sentence *They were too partisan for each other to be convinced* is grammatical.  
 (b) From (IM1)(b) we obtain that the sentence *They were too partisan for each other to be convinced* is ungrammatical.

As Baltin remarks, however, the problem is that we can give up neither (RD) nor (RA) because they are both needed to explain examples like (4)-(7). From this Baltin concludes that since (RD) and (RA) *behave complementarily* in the sense that each of them can explain linguistic data which lead to a failure in the case of the other proposal, the solution lies in *separating* the two representations. See Figure 4 for the representation of the selectional relations, i.e., of the thematic structure governing the application of transformations and Figure 5 for the representation to which binding theory applies (cf. Baltin 1987: 23).

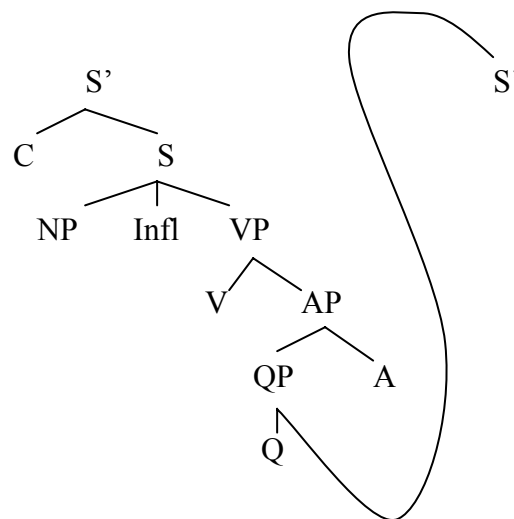


Figure 4

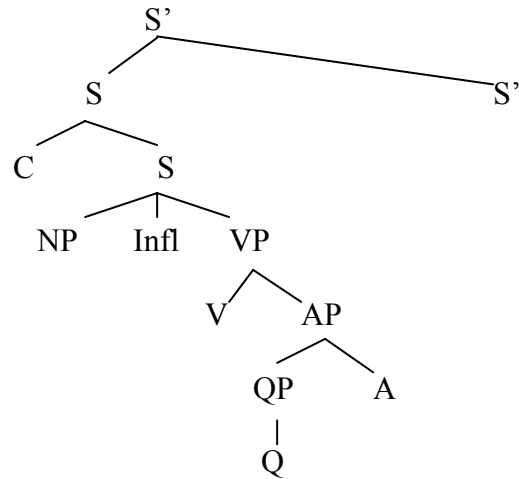


Figure 5

In sum, Baltin argues that (IS) can be resolved by (RF):

- (RF) Sentences containing degree word complement clauses have *two distinct structures*: a thematic structure where transformations can be applied and thematic relations hold, differing from the structure which is the domain for binding relations.

That is, degree word complements constitute discontinuous constituents with the degree word on the one hand, and they are adjoined to the sentence from outside on the other hand. The contradiction (IS) can be resolved this way by a seemingly very simple technique: by separating the conditions under which claims referring to thematic roles and those applying to binding relations may be checked.

### 3.2. Rescher and Brandom's paraconsistent logic

In the second half of the twentieth century several attempts have been made to develop non-classical logics in which it is not the case that anything follows from a pair of contradictory statements. More precisely, let  $\models$  be the relation of logical consequence, defined either semantically (that is, in terms of truth conditions) and symbolized by  $\Rightarrow$ , or syntactically (that is, in terms of derivability), symbolized by  $\vdash$ .  $\models$  is *explosive* if and only if for every statement  $P$  and  $Q$ ,  $\{P, \sim P\} \models Q$ . Classical logic is explosive. A logic is said to be *paraconsistent* if and only if its relation of logical consequence is not explosive. (For recent surveys see, for example, Priest 2002b, Meheus (ed.) 2002, Priest et al. (eds.) 2004 etc.) The relevance of paraconsistent logics is, among others, that they facilitate the *consistent representation of an inconsistent system of statements*.

One of the most fruitful attempts at elaborating a paraconsistent logic is Rescher and Brandom's seminal book *The Logic of Inconsistency* (Rescher & Brandom 1980), which we will apply to solve the problems (P) and (P').<sup>12</sup>

The authors presuppose a Kripke-semantics, and they introduce, among other things, the operation of *superposition* on the set of possible worlds.<sup>13</sup> The operation of superposition relates possible worlds disjunctively:

<sup>12</sup> This approach is especially useful because it also challenges the principle of excluded middle. Thus it provides us with a unified treatment of deviances from two basic principles of classical logic.

