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BOOK REVIEW

Edwin Williams: Representation Theory. MIT Press, Cambridge MA, 2003, 285 pp.

Representation Theory is a concise and provocative book.[1] The range of phenomena that are addressed and of the issues covered is vast. Because of the wide coverage, no review can do justice if it is much shorter than the book itself. Having to observe the reasonable limits, I will restrict myself to illustrating and discussing the most significant points of the theory. In addition, I will point out some implications and problems that may follow from the suggestions. *Representation Theory* is a programmatic book (a program in the sense that the minimalist program is), so loose ends are expected, and often pointed out by the author.

1. Basic tenets of Representation Theory

Following the organization of the book, first I sketch the basics of Representation Theory. Then section 2 follows Williams (his chapters 2–8) in discussing how various components of the grammar are treated in this approach.

In chapter 1, *Economy as shape conservation*, Williams lays down the guidelines of Representation Theory (RT). The various levels, which encode different structures, form a crucial part of the theory. The labels of individual levels are largely self-explanatory: for instance, TS encodes thematic relations; CS the case-marking of nominals and case-marking/case-checking relations; and PS is the level at which control is defined.

(1)
Theta Structure (TS)
⇝
Case Structure (CS)
⇝
Predication Structure (PS)[2]
⇝
Surface Structure (SS) ⇝ Quantification Structure (QS)
⇝
Focus Structure (FS)
⇝
Accent Structure (AS)

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[2] Predicate Structure is only introduced in chapter 3, but is included here for completeness.

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Levels are temporally ordered as in (1), from top down; TS precedes CS, which in turn precedes PS, and so on. The arrows represent a mapping relation that holds between adjacent levels: the arrow points from the **mapping** level to the **mapped** one.[3] Mapping usually yields homomorphic levels (preserving linear ordering and hierarchical relations), but mismapping can also arise (in (2) and (3), respectively; the exclamation mark next to the arrow indicates a mismapping).[4]

(2)	(a)		Fred	believes	the lie		
	(b)	TS	agent	V_{pred}	theme		[homomorphic mapping]
			⇡	⇡	⇡		
	(c)	CS	NP_{nom}	$V_{case\ assigner}$	NP_{acc}		
(3)	(a)		Fred	believes	Frank	to lie	
	(b)	TS	agent	V_{pred}	agent	V_{pred}	[mismapping]
			⇡	⇡	⇡**!**		
	(c)	CS	NP_{nom}	$V_{case\ assigner}$	NP_{acc}		

The homomorphic mapping in (2) maps the agent to a nominative NP and the object to an accusative NP. In (3), the familiar ECM construction, the matrix agent *Fred* is mapped to a nominative NP, as before. The embedded agent, however, is mapped to an accusative rather than a nominative NP; an instance of mismapping.

Mapping, as the terminology suggests, is preferred to mismapping. Mismapping, a non-homomorphic match to a structure at level L_i, is possible only if homomorphic matches at level L_{i+1} are missing. In (3) no homomorphic match is available for TS at CS, since nominative case is not licensed by nonfinite T in English. The availability of mismappings can be seen as an application of Panini's principle (p. 7): "use the most specific applicable form." The most specific form, derived by homomorphic mapping, is not available in (3); thus it must do with the mismatched representation at CS.

If no mismapping is enforced, then representations at the earlier levels are (homomorphically) mapped to later levels. This yields the (violable) principle of **Shape Conservation**: whenever possible, operations conspire to preserve hierarchical and linear order. Thus within RT shape conservation follows from the preference for homomorphic mapping.

To summarize: the basic ingredients of RT, presented in chapter 1, are (a) the existence and organization of levels, which encode different structures; (b) mapping

[3] Williams uses a wavy arrow to represent the mapping relation. The direction of mapping is relevant only if mapping is understood as some kind of derivation, as also indicated by the terminology of **later** and **earlier** levels.

[4] The author describes mapping as **isomorphic** rather than homomorphic. He allows, however, the introduction of new elements in levels other than TS, the earliest level. Thus mapping is homomorphic, preserving relations between elements of the lower level at the higher one. The inverse of mapping is not homomorphic, so mapping itself cannot be described as isomorphic (as Williams himself notes on p. 61).

(or mismapping), which relates structures at adjacent levels, and (c) blocking, where more specific [= homomorphic] mappings block non-homomorphic ones, resulting in shape conservation whenever possible.

Shape conservation also characterizes theories other than RT. Consider, for instance, Fox–Pesetsky (to appear). They assume a minimalist structure of grammar, along with restrictions on the linearization of terminals. Terminal elements of a syntactic structure are linearized at the end of a phase. Once order among two elements is established, it cannot be revised, but must be respected throughout the derivation. In this way, Fox and Pesetsky assure shape conservation within a minimalist setting. Shape conservation can also be introduced explicitly. This is the track taken by, for instance, Mueller (2000), who introduces **Shape Conservation** as a (relativized) constraint in an OT system.

