

WPFG

working papers in functional grammar

wpfg no. 55
November 1993

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0 Introduction

Both FG and Jackendoff consider semantic roles¹ (SRs) to be non-primitive notions, inferable from the semantic properties of predicates, their arguments and adjuncts. However, whereas the FG semantic functions (SFs) are part of linguistic structure, Jackendoff's theta-roles (θ -roles) belong to conceptual structure.

The precise characterization of the difference in status of SFs and θ -roles is complicated by the fact that Jackendoff posits a distinction between conceptual and linguistic structure, while FG does not. In FG the linguistic structure is also assumed to be the conceptual structure. Therefore, since in FG the linguistic/conceptual dichotomy is not recognized, to term the FG SFs purely linguistic is in part misleading. Conversely, though Jackendoff's θ -roles are defined on conceptual structures, the conceptual structures that he posits are to a large extent derivative of the lexical and syntactic patterns displayed in natural language. The primary linguistic basis of Jackendoff's conceptual structures is hardly surprising. After all, we have no direct access to our conceptual structure, but we do have access to linguistic expressions, the primary means via which this structure is made manifest.

The above notwithstanding, there are several important differences between SFs and θ -roles which follow to a large extent from the basically linguistic as opposed to conceptual approach adopted by FG and Jackendoff, respectively. These major differences concern:

- the way SFs and θ -roles are established;
- the conditions imposed on their assignment to arguments;
- the nature of the relationship between SRs and surface structure.

A comprehensive discussion of each of these points is far beyond the scope of this paper. Therefore in §2, 3 and 4 respectively I will only sketch the most important aspects of these issues. But first we must consider the nature of Jackendoff's conceptual structures.

1 Jackendoff's conceptual structures

To make the exposition of Jackendoff's conceptual structures more accessible to followers of FG, let me begin by saying that Jackendoff's conceptual structures may be likened to a recursive series of FG predicate-argument structures, in which the type of SoA is given an explicit function/argument representation, and the function-argument structure of lexical predicates incorporates not only the arguments of the predicate but also some of the satellites as well as the selection restrictions. The recursive function/argument structures are built up from a repertoire of language-independent primitive conceptual categories such as *Thing*, *Event*, *State*, *Action*, *Place*, *Path*, *Property*, *Manner* and *Amount*.

1. The term *semantic role* will be used as a cover term for the semantic relations recognized in FG and by Jackendoff, and the terms *semantic function* and *θ -role* for will be used when referring specifically to the relations recognized in the two frameworks.

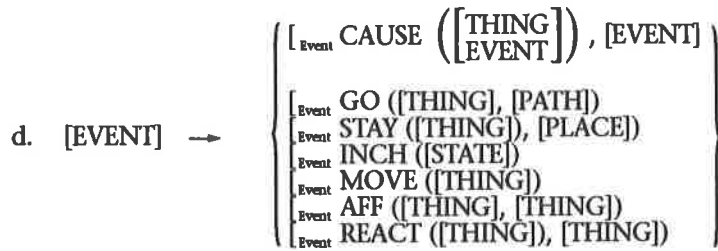
- (1) a. Event John ran toward the house.
 Thing Path Thing
- b. State Sally is in the kitchen.
 Thing Place
- c. Event Liz left quickly
 Thing Manner
- d. State The hat is red.
 Thing Property

The recognition of such language-independent primitive conceptual categories is the single most important feature which distinguishes Jackendoff's conceptual structures from FG predicate-argument structures. As is well known to followers of FG, FG denies the existence of abstract language-independent primitive semantic predicates. While recognizing that meaning, including lexical meaning, is compositional, FG seeks to capture the meaning of lexical items via stepwise lexical definitions which take the form of a system of symmetrical meaning postulates relating the actual predicates of a language to each other. The rejection of abstract semantic predicates by FG follows from the fact that no distinction is made between linguistic and conceptual structure. Conversely, since Jackendoff makes such a distinction, he must distinguish between lexical items and the concepts that underlie them. How the difference between linguistic and conceptual structure could be systematically expressed if not by means of a set of language-independent concepts is difficult to imagine.²

Each of the conceptual categories postulated by Jackendoff is taken to have some realization in which it is decomposed into a function/argument structure, and each argument is in turn a conceptual constituent of some major category. The most important realizations of the basic conceptual categories Place, Path, State and Event are presented in (2).

- (2) a. [PLACE] → [_{Place} PLACE-FUNCTION ([THING])]
- b. [PATH] → [_{Path} { TO
FROM
TOWARD
AWAY-FROM
VIA } ([THING]
[PLACE])]
- c. [STATE] → [_{State} BE ([THING], [PLACE])
_{State} ORIENT([THING], [PATH])
_{State} EXT ([THING], [PATH])
_{State} CONFIG ([THING])
_{State} AFF ([THING], [THING])
_{State} REACT ([THING], [THING])]

2. One could, of course, use pictures for some concepts, which is a possibility envisaged both by Jackendoff and by Dik.



The structure in (2a) states that a conceptual constituent of the category *Place* can be elaborated as a *Place* function plus an argument that belongs to the category *Thing*. The argument serves as a spatial reference point in terms of which the *place* function defines a region. (2b) elaborates a *Path* as one of five functions that map a *Thing* or *Place* argument into a related trajectory. (2c) expresses the fact that a conceptual constituent of the category *State* can be elaborated as one of several *State* functions, namely: *BE* for the location of entities, *ORIENT* for the orientation of entities, *EXT* (extension) for the spatial extension of entities along a linear path, *CONF* (configuration) for entities with an internal spatial configuration but no path specification, *AFF* (affect) for affected entities, and *REACT* for entities reacting to an outside stimulus. An example of predications analyzed as instantiating each of the above *State* functions is given in (3) below.