- (8) *Superposition*: Let  $w_1$  and  $w_2$  be two possible worlds.  $w_1 \mathfrak{R} w_2$  is that world such that, for any statement  $P$ ,  $P$  obtains in this world if and only if  $P$  obtains *either* in  $w_1$  *or* in  $w_2$ .<sup>14</sup>

$$[P]_{w_1 \mathfrak{R} w_2} = + \text{ iff } [P]_{w_1} = + \text{ or } [P]_{w_2} = +$$

See Table 2.

$[P]_{w_1}$	$[P]_{w_2}$	$[P]_{w_1 \mathfrak{R} w_2}$
+	+	+
+	-	+
-	+	+
-	-	-

Table 2

We will call  $w = w_1 \mathfrak{R} w_2$  the *superposed possible world*, and  $w_1$  and  $w_2$  the *component possible worlds*. Possible worlds in which the principles of classical logic hold are called *standard possible worlds*. Rescher and Brandom define the truth operator as

- (9)  $P$  is true in  $w$  if and only if  $P$  is obtained in  $w$ , i.e.  $t_w(P)$  iff  $[P]_w = +$ .

From (8) and (9) we get that with superposed worlds,  $P$  is true in  $w_1 \mathfrak{R} w_2$  if and only if it is true *at least* in one of the component worlds. Four properties of Rescher and Brandom's paraconsistent logic are relevant for the solution of our problem (P). First, superposed worlds are *non-standard*,<sup>15</sup> because it may be the case that both  $P$  and its negation are true in such a world. For example, let us suppose that  $w_1$  and  $w_2$  are standard worlds, and  $[P]_{w_1} = +$ ,  $[P]_{w_2} = -$ . Since in  $w_1$  and  $w_2$  the principles of standard logic prevail,  $[\sim P]_{w_1} = -$  and  $[\sim P]_{w_2} = +$ . From  $[P]_{w_1} = +$  we get that  $t_{w_1}(P)$  and from  $[\sim P]_{w_2} = +$  it follows that  $t_{w_2}(\sim P)$ . According to (8) the former leads to  $t_{w_1 \mathfrak{R} w_2}(P)$  and the latter to  $t_{w_1 \mathfrak{R} w_2}(\sim P)$ ; that is, both  $P$  and  $\sim P$  are true in the superposed world  $w$ .<sup>16</sup>

Second, the semantic consequence relation in superposed worlds seems to differ radically from that of standard worlds because *a series of classical inference schemata are not valid*. Among others, the conjunction principle of classical logic<sup>17</sup> which says that

- (10)  $t_w(P), t_w(Q) \Rightarrow t_w(P \& Q)$

has to be *rejected* in superposed worlds. That is, from the fact that two statements are true in a superposed world, it does not follow that their conjunction is true in this world as well. It is easy to show that this is so: if  $P$  is true in the component world  $w_1$  but false in  $w_2$  and  $Q$  is

<sup>13</sup> Another operation Rescher and Brandom introduce is *schematization* which is intended to capture situations in which the law of excluded middle is not valid. With respect to the treatment of inconsistency, it is only superposition that is relevant; therefore we will not deal with schematization.

<sup>14</sup>  $[P]_w = +$  and  $[P]_w = -$  are contradictory:  $P$  either obtains in a world or not.

<sup>15</sup> In Rescher and Brandom's system there is another kind of non-standard possible worlds, too, in which the law of excluded middle is not valid.

<sup>16</sup> Rescher and Brandom introduce ' $P$  is false' as ' $\sim P$  is true'. Therefore, in superposed worlds it may happen that a statement is both true and false (and in schematic worlds that it is neither true nor false).

<sup>17</sup> This principle is also called *the adjunction principle*.

true in  $w_2$  but false in  $w_1$ , then both  $P$  and  $Q$  will be true in  $w_1 \mathfrak{R} w_2$  but  $(P \& Q)$  not, since the latter is obtained in none of the component worlds. For similar reasons, every inference schema which starts from many premises such as modus ponens etc. must be rejected in superposed worlds.

Accordingly, Rescher and Brandom's paraconsistent logic is double-faced. On the one hand, the syntactic consequence relation remains intact and in this sense the logic is classical. On the other hand, one of the principles of classical logic fails: namely, the principle that says that if the premises of a syntactically valid inference are true, then the conclusion must also be true. That is, (11) does not hold in superposed worlds:

- (11) If  
 (a)  $P_1, P_2, \dots, P_n \vdash Q$   
 and  
 (b)  $t_w(P_1), t_w(P_2), \dots, t_w(P_n)$ ,  
 then  
 (c)  $t_w(Q)$ .