2. Elaboration and application of RT

In later chapters, Williams elaborates and applies the theoretical skeleton of RT to a variety of phenomena. In chapter 2, he discusses topicalization, scope, and focus phenomena, and points out a source of crosslinguistic variation in RT. Chapter 3 introduces the **Level Embedding Conjecture** (LEC), which allows variation across elements according to the level where they are embedded. Chapters 4–6 apply a LEC-inspired analysis to a range of phenomena: anaphora, reconstruction effects, and movement (versus mismapping). Chapters 7 and 8 provide an outline of phrase structure, inflection, and head movement phenomena within RT. In the remainder of this section I will briefly note the import of these chapters.

2.1. Quantifiers, focus, and crosslinguistic variation

Chapter 2 elaborates on SS, QS and FS, the levels that encode the surface structure, quantifier scope relations and focus, respectively. Recall from (1) that SS is adjacent to CS, FS and QS, as shown below.

(4) Case Structure (CS)
$\wr$
Surface Structure (SS) $\rightsquigarrow$ Quantification Structure (QS)
$\wr$
Focus Structure (FS)

Either one of the three mapping relations above can give rise to mismapping. Williams suggests that Heavy NP shift (HNPS) in an instance of mismapping between SS and CS. The mismatch is tolerated because the FS $\rightsquigarrow$ SS mapping is canonical. Consider the data in (5).

(5) (a) John gave to Mary [all of the money in the SATCHEL]
(b) *John gave to MARY [all the money in the satchel]
(c) John gave [all the money in the SATCHEL] to Mary
(d) John gave [all the money in the satchel] to MARY

HNPS is possible if the shifted NP contains focus (or if the NP itself is focused), as in (5a). If focus falls outside of the NP, the result is ungrammatical (5b). Focusing the object is also possible without HNPS (5c). The data in (5) follow if (a) English nuclear stress falls on the right edge of the clause, and (b) HNPS is optional. The generalization is the following: HNPS, if it applies, moves the focus to the end of the clause, to the default nuclear stress position. Thus HNPS yields a canonical FS $\rightsquigarrow$ SS mapping, with default nuclear stress positioning. (5c) shows an alternative without HNPS, where mismapping occurs between FS and SS.

A partial RT derivation of (5a) is given in (6). HNPS results in a SS $\rightsquigarrow$**!** CS mismapping, but a canonical FS $\rightsquigarrow$ SS mapping. If HNPS applies and focus falls on the indirect object, as in (5b), then mismapping occurs both in SS $\rightsquigarrow$**!** CS, and FS $\rightsquigarrow$**!** SS. This double mismatch is not tolerated because the structure has an alternative with no mismappings at all, namely (5d).

(6) Case Structure (CS)
$\uparrow$**!**
Surface Structure (SS) $\rightsquigarrow$ Quantification Structure (QS)
$\uparrow$
Focus Structure (FS)

(7) *Case Structure (CS)
$\uparrow$**!**
Surface Structure (SS) $\rightsquigarrow$ Quantification Structure (QS)
$\uparrow$**!**
Focus Structure (FS)

The paradigm in (5) shows that mismapping is tolerated if there is no alternative without mismappings. HNPS is optional; mismapping between both SS $\rightsquigarrow$**!** CS or FS $\rightsquigarrow$**!** SS leads to an ungrammatical result. However, not all variation in mismapping is available in a given language: quantifier positions are a case in point. Williams argues that languages vary in preferring homomorphic mapping between certain levels. English and German differ in this respect: English prefers a homomorphic SS $\rightsquigarrow$ CS mapping, and German, a SS $\rightsquigarrow$ QS mapping. The difference that arises from these preferences can be observed with two quantifiers, as in (8).

(8) (a) dass eine Sopranistin jedes Schubertlied gesungen hat
that a soprano every Schubert song sung has
'that a soprano sang every song by Schubert' [a > every, *every > a]

(b) dass jedes Schubertlied eine Sopranistin gesungen hat
that every Schubert song a soprano sung has
'that a soprano sang every song by Schubert' [*a > every, every > a]

(c) a soprano sang every song by Schubert
[a > every, every > a]

((8a,b) from Diesing 1992; (8c) from Williams)

German surface order mirrors quantifier scope (8a,b), while the unique English order is ambiguous (8c). At the same time, English surface structure shows a canonical case configuration, and German (8b) does not. The difference between the two languages is captured by the assumption that English enforces canonical homomorphic

SS $\rightsquigarrow$ CS mapping, at the cost of mismapping to QS, while German does the reverse. (9) indicates the mismapping that arises with the inverse reading in (8c) and (8b).