- (3) a. The dog is in the park.
- b. The sign points towards New York.
- c. The road goes from New York to San Francisco.
- d. Felix sat.
- e. Cats amuse Rick.
- f. Fred fears snakes.

And finally (2d) presents seven elaborations of the conceptual category *Event* in terms of the conceptual functions *GO*, *STAY*, *INCH* (inchoative), *MOVE*, *CAUSE*, *AFF* and *REACT*. A linguistic realization of each of these seven *Event* functions is presented in (4).

- (4) a. Bill ran into the room.
- b. Dan stayed in the kitchen.
- c. The ball hit the wall.
- d. The cat wiggled.
- e. Harold hit the ball (into the field).
- f. *any of the above*
- g. The student resisted the teacher's pressure.

Each of the examples in (3) and (4) will be commented on below.

Two major points need to be noted about the above conceptual structures. The first is that the conceptual functions belong to two major frames of reference, namely that of motion and location as reflected in Gruber's (1965) localist hypothesis, and that of action as developed in the event typology of Vendler (1957/67) and Dowty (1979). The use of the two frames of reference will be explicated in more detail later below. The second point is that there is no one-to-one correspondence between conceptual argument structure and linguistic argument structure. Jackendoff argues that what others call predicate-argument structure can be thought of as an abbrevi-

ation of the part of conceptual structure that is visible to the syntax. He sees no need to posit a separate level of predicate-argument structure, and maintains that predicate-argument structure can be inferred from the *correspondence or linking rules* between semantics (conceptual structure) and syntax. The correspondence rules that he posits will be elaborated in §4. At this point let us just briefly consider the general relationship between conceptual and linguistic function/argument structure.

Though all lexical items, barring expletives, are assumed to correspond to a conceptual constituent of some major conceptual category, the converse does not hold. Neither the conceptual functions in the structures in (2) nor the arguments of the postulated conceptual functions need have a linguistic realization. Thus, for example, the conceptual functions elaborating Place or Path may be realized by prepositions, as in (5), or they may be fully incorporated in the meaning of the verbal predicate as in (6).

- (5) a. Sally put the book *under* the bed.
 b. The thief ran *out of* the house.
- (6) a. John entered the room.
 b. John climbed the mountain.

The conceptual structures corresponding to (6a,b) are shown in the lexical entries for *enter* and *climb* in (7a,b) respectively.

- (7) a. enter
 V
 — <NP_j>
 [Event GO ([Thing]_i [Path TO ([Place IN ([Thing]_j)])])])]
- b. climb
 V
 — <XP_j>³
 [Event GO ([Thing]_i [Path {TO ([Place TOP-OF ([Thing]_j)})}])])]

We have just seen that the conceptual functions occurring in the conceptual structure need not be overtly realized. The same applies to the arguments of the conceptual functions. Consider, for instance, the lexical entries for *run* and *butter* shown in (8) and (9), respectively.

- (8) run
 V
 — <PP_j>
 [Event GO ([Thing]_i, [Path]_j)]
- (9) butter
 V
 — <NP_j>
 [Event CAUSE ([Thing]_i, [Event GO ([Thing BUTTER], [Path TO ([Place ON ([Thing]_j)])])])])]

3. The XP in (7b) stands for any category.

Run, which is taken to express the Go function is analyzed as requiring two arguments, a Thing and Path. However, the Path argument may be lexically expressed as in (10a) or it may not be, as in (10b).

- (10) a. The dog ran into the room.
- b. The dog ran.

In either case the Path argument is assumed to be present in the conceptual structure. As for *butter*, under Jackendoff's analysis the verb *butter* is viewed as having three conceptual arguments though, as shown in (11), only two tend to receive distinct lexical expression.

- (11) a. Mother buttered the toast.
- b. *Mother buttered the toast with butter/jam/honey.
- c. Mother buttered the toast with a new brand of table margarine.

Moreover, note that *toast* in (11a) is not treated as a direct argument of the predicate *butter*, but is embedded several functions down into the conceptual structure just like *the room* in (6a) or *the mountain* in (6b). An analogous analysis is also assigned to what in FG would be expressed in the form of selection restrictions. As shown in Jackendoff's lexical entry for *drink* in (12) directly below, both the fact that drinking involves a liquid and that the liquid is placed in the mouth of the entity doing the drinking are assumed to correspond to conceptual arguments.

- (12) drink
- V
- <NP_j>
- [_{Event} CAUSE ([_{Thing}]_i, [_{Event} GO ([_{Thing} LIQUID]_j, [_{Path} TO ([_{Place} IN ([_{Thing} MOUTH OF ([_{Thing}]_i)))])))]

The function/argument structures posited by Jackendoff in addition to functions and arguments may also contain special semantic feature specifications. Two types of such extra semantic features are recognized. The first are semantic field features, which are used as in Gruber (1965), i.e. to distinguish the occurrence of verbs and prepositions in different semantic fields such as those shown in (13) below.