The failure of (11) in superposed worlds is due to premise (11)(b), which requires that the premises are true *distributively*. That is, owing to (8) it is allowed that  $P_1, P_2$  etc. are true in different component worlds. However, a second interpretation of the requirement that "the premises have to be true" is also possible: by this, the premises must be true *collectively*, that is, within one component world. And this interpretation results in a principle that prevails in superposed worlds as well:

- (12) If  
 (a)  $P_1, P_2, \dots, P_n \vdash Q$   
 and  
 (b)  $t_w(P_1 \& P_2 \& \dots \& P_n)$ ,  
 then  
 (c)  $t_w(Q)$ .

(12) states that valid inferences from *collectively* true premises yield true conclusions.

As we have seen, the key issue is that the *syntactic* consequence relation (11)(a) was retained in (12)(a), while its *semantic interpretation* in (11)(b) was modified in (12)(b). In particular, in superposed worlds the premises of the inferences must be true *collectively*; a distributive interpretation of the premises is insufficient to ensure the truth of the conclusion. In standard worlds, however, these two interpretations coincide. Thus, in superposed worlds the rules for drawing inferences from a set of premises are more restrictive. This shows that paraconsistent logic and classical logic are not totally alien to each other: in the former the syntax remains classical, and it is only the meta-principle connecting syntactic consequence relations with the semantic issue of the truth-status of statements that is altered. Accordingly, only the semantics is unorthodox.

Third, from the failure of (11) and the non-standardness of superposed worlds it follows that in these worlds the semantic consequence relation  $\Rightarrow$  is *not explosive*. Accordingly, it is possible to have both  $P$  and  $\sim P$  in a superposed world  $w$ , but from  $t_w(P)$  and  $t_w(\sim P)$  we cannot conclude that  $t_w(Q)$ , although  $P, \sim P \vdash Q$  is valid.

Fourth, the classical and paraconsistent treatment of inconsistency is different. In *standard worlds*, in which (11) holds, any arbitrary statement  $Q$  can be inferred from a contradiction. In *superposed worlds*, however, since (11)(b) and (12)(b) do not coincide and only (12) holds, we can distinguish between two kinds of inconsistency:

(13) *Weak inconsistency*:  $P$  is true in  $w$  and  $\sim P$  is true in  $w$ .<sup>18</sup>

(14) *Strong inconsistency*:  $(P \ \& \ \sim P)$  is true in  $w$ .<sup>19</sup>

Classical logic cannot differentiate between (13) and (14) and therefore *in standard worlds* these two versions of inconsistency are equivalent and lead inevitably to logical chaos. In superposed worlds, however, (13) is harmless because the contradictory statements – due to the unavailability of (11) – cannot serve as premises of conclusions. By contrast, (14) is harmful because (12) is operative in superposed worlds as well, thus nothing prevents that one draw conclusions from contradictory premises within the same possible world.

Rescher and Brandom's paraconsistent logic motivates the following strategy of inconsistency-treatment: if we represent the contradictory statements in a way that they are included in *different* component worlds, then they constitute weak inconsistency. However, we must not permit that  $P$  and  $\sim P$  appear in the same component world, because the superposed world will also contain their conjunction according to (8) and through (12) the logical chaos is inescapable. From this we may conclude that although in a non-standard possible world constructed by superposition there may appear statements mutually contradicting each other, *self-contradiction must be excluded* and therefore the destructive consequences of contradictions can be avoided. Self-contradiction in a superposed world can be avoided if the two statements which contradict each other *belong to two different component worlds* related by superposition.

In sum, Rescher and Brandom's approach suggests the following solution to (P):

- (H)
- (a) The *separate* maintenance of the two contradictory claims leads to *weak inconsistency*. That is, if the two contradictory claims hold under different circumstances, then on the meta-level they can be represented in two different possible worlds. The superposition of the latter corresponds to the whole theory that does not contain the conjunction of the two claims.
  - (b) The *simultaneous* maintenance of the two contradictory claims results in *strong inconsistency*. This means that if the two claims contradicting each other hold under the same conditions, then on the meta-level they have to be represented within the same possible world, which contains the conjunction of the two claims.
  - (c) The logic does not allow drawing conclusions from mutually inconsistent premises.
  - (d) Nevertheless, only weak inconsistency can be tolerated, for it may be the case that in a possible world  $w$  which consists of the two possible worlds  $w_1$  and  $w_2$  connected by superposition, both  $P$  and  $\sim P$  are true, where  $P$  is true in  $w_1$  and  $\sim P$  is true in  $w_2$ , while  $\sim P$  is false in  $w_1$  and  $P$  is false in  $w_2$ .
  - (e) In addition, it is not permitted that  $P \ \& \ \sim P$  is true in  $w_1$  or in  $w_2$  if  $w_1 \mathfrak{R} w_2 = w$ .