(9)	(a)	English [every > a (8c)]	(b)	German [every > a (8b)]
		Case Structure (CS)		Case Structure (CS)
		$\wr\uparrow$		$\wr\uparrow$ **!**
		Surface Structure (SS)		Surface Structure (SS)
		$\wr\downarrow$ **!**		$\wr\downarrow$
		Quantification Structure (QS)		Quantification Structure (QS)

In sum, Williams argues that focus and quantifier movement (and scrambling in general) arise from mismappings, and not from familiar movement operations. In addition, he identifies various instances of mismappings: (a) due to restrictions on a given level (ECM, section 2); (b) due to a mismapping between any of two pairs of levels (HNPS); and (c) due to preference for canonical mappings between two levels (quantifier movement in German).

2.2. Embedding and variation in embedding levels

The third chapter deals with embedding. Williams defines the **Level Embedding Conjecture** (LEC), which states that an item can be embedded only at the level where it is defined. Functional elements and adjuncts, which do not have to be theta-marked, can be introduced at later levels. For instance, complementizers and complementizer structure are introduced at SS. Thus any embedding that involves complementizers can take place, by the LEC, only at SS.

Williams presents a typology of embedded clauses, where the properties of predicates vary according to the level where they are inserted. Clauses that are to be embedded are constructed in parallel with the matrix clause. If the to-be-embedded clause is an argument, then Williams assumes that a dummy "shadow" element is merged in its position at TS. The to-be-embedded clause can be inserted at various levels, depending on its functional category. A predicate inserted at TS is a theta-role assigner. The resulting **serial verb** construction shows strong clause union effects and has a complex theta structure. Embedding at CS establishes a looser connection: only the case marking abilities of the predicates interact, and yield **ECM** structures. As noted above, complementizer structure is inserted at SS. Thus the predicate embedded at SS is a CP. Embedding at FS, the level following SS, is still larger, and disallows extraction from the embedded predicate. In general, a predicate embedded at level L shows union with the embedding predicate with respect to properties that are defined at L. The embedding typology is summarized in (10).

(10) (a) TS: serial verb constructions
(b) CS: ECM constructions
(c) SS: transparent *that*-clauses
(d) FS: non-bridge embedding

This layered view of embedding can be extended to ban improper movement in general.[5] The traditional formulation of the ban prohibits moving an element from an A′-position to an A-position, and so rules out (11).

(11) *[$_{IP}$ John$_1$ seems [$_{CP}$ t$_1$′ [$_{IP}$ t$_1$ knows every Schubert song]]]

In RT, the ban is more general, as it prohibits all movement licensed at level L_i if it follows movement that happens at level L_{i+n}. The ban follows if not only embedding and mismapping, but also movement must take place at the level where the moved element (or the target) is defined.[6] Consider the familiar A- and A′-movement, assuming that these are real instances of movement. It was noted above that complementizer structure is inserted at SS; let us assume, following Williams , that finite inflection is inserted at the earlier PS level. Given the ties between the insertion of functional elements and the movement they trigger, A-movement (at PS) will precede all instances of A′-movement (at SS).

2.3. Anaphora

If anaphors can be introduced at different levels, then—just like predicate embedding—they are predicted to show different properties, in accordance with the level at which they are introduced. Variation is predicted with respect to three properties: locality, reconstruction, and the nature of the antecedent.

As noted above, elements can be merged at levels later than TS. No deletion is possible, however; thus the size of the structure can grow from level to level. If the anaphor has to be bound at the level where it is introduced, then the search space will be larger in later levels than earlier ones. The locality difference follows: if anaphor A_1 is bound in a domain larger then anaphor A_2, then A_1 was merged at a later level than A_2.

Williams discusses three levels where anaphors can be merged: TS, CS, and SS/FS. Anaphors merged at TS must choose coarguments as antecedents, as only these are available at the level. TS anaphors include the prefix *self*- in English and the Dutch *zichzelf* (12). CS anaphors may choose from a wider range of elements for an antecedent. Recall that ECM constructions are established at CS. An exceptionally case-marked CS anaphor (such as *himself* in (13a), and the Dutch *zich*) can thus also seek an antecedent in the matrix clause. Finally, anaphors such as Greek *o/thon idhio*, Korean *caki* or Japanese *zibun* are merged at SS/FS (14). These anaphors do not need to be bound even within the minimal finite clause, as (14) shows.

(12) (a) the case **self**-destructed
(b) Max haat **zichzelf**
M. hates himself
'Max hates himself' (Koster 1985)

[5] For the ban on improper movement to hold, it must also be assumed that movement is constrained by the extension condition, which requires movement to target the root of the tree.

[6] Williams analyses passivization as mismapping between TS and CS. Possibly raising (not discussed in RT) is also derived as an instance of mismapping.