- (13) a. Spatial location and motion
 - i. The bird went from the ground to the tree.
 - ii. Harry kept the dog in a kennel.
- b. Possession
 - i. The inheritance went to the church.
 - ii. Ken kept the portrait.
- c. Ascription of properties
 - i. The light went from green to red.
 - ii. The clown kept the children amused.
- d. Scheduling of activities
 - i. The meeting was changed from Monday to Saturday.
 - ii. Let's keep the trip on Saturday.

The semantic field in which a given verb or preposition occurs is indicated by a subscript on the conceptual function in terms of which the verb or preposition is analyzed. For example, the conceptual function GO may take on one of the following subscripts: GO_{poss}, GO_{spatial}, GO_{temporal}, and GO_{identificational}. The precise values of the semantic field feature of a given verb or preposition is assumed to be a lexical property of the relevant predicate which must be learned individually and thus must be specified in lexical entries.

The second type of features, also indicated by subscripts on the conceptual functions, specify further semantic differences in the type of location, motion or action conveyed by different predicates. For instance, whether the location or motion is distributive or nondistributive, whether it involves physical contact, or whether it is volitional etc. The use of these features is a means of reducing the number of conceptual functions that would otherwise need to be recognized in order to account for the different inferential relations associated with the use of various predicates.

Having outlined the major characteristics of Jackendoff's conceptual structures, we can now proceed to our major concern, namely the comparison of his θ -roles with FG SFs.

2 The establishing of semantic functions and θ -roles

In FG the SFs of first arguments are tied to a typology of SoAs. Jackendoff's θ -roles, on the other hand, are intended to capture similarities between predications representing different SoAs. This difference in the function of SFs and θ -roles has a direct bearing on the type of semantic distinctions reflected by means of each of these relations. To facilitate the exposition of Jackendoff's θ -roles for adherents of FG, I will begin with a brief review of the FG approach to SFs and then compare it with the relations proposed by Jackendoff.

2.1 The FG SFs

The typology of SoAs elaborated in FG is defined in terms of the features *dynamism*, *control* and *telicity*. The feature [dynamic] is taken to distinguish Situations from Events, both of which are in turn subdivided in terms of the property [control], resulting in a four-way classification of SoA into States, Positions, Actions, and Processes. Within Actions and Processes a further distinction is made on the basis of telicity, the outcome of which is the following subclassification: Accomplishment, Activity, Change, and Dynamism. The above typology of SoAs and the parameters determining it are shown in the matrix in (14).

(14) SoA type	[dyn]	[con]	[tel]
• Situation	-		
• • Position	-	+	
• • State	-	-	
• Event	+		
• • Action	+	+	
• • • Accomplishment	+	+	+
• • • Activity	+	+	-
• • Process	+	-	
• • • Change	+	-	+
• • • Dynamism	+	-	-

The first arguments of the above SoAs are associated with the following five SFs.

- (15) Agent: the entity controlling an Action (Activity or Accomplishment).
 Positioner: the entity controlling a Position.
 Force: the non-controlling entity instigating a Process (Dynamism or Change).
 Processed: the entity that undergoes a Process.
 Zero: the entity primarily involved in a State.

Of the three features that define the typology of SoAs, only two, [dynamicity] and [control], are reflected in the SFs. Dynamicity is taken to involve some sort of change which is interpreted in FG rather broadly as involving not only movement but any difference capable of being perceived by the senses. Control is viewed as involving animacy and intentionality. The two features [dynamicity] and [control] define a very restrictive notion of agentivity which is confined to animate entities performing dynamic and intentional acts. The inanimate counterpart of the Agent is Force, which denotes machines, natural elements and inanimate stimuli, as in the examples in (16) below.

- (16) a. The crane broke the wall.
 b. The wind rolled the ball down the hill.
 c. The book upset the royal family.
 d. The same fate befell the Armenians.

Entities, both animate and inanimate, subject to a process which is depicted as involving no direct outside cause, bear the Processed SF. Some relevant examples are given in (17).

- (17) a. The cup broke.
 b. The rubber trees withered under the assault of the sun.
 c. John received a present.
 d. Mary grew tall.
 e. The plant emitted a funny smell.

And entities involved in situations as opposed to events take either the Positioner SF or Zero. The former is reserved for controlled situations as in (18), the latter for noncontrolled ones as in (19).

- (18) a. Biologists keep specimens under observation.
 b. Felix sat.
 c. The enemy occupied the city for three days.

- (19) a. Mary is tall.
 b. The river and forest system covers 2.7 sq miles.

Unlike the SFs associated with first arguments, those borne by second or third arguments are not directly tied to the typology of SoAs. The relevant SFs are:

- (20) Goal: the entity affected or effected by the operation of some controller (Agent/Positioner) or Force.

Recipient:	the entity into whose possession something is transferred.
Location:	the place where something is located.
Direction:	the entity towards which something moves/is moved.
Source:	the entity from which something moves/is moved.
Reference	the second or third term of a relation with reference to which the relation is said to hold.