At this point the question is whether the application of (H) to Baltin's analysis yields the solution to the problem (P').

---

<sup>18</sup> For example, if  $w = w_1 \mathfrak{R} w_2$  and both component worlds are standard worlds, then (13) means that  $P$  is true in  $w_1$  and false in  $w_2$ ,  $\sim P$  is true in  $w_2$  and false in  $w_1$  or conversely.

<sup>19</sup> For example, if  $w = w_1 \mathfrak{R} w_2$  then (14) means according to (8) that  $(P \ \& \ \sim P)$  is true in  $w_1$  or  $w_2$ ; that is, at least one of the component worlds contains the contradictory statements.

### 3.3. The metascientific representation of inconsistency in Baltin's analyses of discontinuous elements

The metascientific representation of the way Baltin treats inconsistencies seems to be very simple along the lines of (H). In the case of (RE) we get (15):

- (15) (a) Let the following statements be given:  
 $P =$  Sentential complements are located between the degree word and the adjective.  
 $Q =$  Sentential complements are adjoined to the sentence.
- (b) Let the possible world  $w_1$  be the deep structure and the possible world  $w_2$  the surface structure.<sup>20</sup> Thus,  $P$  is true in  $w_1$  but false in  $w_2$  and  $Q$  is true in  $w_2$  but false in  $w_1$ . If  $w$  stands for the whole theory then  $w = w_1 \Re w_2$ .
- (c) Consequently, in  $w$  both  $P$  and  $Q$  are true, but  $P \& Q$  is true neither in  $w_1$  nor in  $w_2$ .
- (d) In the possible world  $w_1$  (IS)(a) is true, i.e., sentential complements are located between the degree word and the adjective, because it can be inferred from  $P$ . Similarly, in the possible world  $w_2$  (IS)(b) is true, i.e., sentential complements appear in clause-final position, because it can be inferred from  $Q$ . However, (IS)(a) is false in  $w_2$  and (IS)(b) is false in  $w_1$ .
- (e) From this we can conclude that while both (IS)(a) and (IS)(b) are true in  $w$ , their conjunction, i.e. (IS)(a) & (IS)(b) is not.
- (f) This means that (IS)(a) and (IS)(b) are only *weakly inconsistent* in sense of (13).

(RD) and (RF) can be reconstructed similarly, only (15)(a) and (b) have to be modified in the following way:

- (16) (a)  $P =$  Sentential complements are complements of the degree word, that is, they are contained by the QP and contiguous with its head, Q.  
 $Q =$  Sentential complements are discontinuous with the degree word.
- (b) Let the possible world  $w_1$  be the thematic relations and the possible world  $w_2$  the linear ordering of the words.
- (17) (a)  $P =$  Sentential complements constitute discontinuous constituents with the degree word.  
 $Q =$  Sentential complements are adjoined to the sentence.
- (b) Let the possible world  $w_1$  be thematic structure and the possible world  $w_2$  the structure for binding relations.<sup>21</sup>

Therefore, we obtain a possible explanation for the double-sidedness of the resolution attempts (15)-(17). On the one hand, they are *workable*, because they do not allow drawing conclusions from the inconsistent premises. On the other hand, our reconstruction has shown that the two statements contradicting each other can be *maintained* as long as they are separated from each other, that is, they may be true only in two different possible words.

---

<sup>20</sup> Or to be more precise: Let the possible world  $w_1$  be the set of the statements which are true of the deep structure and  $w_2$  be the set of the statements which are true of the surface structure.

<sup>21</sup> Or rather: Let the possible world  $w_1$  be the set of the statements concerning the thematic structure of sentences (which transformations feed on and where thematic relations hold) and  $w_2$  be the set of the statements which refer to the binding relations.