(13) (a) John believes [**himself** to be safe]
(b) Max hoorde mij over **zich** praten
M. heard me about self talk
'Max heard me talk about him' (Koster 1985)

(14) o Yanis$_1$ ipe ston Costa$_2$ [oti i Maria aghapa **ton idhio**$_{1/2*3}$]
the Y. said to-the C. that the M. loves himself
'Yanis told Costa that Maria loves him' (Iatridou 1986)

I believe that the typology of anaphors can be extended and assimilated to that of Büring (2004). Büring describes four kinds of anaphors, as in (15). The RT levels that can be equated with them are in square brackets.

(15) (a) anaphors with the **coargument domain** as the binding domain [TS]
(b) anaphors with the **subject domain** as the binding domain [CS]
(c) anaphors with the **tense domain** as the binding domain [PS]
(d) anaphors with the **root domain** as the binding domain [SS]

The anaphor type not present in Williams' typology is the one bound in tense domains. This anaphor (instantiated by the Marathi *swataah* (16), Danish *sig*, or Russian *sebja*) must be bound within a finite clause.[7]

(16) Jane$_1$ [John ne swataahlaa$_1$ maarlyaavar] rusun
J. J. erg self hitting angry
'Jane remained angry upon John hitting (her)self'
(Dalrymple 1993, cited by Büring 2004)

Recall that variation among the possible antecedents is also encoded in RT: only those elements can serve as antecedents that are present at the level where the anaphor is introduced. Reconstruction for binding also follows from the level-based account; binding relationships are established at the level where anaphors are introduced, but need not be reflected at the surface. Later mismappings or movement can obscure the binding relations.

The RT-based approach to anaphors makes interesting predictions with respect to the variety of anaphora and their properties. In addition, the proposed categories

[7] In classifying anaphors, Büring (2004) differs from Williams in some respects. For instance, he characterizes the coargument domain as being only a negative domain for anaphors. He assumes that Dutch *zich* and Marathi *to* are excluded from the coargument domain. However, the distribution of these anaphors is different: while *to* cannot corefer with a coargument, *zich* can do so:

(i) Max$_1$ wast / schaamt zich$_1$
M. washed shames self

Other anaphors that must be bound within a coargument domain may include *self-* and the Chi-mwi:ni reflexive *ru:hu-* (Marantz 1984, citing Abasheikh 1979).

seem to be in line with the typology of anaphors, as in Büring (2004). As expected in a programmatic theory, some questions still remain. For instance, if theta role assignment is confined to TS, then how is it possible for anaphors introduced at later levels to be assigned thematic roles? Possibly, the theory has to make recourse to "dummy" filler elements at TS,[8] which are replaced by the anaphors at a later level—but this way the theory loses some of its appeal. Alternatively, anaphors can be seen as operators affecting the argument structure of the predicate, similarly to Reinhart–Reuland (1983). These operators can be treated as adjuncts, free to be merged at a later level.

2.4. A/A′/A″/A‴

Given the preceding discussion, it may not come as a surprise that movement can also be seen as a level phenomenon in RT, with properties depending on the level where it applies (the notation in the section title refers to this *n*-ary distinction). As in the case of anaphors, locality, target and reconstruction properties correlate, depending on the level where the movement applies.

Williams assumes traditional movement as well as mismappings between adjacent levels. *Wh*-movement is an instance of genuine movement in RT, targeting Spec,CP. Since movement applies at the earliest level possible, *wh*-movement happens at SS, where complementizer structure is introduced. *Wh*-movement is interpreted as reconstructed for processes that take place at earlier levels — for instance, binding, since (anaphor) binding applies at CS:

(17) who_1 will John_2 want [t_1 to invite $\text{him}_{*1/2}$/$\text{himself}_{1/*2}$]?

Movement and mismapping behave similarly with respect to the "level effects" of locality, target and reconstruction. After detailed discussion of reconstruction effects, Williams presents a table that summarizes movement and mismapping operations and the relations that they reconstruct for.

However, the level-based view of *wh*-movement fails to account for the existence of intermediate landing sites between the extraction position and Spec,CP. As Fox (2000) shows, binding facts indicate that a *wh*-phrase must be able to reconstruct to an intermediate site below Spec,CP. In (18), the *wh*-phrase must reconstruct to a position below the subject to ensure variable binding of *he*. If the phrase reconstructs to below *her*, then a condition C violation arises. Since the sentence is judged grammatical, there must be an available reconstruction site ([_]) which allows variable binding without the condition C violation.

(18) [which of the papers that he_1 wrote for Ms Brown_2] did every student_1 [_] get her_2 [*] to grade?[9]

(Fox 2000)

[8] Suggested by Williams in a later chapter (p. 183), where he uses the term "shadow" for filler elements.