The Goal is the exclusive domain of the second argument. The remaining SFs may be borne by either the second argument or the third; in this latter case the second argument is always a Goal. All of the labels but for Goal and Reference are used more or less in the standard way. The FG Goal denotes not the direction or recipient roles, as is the case in other theories of semantic roles, but the affected entity, i.e. what in various other theoretical frameworks is labelled as the patient. It also suffers from the same indeterminacy as the patient of other approaches. Though the definition of the Goal given above confines it to the second argument of controlled predications, Dik (1989) generalizes it also to processes. Whether it also needs to be extended to the second argument of states depends in part on how the Reference SF is interpreted. So far very little has been said about this SF in FG. It was introduced by Mackenzie (1983) to deal with certain relations in nominal predications and extended by Dik (1989) to the second and third arguments of the verbal predications in (21a,b) and (21c) respectively.

- (21) a. John resembles his father.
 b. The climber reached the summit.
 c. Danny taught the child mathematics.

The above are the only three examples of Reference given in Dik (1989). The characterization of this SF as the relation with reference to which a relation holds is vague enough to accommodate any second or third argument which is not directly affected or effected. It therefore constitutes the most likely choice for the second arguments of both the states in (22) and activities in (23).

- (22) a. The circle contains a dot.
 b. Mary has a book.
 c. The circle surrounds the square.
 d. Three lines form a triangle.
- (23) a. The train climbed the mountain.
 b. The bus passed the church.
 c. We avoided the beach.
 d. The plane approached the terminal.

However, if passivizable predications are to be confined to those with a second argument Goal, then (22c,d) and arguably some of the contextual realizations of the predications in (23) must be assumed to be Goals rather than Reference. Which third arguments should be viewed as bearing the Reference SF is also problematic. Some potential candidates are the *of* and *with* phrases in (24), which however, are also open to a Source and Instrument interpretation respectively.

- (24) a. John made a gardener of Paul.
 b. The spray rid the room of insects.

- c. The townplanner lined the streets with trees.
- d. The storm capped the mountain with snow.

The issue of the SR of these entities will surface again when discussing Jackendoff's analysis.

Four of the above argument SFs, i.e. Processed, Zero, Goal and Recipient may form doublets with an experiencer. FG adopts the position that experiences do not constitute an independent SoA, but are conceptualized and expressed within the models used for non-experiencers. Consequently no special experiential SoA is recognized, but rather all six SoAs are taken to have an experiential option. However, since predicates manifesting [-control] experiential SoAs may exhibit certain morpho-syntactic characteristics distinct from their non-experiential counterparts, the first arguments of such predications are assigned the double SFs of Zero[Experiencer] and Processed[Experiencer], as in (25a) and (25b) respectively.

- (25) a. Fred fears snakes.
b. John got an interesting idea.

The double Goal[Experiencer] and Recipient[Experiencer] functions are assigned to animate arguments in experiential predications with a stimulus, an FG Force, as a first argument, such as the ones in (26).

- (26) a. Heat soothes me.
b. The paper impressed the professor.
c. A wonderful idea occurred to him.
d. A similar thing happened to the secretary.

2.2 Jackendoff's θ -roles

As shown in §1, Jackendoff also offers a typology of SoAs which is expressed by means of different conceptual functions. Recall that states may be elaborated into one of five conceptual functions and events into seven. The conceptual functions do not, however, correspond to clear-cut parameters, unlike in FG. The distinction between states and events relies in part on [motion]. Nonetheless, one of the event functions is STAY which denotes stasis over a period of time. Jackendoff mentions that STAY could in fact be analyzed as a durational form of BE, which would be more in line with the FG analysis of such SoAs as Positions. But even under such an analysis, he would consider the relevant SoA to be an event. The subdivisions of states and events are achieved in part with reference to the presence or absence of a path argument and, in the case of events, also in terms of outside instigation. In addition to these distinctions, both states and events are subclassified by means of the AFF and REACT functions which define subdivisions that overlap with the other conceptual functions, rather than being subordinate or superordinate to them.

Unlike in FG, the conceptual functions defining each type of SoA are not associated with distinct θ -roles. The typology of SoAs does not, therefore, have a direct bearing on the nature of the θ -roles recognized by Jackendoff. In fact his θ -roles are intended to capture similarities rather than differences between different types of SoAs. Also, unlike in FG, θ -roles are assigned both to entities and properties.

Jackendoff posits two sets of θ -roles belonging to what he calls the thematic and

the action tier respectively. The former reflects the conceptual plane of motion and location and the latter that of action and affect. Let us consider the two tiers of θ -roles in turn. As in the case of the FG SFs, we will restrict our attention primarily to the argument θ -roles.