However, (RM) does not allow this kind of representation because the inconsistent premises do not get separated but they appear in the same possible world. Thus, (RM) can be reconstructed in Rescher and Brandom's paraconsistent logic as follows:

- (18) (a) Let the following statements be given:  
 $P =$  Sentential complements are located between the degree word and the adjective.  
 $Q =$  Sentential complements are adjoined to the sentence.  
 (b) Let the possible world  $w$  be the whole theory.  
 (c) In  $w$  both  $P$  and  $Q$  are true.  
 (d) In the possible world  $w$  (IS)(a) is true, because it can be inferred from  $P$ . Similarly, in the possible world  $w$  (IS)(b) is true, because it can be inferred from  $Q$ .  
 (e) From this we can conclude that since (IS)(a) and (IS)(b) are simultaneously present in  $w$  (because they are consequences of  $P$  and  $Q$ , respectively, which do not belong to different component worlds), so their conjunction, i.e. (IS)(a) & (IS)(b) is true in  $w$  as well.  
 (f) This means that in this case, (IS)(a) and (IS)(b) are *strongly inconsistent* in sense of (14).

On the basis of (15)-(18) we may put forward the following solution to (P'):

- (H') (a) In the metascientific representation of Baltin's account of discontinuous constituents (RE), (RD) and (RF) can be represented as weakly inconsistent sets of statements.  
 (b) From weakly inconsistent statements we cannot draw contradictory predictions.  
 (c) However, nothing excludes that one of the possible worlds whose superposition is the whole theory, is or gets inconsistent at some other point. That is, the members of the weakly inconsistent set may contradict some statement in the superposed possible world which they belong to. Thus, the inconsistencies (IE1)-(IE3) emerge between the consequences of one member of (RE) on the one hand, and other hypotheses of the theory describing the behaviour of linguistic data (i.e., capturing generalizations, analogies etc.) on the other; the same is true of (ID1)-(ID2) and (RD).  
 (d) (RM) can be represented as *strong inconsistency* in our metatheoretical framework.  
 (e) Strongly inconsistent statements may lead to further inconsistencies, because contradictory conclusions can be drawn from them.  
 (f) That is, the inconsistencies (IM1)-(IM2) are contradictory predictions emerging from the members of (RM).

(H') shows that there is a systematic connection between resolution techniques and inconsistency types. While with weak inconsistency, the appearance of a new contradiction depends on the question of whether the component worlds contain hypotheses which contradict one of the inconsistent claims, in the case of strong inconsistency, every inference whose premise is one of the pair of inconsistent statements makes the theory potentially inconsistent because the other member of the pair may lead to the opposite conclusion, cf. (IM1). In the case of strong inconsistency, nothing prevents that one arrives at contradictions again and again – whenever one uses premises which are consequences of one of the

contradictory statements, a new contradiction emerges. In the case of (RM), for example, we obtained (IM1)(a) & (b) and (IM2)(a) & (b) and the chain could be continued. To put it otherwise: strong inconsistencies are (at least partly) the *cause* of the emergence of further inconsistencies, whereas for weakly inconsistent statements this is not true.

#### 4. Open questions

At first sight, (H') seems to be a satisfactory solution to the problem (P'). It summarizes the results of our attempt at the metascientific representation of the inconsistency of Baltin's analysis of discontinuous constituents in English. We succeeded in revealing the fact that both weak and strong inconsistency are present in his argumentation. According to the current literature on paraconsistency, it is only weak inconsistency that can be tolerated, while strong inconsistency is still considered to be illegitimate. This mirrors perfectly the difference between (RM) on the one hand and (RE), (RD) and (RF) on the other hand: while (RM) is rejected sharply by Baltin as a clearly dysfunctional proposal, he judges (RE) and (RD) unsatisfactory only because they do not allow explaining certain types of linguistic data.

However, these findings can be regarded as the starting point rather than the outcome of tackling the problem of inconsistency in linguistics, because they raise a series of open questions.

First, as Section 3.3 witnesses, there are *different ways of splitting the theory into component possible worlds*: (RE), (RD) and (RF) could be reconstructed as weak inconsistencies. In spite of this, Baltin did not evaluate these alternatives equally: he preferred (RF) against (RD) and (RE). That is, Baltin makes distinctions which were *not* grasped by our paraconsistent reconstruction. It seems not to be sufficient to assume mechanically that strong inconsistencies are destructive while weak ones are acceptable; the situation is much more sophisticated. It is clear that consistency cannot be the criterion which the decision between rival symbolic representations of a given sentence can be based on. This is true of (RF) as well. Baltin himself realized that his proposal was inconsistent in several respects. For example, he could not give a satisfactory answer to the question of why there were cases in which discontinuous constituency could not be applied but extraposition was needed. He was not able to identify the circumstances precisely enough in which discontinuous constituency is allowed and those in which it is not.<sup>22</sup> However, paraconsistent logic cannot tell us what to do if we possess rival proposals which represent the given contradiction as weak inconsistency but which are inconsistent in other respects.