[9] If the quantifier bound the variable from a QR-ed position, then a WCO violation would arise.

Recall from section **2.2.** that the generalized ban on improper movement crucially depends on assuming extension; namely, that movement targets only the root of the tree. By assumption, *wh*-movement can only happen at SS, where the CP structure is introduced. A to-be-embedded clause is built in parallel with the matrix clause, and embedded at SS. By the extension condition, a *wh*-phrase inside the embedded clause can then only target matrix Spec,CP. Thus the availability of intermediate landing sites is incompatible with the RT view of *wh*-movement.

2.5. Superiority and movement

As noted in the previous section, Williams strictly distinguishes movement from mismapping (e.g., scrambling). They are distinguished by the dependencies that they establish within a single level: mismapping yields intersecting dependencies (deriving Scandinavian object shift), while (*wh*-)movement results in nested dependencies.

Williams goes further than merely distinguishing movement from mismapping. He also suggests that not all instances of "*wh*-movement" are real instances of movement, only movement of the structurally highest element. In his account, mismapping accounts for the movement of lower *wh*-phrases as well as scrambling, passivization, and HNPS. In assigning such a wide empirical coverage to mismapping, Williams reduces almost all instances of (phrasal) movement to mismapping—with the recalcitrant exception of movement of the highest *wh*-phrase.

A different approach that makes it possible to unify movement phenomena was presented by Richards (1997; 2001). Richards defines superiority in a way that enforces this locality restriction on the highest element only, which moves first. Once this element has paid the "subjacency tax", the others are free to violate subjacency, and can move in any order. The variable ordering of overtly moved *wh*-phrases in Bulgarian, which conforms to the subjacency tax account, is shown below.

(19) (a) koj kogo kakvo e pital?
who whom what aux asked
'who asked what from whom?'
(b) koj kakvo kogo e pital? (Boškovič 1995, cited in Richards 1997)

According to Williams, only the highest *wh*-phrase is moved by standard *wh*-movement. Other *wh*-phrases are displaced by scrambling, an instance of mismatch in RT. D-linking plays a role in scrambling, and it also determines the placement of *wh*-phrases. In Serbo-Croatian, D-linked *wh*-expressions do not need to move, while non-D-linked *wh*-phrases obligatorily move.

(20) (a) ko šta kupuje? [non-D-linked *šta*]
who what bought
'who bought what?'
(b) *ko kupuje šta? [non-D-linked *šta*]
(c) ko je kupio koju knjigu? [D-linked *koju knjigu*]
who aux.3sg bought.prt which book
'who bought which book?' (Richards 1997)

A scrambling account of secondary *wh*-movement predicts that D-linking plays a role in regulating displacement. It also accounts for (21), which is problematic for an all-move account.

(21) (a) ko$_1$ tvrdis [da **koga** t$_1$ voli]?
who.nom claim.2sg that who.acc love.3sg
'who do you claim that who loves?'

(b) *ko$_1$ tvrdis [da t$_1$ voli **koga**]?
who.nom claim.2sg that love.3sg who.acc

(Konopasky 2002 cited by Williams)

The movement of *koga* in (21) is obligatory. However, rather than targeting the matrix Spec,CP position, where the first *wh*-phrase *ko* is licensed, it moves to the embedded Spec,CP. Thus the Serbo-Croatian example clearly shows that the licensing position for the lower whP is different from the first whP.

Some additional data support Williams' analysis, showing that the embedded Spec,CP is not a *wh*-licensing position. Croatian question cannot be introduced by the complementizer *da*; *da* and a single *wh*-phrase can cooccur in a single clause only if the sentence is an echo question. In this case, the *wh*-phrase does not move overtly (M. Gracani, p.c.):

(22) (a) rekao si [da tko nije stigao na vrijeme]?
said-2sg aux that who didn't come on time
'you said **who** didn't come on time?' [echo question only]

(b) ??/*rekao si [da sto Ivan kupuje]?
said-2sg aux that what I. buys

(c) rekao si [da Ivan sto kupuje]?
said.2sg aux that I. what buys
'you said Ivan buys **what**?' [echo question only]

An account of the data in (21)–(22) can be given in any framework, once the heterogeneity of *wh*-movement is acknowledged. For instance, Boškovič (1998) suggests that there are two types of *wh*-movement: regular *wh*-movement, and movement driven by focusing. Focus-driven *wh*-movement applies to the lower *wh*-phrases, corresponding to Williams' *wh*-phrase scrambling. In addition, Boškovič suggests that not only heads, but moved elements can also have a strong feature, and thus trigger movement. In this approach, *koga* in (21a) moves overtly because of its own strong (more recently, EPP) feature; the position where it moves is not a *wh*-licensing, but a focus position.