2.2.1 *The thematic tier*

The thematic tier consists of five argument θ -roles, namely: Agent, Theme, Source, Goal and Location/Reference Object. Notionally, the Theme may be characterized as the entity in motion or the entity being located. Location denotes the place where the Theme is located or the point of reference in terms of which the Theme may be identified. In the latter case Jackendoff uses the label Reference Object rather than Location. Source is the entity from which motion proceeds, and Goal the entity to which motion proceeds. And finally, Agent is the outside instigator of motion. The θ -roles are defined in terms of specific structural configurations in conceptual structure as follows:

- | | |
|--------------------------------|---|
| (27) Theme: | 1st argument of GO, MOVE, INCH, CONF, STAY, BE and EXT; |
| Source: | argument of the path function FROM |
| Goal: | argument of the path function TO |
| Location/
Reference Object: | argument of the PLACE function |
| Agent: | 1st argument of the CAUSE function |

Since the parameters underlying the above θ -roles are motion, location and outside instigation rather than dynamicity and control, there is no one-to-one correspondence between the above θ -roles and FG SFs. Jackendoff's Theme may be rendered by each of the five first argument SFs as shown in the examples in (28) below.

- (28) a. The tree (Zero) touched the house for years.
 b. The model (Pos) stood on the chair for hours.
 c. Bill (Ag) intentionally rolled down the hill.
 d. The ball (Proc) rolled down the hill.
 e. The rain (Fo) moved to the land.

The Theme borne by second arguments typically corresponds to FG Goals. E.g

- (29) a. Sonia threw the ball (Goal).
 b. The sodium emits electrons (Goal).

The characterization of the Theme as the entity in motion also identifies the prepositionally marked entities in (30) and (31) as displaying the Theme θ -role.

- (30) a. The terrorists deprived the hostages of food.
 b. The spray rid the room of insects.
 c. The Red Cross provided the hostages with medicine.
 d. The artist encrusted the throne with jewels.
 e. The storm capped the mountain with snow.

- (31) a. The artist decorated the throne with jewels.
 b. The pickpocket robbed me of my keys.
 c. The Red Cross supplied the refugees with medicine.

As mentioned above, in FG such Themes would be perhaps analyzed as bearing the Reference SF. It needs to be noted that though the PPs in (30) are obligatory while those in (31) are not, Jackendoff treats both as adjuncts. In FG the former would be considered as arguments. Since the latter are optional and their omission does not affect the semantic interpretation of the respective predications, they qualify as satellites.

Turning to the other θ -roles, Jackendoff's Source and Goal (in the examples below indicated in italics) may correspond to FG Source and Direction SFs, as in (32), but also to an FG Goal as in (33) or an FG Agent or Processed as in (34).

- (32) a. Jack returned from Paris. (Source: *Source*).
 b. Paul went to New York. (Dir: *Goal*).
- (33) a. Betty emptied the sink (Goal: *Source*).
 b. The car hit the tree (Goal: *Goal*).
 c. Sam created a house (Goal: *Goal/Theme*) out of an old barn (Source: *Source*).
- (34) a. John (Ag: *Source*) gave Allan the book.
 b. The chimney (Proc: *Source*) smoked.
 c. The tank (Proc: *Goal*) filled.
 d. The sodium (Proc: *Source*) emitted electrons.

The Location/Reference Object θ -role of first arguments coincides with an FG Zero SF, as in (35).

- (35) a. The garden is swarming with bees.
 b. The circle contains the dot.

A second argument Location/Reference Object correlates with an FG Location, Reference or Goal, the last of these if the entities in (36) are treated as Goals rather than Reference.

- (36) a. John lives in Amsterdam (Loc).
 b. The climbers reached the summit (Ref).
 c. Three lines form a triangle (Ref).
 d. The triangle consists of three lines (Ref).
 e. The plane approached the terminal (?Goal/?Ref).
 f. The bus passed the church (?Goal/?Ref).
 g. The stuntman jumped the gorge (?Goal/?Ref).

As for Jackendoff's Agent, unlike the FG Agent, it need not be animate nor volitional and therefore covers the FG Agent, Force and Positioner but only when these denote external instigation as in (37) as opposed to (38).

- (37) a. Peter rolled the ball down the hill.

- b. The wind rolled the ball down the hill.
 - c. Biologists keep specimens under observation.
- (38)
- a. Peter rolled down the hill.
 - b. The wind rolled in the mountains.
 - c. The patient lay lifeless for three days.

We have seen that the θ -roles of the thematic tier bear little resemblance to the FG SFs. Given that the FG typology of SFs is action-based, we would expect the θ -roles of the action tier to be closer to the FG ones. Let us now consider to what extent this is the case.

2.2.2 The action tier

The primary θ -roles of the action tier are: Actor, Patient and Beneficiary. The last of these, unlike in FG, is both an argument and a satellite role. All three θ -roles are defined as arguments of the conceptual function AFF(ect):

- (39)
- | | |
|--------------|----------------------------------|
| Actor: | 1st argument of AFF |
| Patient: | 2nd argument of AFF ₋ |
| Beneficiary: | 2nd argument of AFF ₊ |

The Actor is the first argument of AFF, and the Patient and Beneficiary constitute second arguments of AFF; the subscripts (-) and (+) on the AFF function indicate negative affect (undergoing) and positive affect (benefit), respectively.