Second, in general paraconsistent logic does not tell us how to decompose the theory into component possible worlds; it is not capable of assisting us in deciding whether the two possible worlds are *well-motivated entities* or *ad hoc constructs*. For example, a trivial ad hoc proposal, namely the well-known strategy of labelling the 'disobedient' cases 'exceptions' can also be reconstructed as weak inconsistency. In our case this means that a possible resolution of (IS) lies simply in construing the superposition from a possible world  $w_1$  which contains propositions describing the behaviour of degree word complement clauses and from a possible world  $w_2$ , containing propositions relating to all other kinds of complements. In  $w_1$  complements are adjoined to the sentence from outside, in  $w_2$  they are sisters of their selector. In this way, it can be achieved that degree word complement clauses are treated as exceptions

---

<sup>22</sup> For example, if our grammar would permit discontinuous constituency without any restriction, then structures like *a fond of Sally man* or *a fond man of Sally* should be correct, because the grammar would allow *fond* and *of Sally* to be discontinuous constituents without requiring that they are adjacent. However, this is not the case.

to the principles of generative grammar which require complements to be generated within the phrase whose head is their selector and can be moved only leftwards under particular circumstances.

Third, it may be the case that among the rival alternatives, there are proposals which do not treat the inconsistency at issue as weak inconsistency but simply give up one of the contradictory hypotheses. For instance, Abney (1987) regards words like *too*, *so*, or *enough* as belonging to the functional category Degree. In analogy with Williams' (1980) assumption that theta-roles are assigned under sisterhood, he assumes that the functional Category Degree holds under sisterhood, too (see also White 1997: 3). Thus, he obtains a ternary branching structure as exemplified in Figure 6:

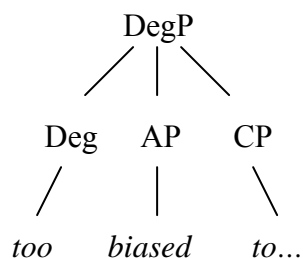


Figure 6

This solution does not lead to a conflict between syntactic relatedness and surface order, because (2) does not emerge. However, his theory is inconsistent as well, although in another respects. First, (7) remains a problem because according to his analysis, it should be grammatical. Second, ternary branching trees are not allowed in X'-theory. This raises a metatheoretical problem because paraconsistent logic does not provide us with criteria with the help of which one could compare two fundamentally different treatments of a given inconsistency. That is, it is not clear when one should prefer a solution based on the representation of the given contradiction as weak inconsistency to another based on giving up one of the contradictory hypotheses, and when the latter should be preferred to the former.

With respect to all three open questions raised above, we face the problem of how to decide whether a particular paraconsistent problem-solving strategy of a contradiction is *possible*, *acceptable*, *preferable* etc. or not. It is clear from the above considerations that this problem is extraordinarily complex, because it boils down, among others, to the following sub-problems: (a) Is the paraconsistent treatment the only possibility? (b) Is the inconsistency really irresolvable? (c) Is the solution at issue better than its alternatives? Clearly, Rescher and Brandom's model that we have applied so far is, without being substantially supplemented by additional tools, far from being capable of capturing these issues.

The choice between competing paraconsistent representations cannot be grounded solely on formal considerations, i.e., on the logical representation of the theories. Namely, weak inconsistencies – although they have the same logical structure – are often evaluated differently: the violation of some hypotheses of the theory seems to be tolerable while others not.

## 5. Conclusions

All mainstream linguistic theories, on the one hand, *presuppose* the concept of rationality of the analytical philosophy of science mentioned in Section 1. They declare the validity of its standards and, specifically, stick to the law of non-contradiction. On the other hand, as we

have just seen, in actual linguistic *practice*, they make substantial use of contradictory theories. This boils down to the destructive consequence that the theories at issue have to be evaluated as *irrational by their own standards*. This problem affects the very nature of the relationship between object- and metatheories in linguistics. To underline the significance of this relationship let us quote Devitt and Sterelny:

“There is obscurity and controversy not only over the problems for which we need theories of language but also over the status of the theories themselves. This issue of status is highly abstract: it requires a theory of theories of language, a ‘meta-theory’. It would be nice to ignore the meta-theory and get on with the theory, but that is a luxury we cannot afford. We think that *many mistakes in the theory of language arise from a mistaken meta-theory*. Further, we think that *these mistakes are often facilitated by a failure to be explicit about the meta-theory*: once the implicit meta-theory is exposed, it can be seen to be *implausible and unsupportable*.” (Devitt & Sterelny 1999: 9; emphasis added)

The radical consequence of these considerations is, of course, that the *metatheory* that underlies the clash between the methodological *prejudices* of mainstream linguistic theories and the *practice* of linguistic research has to be discarded and another one has to be chosen.