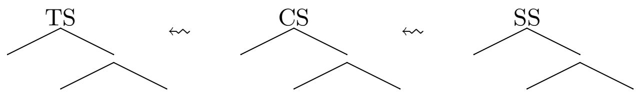
In the chapter on superiority and raising Williams advances a split of displacement operations that takes a bite out of movement that is even larger than in previous chapters. He argues that only the first instance of *wh*-movement is real movement; further instances of *wh*-phrase displacement arise from mismapping. To bolster this division, he cites the effect of D-linking on secondary *wh*-movement (D-linking also plays a role in scrambling) and the different locality restrictions on primary and secondary *wh*-movement.

For the reader, the proliferation of mismapping-based displacement phenomena may well raise the question of whether genuine movement is reduced to movement of the highest *wh*-phrase.[10] Let us assume that it proves to be correct that *wh*-movement is exceptional in this regard and cannot be reduced to mismapping. In this case, it is interesting to know what property of *wh*-movement forces it to instantiate a displacement type of its own. The claim that "secondary" *wh*-movement is scrambling is not without problems: it is not clear, for instance, whether D-linking affects scrambling and "secondary" *wh*-movement in the same way. Whether focusing plays a role in forcing or allowing secondary *wh*-movement is also far from clear.

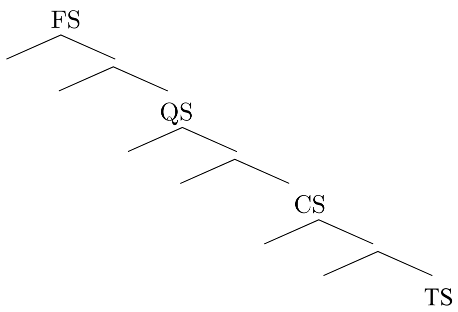
2.6. Phrase structure

Chapters 7 and 8 sketch an RT model of phrase structure. In addition, Williams outlines an account of inflection and head movement. Phrase structure within RT differs from the familiar generative phrase structure. RT trees represent structures at different levels; they are series of 'partial' trees that are related by mapping:

(23) RT PHRASE STRUCTURE



(24) STANDARD CLAUSE STRUCTURE



To represent the **complement-of** relation, Williams introduces the notation $x > y$, where x takes y as its complement. Phrase structure is restricted by two axioms: one defining possible juncture types, and the other determining a universal hierarchy of functional elements (based on Cinque 1998). Possible junctures are embedding, satisfaction (of features via agreement) and adjunction (p. 181). The universal hierarchy of functional heads can, incidentally, vary between T > AgrS > AgrO > Asp > V and AgrS > T >

[10] See the next section for a discussion of head movement within RT, which is also done without movement operations in the Government and Binding/Minimalist sense.

AgrO > Asp > V. Unlike standard phrase structures, not all heads need project in RT. A functional head may either appear as a free-standing lexical item (inserted in the respective head position) or as a feature (realized as an affix on a lower lexical head, without projection of the head). In this respect, functional structure is minimal, projected only when necessary. The functional hierarchy, assumed to be universally given, ensures that the mirror principle is observed (pending exceptions, to be discussed below). The mirror principle follows from the organization of RT if one functional element is introduced at each level (since levels are inherently ordered), and if the extension condition is observed.[11] Given level ordering, a suffix introduced at level L_i will always precede a suffix introduced at level L_{i+n}. Similarly, if the functional heads are freestanding, then the head introduced at L_i will follow the head introduced at L_{i+n} (25).

(25) $[_{L(i+n)}$ aux$_1$ $[_{L(i)}$ aux$_2$ [...]]]

Even though the mirror principle is largely valid, it is not always observed. In order to account for the ordering violations, Williams introduces an operation that yields fusion. Fusion arises when the **rule of combination** applies.

(26) RULE OF COMBINATION
$X\_{Y} + Y\_{Z} \rightarrow [X + Y]\_{Z}$

In Southern Tiwa, the adjacent AgrS and AgrO morphemes are fused. Fusion and some reordering (resulting from **flip**, cf. below) yield (27).

(27) ka -'u'u -wia -ban
AgrS.AgrO baby give past
[[AgrS + AgrO] > V] > T

In addition, Williams introduces the language CAT. CAT operates on right-branching syntactic structures, and has two operations that can alter the organization of elements. These operations are **flip** and **reassociate**, defined in (28).

(28) (a) FLIP
If X = [A > B], A and B terminal or nonterminal, Flip(x) = [B < A]
(b) REASSOCIATE
If X = [A > [B > C]], R(X) = [[A > B] > C]

Flip reverses the ordering of two elements in head–complement relation, and **reassociate**—as the name suggests—regroups elements. Note that both **flip** and **reassociate** are defined for right-branching structures; thus, for instance, **flip** bleeds further applications both **flip** and **reassociate**. Some limitations on displacement follow from the definitions of **flip** and **reassociate**:

[11] Recall from section **2.2.** that the extension condition is also necessary to derive the ban on improper movement.