Jackendoff characterizes the Actor as 'the doer of the action' or the 'volitional actor'. The two senses are distinguished in the conceptual structure by the presence of the subscript +volitional on the conceptual function AFF. The volitional Actor converges with the FG Agent, but the Actor as doer of action may correspond to an FG Force, Processed or Positioner. In other words the Actor, under Jackendoff's analysis does not actually have to do anything; its presence may just impede or facilitate movement or induce some sort of reaction from the things that happen to come into contact with it. For identifying the doer of action Jackendoff suggests the ability of an entity to occur in the test frame *What NP did was* Observe that all of the subjects in (38) above, which are FG Forces, Processed and Positioners, qualify as doers of actions according to this test frame. E.g.

- (40)
- a. What Peter did was roll down the hill.
 - b. What the wind did was roll in the mountains.
 - c. What the patient did was lie lifelessly in bed.

In the light of the above, Jackendoff's Actor may be seen to approximate the Actor super-role of Foley & Van Valin (1984) or the Proto-Agent super-role of Dowty (1991).

The Patient, in turn, corresponds fairly closely to Foley & Van Valin's Undergoer and Dowty's Proto-Patient. Notionally Jackendoff's Patient receives the same characterization as the FG Goal, i.e. the affected entity. However, unlike the FG Goal, which is restricted to second arguments, Jackendoff's Patient may be borne by certain first arguments such as the ones in (41), which in FG are considered to bear the Processed SF.

- (41) a. Amy lost the money.
 b. Kate underwent an operation.
 c. The captain sustained an injury.

In order to comply with the structural configuration defining the patient as the second argument of AFF, the first arguments of the verbs in (41) are analyzed as second arguments. The arguments of the conceptual function AFF, unlike those of the thematic conceptual functions, are taken to be optional. The optionality of the action tier arguments is intended to reflect the fact that events may be conceptualized without an Actor, as in the examples above, or a Patient/Beneficiary.

Jackendoff seeks to distinguish the Beneficiary from the Patient θ -role in terms of the use of the preposition *for* as opposed to *to* in the test frame *What Y did for/to X was ...* Accordingly *the boys*, *the Arts faculty* and *the little girl* in (42) below are considered to be Beneficiaries.

- (42) a. The girls helped the boys.
 i. What the girls did *to/for the boys was help them.
 b. Wilson's supply the Arts Faculty.
 i. What Wilson's do *to/for the Arts faculty is supply it.
 c. Sally guided the little girl to the shop.
 i. What Sally did *to/for the little girl was guide her to the shop.

Like the Patient, the Beneficiary is also a possible first argument θ -role as in the examples in (43), which again correspond to the FG Processed SF.

- (43) a. John received a financial reward.
 b. Jane got only a diploma.

Since the Patient and Beneficiary are mutually exclusive, the postverbal constituents in predications with first argument Patients or Beneficiaries are not assigned a θ -role on the action tier. Consequently, while Jackendoff's second argument Patients/Beneficiaries of transitive predications correspond to FG Goals, the converse does not hold.

The recognition of only two action tier θ -roles, Actor and Patient/Beneficiary has interesting repercussions for Jackendoff's analysis of ditransitive predications such as those occurring with the verb *give* in (44).

- (44) a. Vicky gave Ted the photographs.
 b. Vicky gave the photographs to Ted.

Whereas FG assigns the same SFs to the entities in pairs of clauses such as (44), Jackendoff maintains that they differ both in θ -roles and argument structure. Interestingly enough, the recipient of *give* in (44a) is taken by Jackendoff to be a Beneficiary, and *the photographs* are assigned no action tier θ -role. In (44b), on the other hand, *the photographs* are taken to be a quasi-Patient, while *Ted* is treated not as an argument, but as an adjunct (satellite) bearing the Recipient θ -role. Note the different behaviour of both *Ted* and *the photographs* with respect to the test frames for Patients and Beneficiaries.

- (45) a. *What Vicky did to/with the photographs was give Ted them.
 b. What Vicky did *to/?with the photographs was give them to Ted.
 c. What Vicky did for Ted was give him the photographs.
 d. ?What Vicky did for Ted was give the photographs to him.

In addition to the conceptual function AFF, Jackendoff posits another action tier conceptual function, namely REACT. The REACT conceptual function is seen to underlie event predications such as those in (46) and experiential states as in (47).

- (46) a. The student gave in to the teacher's pressure.
 b. The child resisted his mother's tears.
- (47) a. Fred fears snakes.
 b. I like Schubert.

Jackendoff argues that REACT is a sort of mirror image of AFF in that the first argument of this function reacts to a situation or event brought about by the second argument. The θ -role of the first argument of REACT is tentatively called the Reactor and of the second argument the Stimulus. In FG the Reactors in (46) would be considered to be Agents, while those in (47) would bear the double SF of Zero[Experiencer]. It is important to note that Jackendoff, like FG, does not recognize an experiencer θ -role. What others would call experiencers are analyzed by Jackendoff on the action tier either as Patients e.g. *John* in *The news frightened John* or as Reactor, and on the thematic tier as Goals or Locations.

So far we have been considering the difference in the inventory and interpretation of SFs and θ -roles. Another important difference between the overall approach to these relations in FG and Jackendoff's theory of grammar is the opposing stance of the two theories in relation to Fillmore's 'one semantic function per argument' constraint. This will constitute the topic of the next section.