Now we must ask, of course, what kind of new metatheory we should vote for.

According to the standard view of the analytical philosophy of science, inconsistencies fulfil a dual function in the development of science. On the one hand, they force the scientist to give up his/her theory because it has been falsified. On the other hand, they compel him/her to elaborate a new theory in which this contradiction does not appear. From this it would follow that *inconsistencies cannot be tolerated within theories*; they can *perform their heuristic function outside theories*, that is, by forcing scientists to develop new ones. As we have just seen, however, there is a wide gap between these norms and linguists’ practice.

A realistic metatheory cannot dispense with paraconsistent tools which are necessary for the appropriate metascientific representation of contradictory symbolic representations in object-scientific theories. Paraconsistent logic provides the means to handle inconsistencies in cases when both contradictory statements have to be retained in a way that their maintenance does not lead to a logical chaos. But paraconsistent logic is *not capable of evaluating the possible alternatives*. From this it follows that the mechanical application of paraconsistent logic would lead to an unrealistic methodology, although in the opposite way than the standard view of the analytical philosophy of science: Paraconsistent logic would enable us to legitimize considerations which are results of the superposition of two possible worlds but are clearly counter-intuitive, ad hoc or unpromising solutions from an object-theoretic point of view. Accordingly, there is a *tension* between two aspects of the paraconsistent metascientific representation of inconsistency in linguistics. Paraconsistent logic is *too strong* to model inconsistency in linguistic theorizing because it allows us to reconstruct many different kinds of contradictions as weak inconsistency. At the same time, paraconsistent logic is *not strong enough* to model inconsistency in scientific theorizing because it does not differentiate between well-motivated and ad hoc solutions and is not able to rank the rival proposals.

This means that paraconsistent logic is not capable of grasping the *heuristic function played by inconsistencies within scientific theories*, has no tools for modelling the continuous emergence of inconsistencies during the process of scientific theorizing, and cannot judge how strong or weak counter-arguments inconsistencies embody against the given theory-version. It is easy to find out why this is so: paraconsistent logic is a *formal system* which is a

useful tool for the metascientific representation of certain kinds of inconsistency, but it is not able to grasp the mechanisms of *inconsistency-resolution*, because while the representation of inconsistency “does fall within the province of logic, its resolution is inevitably an extralogical matter” (Rescher 1964: 37).

At this point we risk the bold hypothesis that the metatheory we need can be constructed by supplementing paraconsistent logic with a model of *plausible reasoning*. We expect the latter to capture – at least partially – each of the open questions we raised in the previous section. The effectivity of plausible reasoning is rooted in the fact that it is capable of integrating paraconsistent logic while it transgresses its limits by accounting for significant differences between alternative treatments of contradictions. A classic theory of plausible reasoning has been worked out by Nicholas Rescher that serves as one of the main sources for our metatheoretical model. He introduces his model the following way:

“On the basis of logic [...] one cannot tell what may reasonably be accepted in the face of imperfect, indeed conflicting data. By contrast, the mechanisms of plausibility theory are designed to provide a basis on which it becomes possible to effect [...] a move from the reliability of sources to the plausibility of their declarations. In providing a tool for handling cognitive dissonance, plausibility theory affords a reasonable basis for discriminating between the inferences which can and cannot be drawn from the inconsistent data-base yielded by the conflicting reports of imperfect sources. [...] To be sure, this mission requires ‘material’ resources transcending the austere apparatus of logic [...]. But in going beyond the purely formal considerations of logic [...] in its search for a mechanism for choice-resolution in cognitive dissonance situations – through appeal to ‘material’ factors – plausibility-theory does not, however, go beyond the limits of rationality. Seeking to provide ‘a sensible way’ out of such conflicts [...] it aims at a *rational alignment and coordination* of inferences.” (Rescher 1976: 4f.; emphasis as in the original)

To sum up: the simplest way to characterise the strong correlation between plausible inferences and the emergence of contradictions is to regard plausible inferences as one of the possible *sources* of the *emergence* of contradictions on the one hand, and as one of the possible *means* to *resolve* contradictions on the other.