(29) (a) no further movement of the moved constituent
(b) no movement out of a moved constituent
(c) no movement out of extracted-from constituents

Flip and **reassociate** play a role in inflectional systems, deriving the effects of head movement. In Inuit, the order of inflectional elements does not conform to the mirror principle:

(30) (a) Piita-p mattak nini-va-a-∅
P.-erg mattak-abs ate-indicative-3sg.subj-3sg.obj
(b) [V < [T > AgrS > AgrO]][12]

The surface order arises with two applications of **reassociate**, and one of **flip**. Williams argues that Germanic verb (projection) raising and Hungarian restructuring contexts can also be modeled successfully with CAT. Ignoring verb modifiers (particles and other elements with particle-like distribution), the main patterns of Hungarian restructuring verbs are as in (31) (Brody 1997, Koopman–Szabolcsi 2000, and others).

(31) (a) (nem) $fogok_1$ $akarni_2$ $kezdeni_3$ $énekelni_4$
not will-1sg want-inf begin-inf sing-inf
'I will not want to begin to sing' [straight/English order]
(b) (nem) $fogok_1$ $énekelni_4$ $kezdeni_3$ $akarni_2$
not will-1sg sing-inf begin-inf want-inf
'I will not want to begin to sing' [compound/inverted/roll-up order]

Assuming that the right-branching (31a) is the basic order, **flip** can easily derive (31b). However, if **flip** were free to apply, then certain differences between (31a,b) would remain unaccounted for. For instance, a constituent can intervene between any of the verbs in (31a), but cannot appear within the sequence [*énekelni*$_4$ *kezdeni*$_3$ *akarni*$_2$] in (31b). To account for this difference, Williams suggests specifying two distinct subcategorization frames for restructuring verbs. The head is either a root, requiring the complement (root) to appear to the left of the head (32a), or it is a word, and requires a phrasal complement on its right (32b).

(32) (a) root, F_{root} __
(b) word, __ F_n

The size of the complement is overtly encoded in (32), which yields the effects described above. In addition, it is also predicted that the roll-up structure can only begin with the final (lexical) verb; a word cannot occur inside a complex, compound root. It must also be assumed that tensed auxiliaries have only the subcategorization frame in (32b), to avoid their participation in a rollup structure. Since (32a,b) differ in the level of the head and complement, the alternative orders are not generated by **flip** or **reassociate**,

[12] Ignoring Asp in the functional hierarchy.

but are encoded as ambiguity in subcategorization frames. Williams argues that while a lexically encoded ambiguity that mimics **flip** and **reassociate** can model verb order, it cannot derive the behavior of verbal modifiers, and that verbal modifiers are displaced by movement rather than by the **flip/reassociate**-type operations. This analysis derives the fact that verbal modifier movement is incompatible with the compound structure (33a) and possible from within a finite CP domain (33b).

(33) (a) *be$_1$ fogok akarni [menni$_2$ kezdeni t$_1$ t$_2$]
in will-1sg want-inf go-inf begin-inf
'I will want to begin to go in'

(b) be$_1$ kell, [$_{CP}$ hogy t$_1$ menjek]
in must that go-subj-1sg
'I must go in'

Although Williams' account derives the desired results, it is not immediately clear why (restricted) **flip** and **reassociate** could not derive the facts in (33). In addition, it is not **flip** and **reassociate**, but a lexically encoded ambiguity in the subcategorization frames that yields the different restructuring environments. Thus even if one wishes to maintain Williams' account that verbal modifiers and restructuring predicates are displaced by different means, **flip/reassociate** can be used to account for verbal modifier movement. Finally, let us briefly consider the status of **flip** and **reassociate**. For English restructuring contexts, we have seen that the alternation must be lexically encoded. In inflectional systems, **flip** and **reassociate** are also not free to apply, but are encoded within the entry for the functional element. For German verb (projection) raising, **flip** and **reassociate** must be independently specified for modals and auxiliaries, since they apply differently. Thus it appears that some aspect of **flip/reassociate** must always be specified in the lexicon, making these operations rather unlike mismapping.

3. Semantics in RT

The final chapter of the book discusses some aspects of semantics in RT. One respect in which semantics in RT departs from a standard view of semantics is compositionality. An utterance is not represented in a single structure, but at various levels that are connected by (mis)mapping. Thus there is no unique structure that could be interpreted incrementally. Instead, Williams suggests that translation is determined by matching rather than by a compositional process. A matching semantics requires the definition of what elements are matched; Williams illustrates matching translation by language or sentence matching. It is not clear, however, how the meaning of individual sentences is derived by matching.