3 One semantic argument per clause

FG, like most other theoretical frameworks, recognizes that real world situations and events may be conceived of simultaneously on a number of conceptual planes. However, it holds that only one of the several conceptualizations is actually coded linguistically. Hence, each argument is taken to bear only one SF, and conversely each SF is assigned only to one argument. Jackendoff, on the other hand, seeks to capture in his conceptual structures the alternative conceptualizations that may underlie a single real world state of affairs. Therefore he allows both a single argument to bear multiple θ -roles and also the same θ -role to be shared by several arguments. The second of these situations is taken to hold in examples such as those in (48).

- (48) a. The box has books in it.
 b. Bill brought/carried some books with him.
 c. The list includes my name on it.

Jackendoff views all the pronominal expressions in (48) as bearing the same θ -role as the first argument.

As for multiple θ -role assignment, this may involve θ -roles of the same tier or more typically of different tiers. Both types of multiple θ -role assignment may be illustrated on the basis of verbs of transfer which constitute a prototypical example of the co-existing conceptualizations of a particular situation or event. Consider the predicates *buy* and *sell* in (49).

- (49) a. Ate bought a model Bugatti from Peter for 200 guilders.
 b. Peter sold a model Bugatti to Ate for 200 guilders.

Both of the events in (49) involve a primary transfer of goods -the model Bugatti - and a counter transfer of money - the 200 guilders. On the thematic tier, the direction of the primary transfer identifies *Peter* as the Source and *Ate* as the Goal and the *model Bugatti* as the Theme. From the point of view of the counter-transfer, on the other hand, *Ate* is the Source, *Peter* is the Goal and *the 200 guilders* is the Theme. Moreover, if one also considers the instigator of the transfer, i.e. the Agent, then *Ate* is the Agent with *buy* and *Peter* is the Agent with *sell*. Thus on the thematic tier both *Ate* and *Peter* may be seen to bear three θ -roles: Agent, Source and Goal. In addition, on the action tier, they bear the Actor θ -role with the *model Bugatti* being the patient.

The existence of multiple θ -roles on the thematic tier constitutes the exception rather than the norm. By contrast, apart from stative predications specifying purely location, all predications are assumed to have both thematic and action tier θ -roles. The action tier θ -roles are not predictable from the thematic θ -roles. The Theme may be an Actor or Patient, and so may the Source or Goal. They may also lack action tier counterparts altogether. The Agent, on the other hand, is always an Actor, or in the case of verbs such as *resist*, the Reactor.

The fact that there is no one-to-one correlation between the thematic and action tier θ -roles is considered by Jackendoff as an argument for recognizing both. Jackendoff maintains that there is no basis for treating either the thematic or the action tier θ -roles as primary at the level of conceptual structure. Both simply co-exist. This does not mean, however, that the θ -roles borne by an argument are not differentiated at the level of surface linguistic structure. On the contrary, of the multiple θ -roles that an argument may bear in conceptual structure, Jackendoff takes only one to be of relevance for the syntax. The θ -role in question is termed the *dominant* θ -role. Jackendoff's position is thus similar to the FG one, the major difference being that FG treats the SF that has morpho-syntactic consequences for the grammar as the only SF that a given argument bears, while Jackendoff considers it to be the dominant θ -role of a set of θ -roles. We will see directly below that the dominant θ -roles thus established are primarily those of the action tier, which vindicates the action-oriented typology of the FG linguistically based SFs.

4. The relationship between SRs and surface structure.

The requirement that the postulated SRs have systematic repercussions in the grammar is adopted in one form or another in most if not all theoretical frameworks including FG and Jackendoff's model of grammar. There are, however, vast differences in the range and type of formal properties that are taken to be associated with or considered to be manifestations of the recognized SRs. In theory, practically any morphological, syntactic, semantic or pragmatic similarity (or conversely discrepancy) in the behavioural patterns or co-occurrence possibilities

of two terms can be used as evidence for or against a common SR. Therefore, on its own, the principle of grammaticalization as a constraint on the nature of possible SRs is virtually vacuous. It acquires substance only if coupled with other independently based principles specifying the parameters deemed relevant for the typology of SRs adhered to in a given theoretical framework. In the case of FG the major principles in question are those defining the typology of SoA and the postulated interplay between SFs and syntactic functions captured in the FG Semantic Function Hierarchy (SFH). In Jackendoff's framework, on the other hand, since the θ -roles are not tied to a typology of SoAs, the choice of dominant θ -role is determined solely by his version of the relationship between θ -roles and syntactic positions. As we shall see below, the account of the semantic-syntax correspondence offered by FG and Jackendoff is rather similar. Again we will begin with the FG approach.

4.1 The FG Semantic Function Hierarchy

In FG arguments are associated with SFs in the lexical entries for each predicate which take the form of predicate frames such as the one in (50).

(50) $\text{give}_v(x_1: \langle \text{anim} \rangle (x_1))_{\text{Ag}} (x_2)_{\text{Go}} (x_3: \langle \text{anim} \rangle (x_3))_{\text{Rec}}$

For languages which have no syntactic function assignment, the predicate-argument structure specified in the predicate frame coincides with the syntactic structure, barring matters of morphological form and order. For languages which have syntactic function assignment, on the other hand, the relationship between SFs and syntactic functions is captured in the SFH, the original formulation of which as presented in Dik (1978) is shown in (51).