Thus, we repeat that one of the stimulating and almost entirely unsolved tasks is to elaborate a metatheory of linguistics which is able to account for the factors influencing the decision between different possible alternative resolutions of inconsistencies. This is, among others, what our approach is expected to achieve. We have already outlined its foundations in a series of publications (see e.g. Kertész 2004, Kertész & Rákosi 2006). The tenets we put forward there should therefore be extended to the issues of paraconsistency we have considered in the preceding sections. Let us, accordingly, leave the open questions as they are and postpone their detailed solution within our framework to the continuation of the present paper (Kertész & Rákosi, in preparation).

## References

- Abney, S.P. (1987): The English NP in its sentential aspect. Doctoral dissertation. MIT.  
Allan, K. (2003): Linguistic metatheory. *Language Sciences* 25/6, 533-560.  
Baltin, M.R. (1987): Degree complements. In: Huck, G.J. & Ojeda, A.E. (eds.)(1987): *Discontinuous constituency* (Syntax and semantics 20). Orlando: Academic Press, 11-26.

- Borsley, R.D. (2005): Introduction. In: Borsley, R.D. (ed.) (2005): Data in theoretical linguistics. *Lingua* 115/11 (Special issue), 1475-1480.
- Chomsky, N. (2002): *On nature and language*. Cambridge: CUP.
- Devitt, M. & Sterelny, K. (1999): Language and reality. An introduction to the philosophy of language. Oxford.
- Guéron, J. & May, R. (1984): Extraposition and logical form. *Linguistic Inquiry* 15, 1-31.
- Kepser, S. & Reis, M. (2005): Evidence in linguistics. In: Kepser, S. & Reis, M. (ed.)(2005): *Linguistic evidence. Empirical, theoretical and computational perspectives*. Berlin & New York: de Gruyter, 1-6.
- Kertész, A. (2004): *Philosophie der Linguistik. Studien zur naturalisierten Wissenschaftstheorie*. Tübingen: Narr.
- Kertész, A. & Rákosi, Cs. (2006): Inconsistency and plausible reasoning in an analysis of German affricates. A case study in the philosophy of linguistics. *Language Sciences* 28, 386-423.
- Kertész, A. & Rákosi, Cs. (in preparation): *The paraconsistency of data and plausible reasoning in syntax*.
- Kuhn, Th.S. (1970 [1962]): *The structure of scientific revolutions*. Chicago: University of Chicago Press.
- Lehmann, C. (2004): Data in linguistics. *The Linguistic Review* 21, 175-210.
- Meheus, J. (ed.)(2002): *Inconsistency in science*. Dordrecht: Kluwer.
- Meheus, J. (2002): Preface. In: Meheus, J. (ed.)(2002), vii-ix.
- Moravcsik, E. (2006): *An introduction to syntactic theory*. London & New York: Continuum.
- Moravcsik, E. (1993): Why is syntax complicated? In: Eid, M. & Iverson, G. (eds.): *Principles and prediction: The analysis of natural language*. Amsterdam & Philadelphia: Benjamins, 73-92.
- Penke, M. & Rosenbach, A. (2004): What counts as evidence in linguistics? *Studies in Language* 28/3, 480-526.
- Popper, K. (1962): *Conjectures and refutations*. London.
- Priest, G. (2002a): Inconsistency and the empirical sciences. In: Meheus, J. (ed.)(2002), 119-128.
- Priest, G. (2002b): Paraconsistent logic. In: Gabbay, D. & Guenther (eds.)(2002): *Handbook of paraconsistent logic*. Dordrecht: Kluwer, 287-393.
- Priest, G., Beall, J.C. & Armour-Garb, B. (eds.)(2004): *The law of non-contradiction*. Oxford: Clarendon Press.
- Rescher, N. & Brandom, R. (1980): *The logic of inconsistency*. Oxford: Blackwell.
- Rescher, N. (1976): *Plausible reasoning*. Assen/Amsterdam: Van Gorcum.
- Rescher, N. (1964): *Hypothetical reasoning*. Amsterdam: North-Holland.
- Ringen, J.D. (1975): Linguistic facts. A study of the empirical scientific status of transformational generative grammars. In: Cohen, D. & Wirth, J.R. (eds.): *Testing linguistic hypotheses*. Washington, 1-41.
- Schütze, C.T. (1996): *The empirical base of linguistics. Grammaticality judgments and linguistic methodology*. Chicago & London: The University of Chicago Press.
- Williams, E. (1980): Predication. *Linguistic Inquiry* 11(1), 203-238.