The interpretations of individual levels may be matched among each other, but they express very different aspects of meaning (thematic or quantificational structure, for instance).[13] A similar, matching-like view may be to determine some preestablished properties of meaning independently, as in a checklist (I. Heim, p.c.). It

[13] A similar approach to semantics, where different levels contribute different kinds of meanings, was also advocated in Jackendoff (1972) and in the Extended Standard Theory approach, among others.

should be noted that this approach differs significantly from compositional approaches, which determine truth conditions as the meaning of a proposition.[14]

In order to account for the tendency of meanings to diverge, Williams introduces the notion of **semantic blocking**. Languages tend to disfavor different forms to express the same meaning, which Williams describes as "nature hates a synonymy" (p. 246). The dispreference can be observed among lexical items, where synonyms differ in meaning or stylistic value. Similarly, if there are two distinct forms of a sentence, then they will be assigned different meanings. Recall, for example, that different quantifier orders in German are associated with distinct scope readings (8a,b). Williams presents this semantic blocking of synonymity as a universal property. In order to evaluate the proposal, it is necessary to establish what the comparison set for blocking is. For instance, the same meaning can be assigned to either (5a) or (5c), repeated below (F marks the focused constituent).

(34) (a) John gave to Mary [all of the money in the [SATCHEL]$_F$] (= (5a))
(b) John gave [all the money in the [SATCHEL]$_F$] to Mary (= (5c))

Narrow focus on *satchel* is possible in either example, in violation of the synonymy blocking hypothesis. However, if blocking is interpreted as comparing **all** the meanings assigned to two forms, then (34a) and (34b) will not violate the hypothesis. (36) shows that focus projection is possible in (34a), but not in (34b).

(35) What did John do?
(a) John [gave to Mary all of the money in the SATCHEL]$_F$
(b) *John [gave all the money in the SATCHEL to Mary]$_F$

It appears then that the comparison set for semantic blocking must take into account (at least) the lexical elements in the string and the meanings assigned to the string. In order to evaluate the blocking hypothesis fully, a more explicit formulation of the comparison set is needed.

In the final chapter Williams also includes a detailed discussion of foci. He distinguishes two types of foci: **L(ogical) focus** and **I(nformation) focus**. His terms correspond to contrastive/identificational and information focus, respectively (cf. É. Kiss 1998, among others). The realization of the two focus types can differ. In English, for instance, L-focus is canonically realized as cleft or pseudocleft, and I-focus receives main stress. In Hungarian, (a single) L-focus obligatorily appears in the immediately preverbal position, while I-focus has a much freer distribution. Williams notes that L-focus is subordinate to I-focus in the sense that in (corrective) contexts L-focus can be embedded within the I-presupposition (outside of the I-focus) (36), while the reverse is not possible (37).

(36) (a) It was JOHN that Bill saw
(b) No, it was John that Bill HEARD [corrective I-focus]

[14] A matching approach may prove problematic for variable binding. If binding is determined at a single level (as suggested by Williams for German, where it applies at PS), then quantifiers cannot interact with (variable) binding.

(37) (a) JOHN saw Bill
(b) *No, it was Sam that JOHN saw [corrective L-focus]

The asymmetry between the two foci is due to the different levels where they are located: I-focus is defined at AS, while L-focus is determined at SS (the fact that I-focus is used as corrective focus is presumably due to the fact that it is established later than L-focus).

With respect to Hungarian focus, Williams notes that it differs from English in two respects: (a) focus movement to the left (to the immediately preverbal position), and (b) initial rather than final nuclear stress. In English focus movement can target the right edge (as with HNPS), and the nuclear accent is final. Williams notes that the two parameters are predicted to be independent, since they are defined at distinct levels. Accent (stress) placement is determined at AS, and the positioning of focus is determined at FS. He notes that there is no plausible connection between the values of these parameters, and remarks that "I hope the two parameters do not turn out to be linked empirically." Such a connection is, I believe, not implausible. In fact, Arregi (2002) and Szendrői (2003) argue in detail for connecting focus position and nuclear stress position in Basque and Hungarian, respectively.[15] In these approaches, the driving force behind focus movement is movement to the default nuclear stress position. All in all, I think that it is far from clear that an inherent link between focus displacement and nuclear stress is undesirable.

4. Summary

The organization of RT builds on the separation of deep and surface structure, several times multiplied. The proliferation of levels is useful because it provides a typology that can describe and predict the varied behavior of a number of phenomena (e.g., movement, anaphora, embeddings). At the same time, the novel organization of grammar presents a fresh point of view of old phenomena. The analyses sketched in RT and those inspired by it — even if implemented in more established frameworks — should prove to be interesting to syntacticians as well as to a wider audience.

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[15] Arregi (2002) assumes a hierarchical (Cinque 1993) rather than an edge-based account of nuclear stress.

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