(51) The Semantic Function Hierarchy

	Ag	>	Go	>	Rec	>	Ben	>	Instr	>	Loc	>	Temp
subject	+	>	+	>	+	>	+	>	+	>	+	>	+
object		>	+	>	+	>	+	>	+	>	+	>	+

The SFH is conceived of as a language universal (for languages displaying syntactic function assignment), with different cut-off points for different languages. It predicts a decrease both in the ease with which a given SF can be selected for subject or object and its likelihood of being thus chosen, as we proceed from left to right. Thus the Agent is predicted as being the most likely and frequent candidate for subject, and the Goal for direct object; the next least marked choice for subject or object is the Recipient, then the Beneficiary, and so on. The SFH is interpreted as reflecting the continuity principle whereby only continuous segments of the hierarchy are accessible to subject or object. This means that if in a given language an oblique constituent, say a Beneficiary, can be subjectivized or objectivized, then so should the Recipient and Goal. Since the SFH in (50) caters only for action SoAs, in order to accommodate the full range of SoAs recognized in FG, Dik (1989) substitutes the first position on the SFH by the set of mutually exclusive A1 SFs, i.e. Agent, Force, Processed, Positioner and Zero. Analogous language specific extensions of the second and third positions on the SFH are also necessary to account for the subset of A2 and A3 SFs that are eligible for syntactic function assignment. In terms of the restrictive approach to syntactic functions

adopted in FG (see Dik 1989, Siewierska 1991) in English, for example, of the various SFs that may be borne by the second argument only Goal, Goal[Experiencer] and Reference occur as either subject or object. And the Recipient is the only A3 SF open to either subject or object assignment provided that pairs of clauses such as the ones in (52) are analyzed in terms of predicate formation (which is allowed to change SFs) rather than syntactic function assignment.

- (52) a. The man made a barn (out) of the house.
 b. The man made the house a barn.

Accordingly the expanded SFH for English would look something like the one in (53) below.

(53)	A ¹	>	A ²	>	A ³	>	?Rec	>	Ben
	Ag		Goal		Rec				
	Pos		Goal[Exp]		Rec[Exp]				
	Fo		Ref						
	Proc								
	Zero								

Whether the Recipient should feature twice in the SFH, both as an argument and as a satellite depends on whether the Recipient of verbs such as *throw* and *send* is considered to be optional arguments or satellites. In the former case the Beneficiary and in the latter the Recipient and Beneficiary are under the FG analysis the only satellite SFs open to syntactic function assignment in English.

4.2 Jackendoff's Thematic and Linking Hierarchies

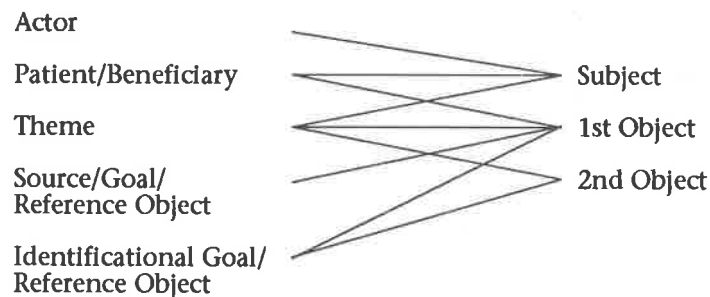
The FG SFH specifies both the set of SFs accessible to subject and object assignment and the permissible alignments of SFs and syntactic functions. In Jackendoff's model of grammar, on the other hand, the above two functions of the SFH are factored out into two separate hierarchies: a Thematic Hierarchy (TH) which specifies the θ -roles that are linked to syntactic positions, and a Linking Hierarchy (LH) which specifies the nature of this linkage. The TH is:

- (54) Actor > Pat/Ben > Theme > Loc/Goal/Source

This hierarchy is used by Jackendoff to determine which from a set of multiple θ -roles is the dominant θ -role, i.e. the θ -role linked to a syntactic position. The dominant θ -role is taken to be the θ -role highest in the TH. The TH is to be read as follows: if one of the θ -roles borne by an argument is the Actor, it will be the dominant θ -role; if there is no Actor but a Patient/Beneficiary, then whichever of these is present will constitute the dominant θ -role; if there is neither an Actor nor a Patient/Beneficiary but a Theme, the dominant θ -role will be the Theme, and so on.

The LH which expresses the relationship between dominant θ -roles and syntactic positions is as shown in (55).

(55) The Linking Hierarchy



The syntactic domain of the LH is not the same as that of the SFH. The three syntactic positions in the LH correspond to the three argument positions of FG, i.e. A1, A2 and A3 which are expressed as NPs rather than to the FG syntactic functions. The FG syntactic functions cover only the subset of A1, A2 and A3 NP arguments that participate in the passive and dative-shift oppositions which in FG define subject and object assignment respectively. Therefore the range of NP constituents encompassed by the LH is much wider than that of the SFH. The LH, however, unlike the FG SFH, pertains only to arguments. The relationship between what Jackendoff considers to be satellites (which incidently do not always coincide with the FG satellites) and their syntactic realization is dealt with by Jackendoff in terms of a separate body of rules.

The LH states that the Actor, like the FG A1 SFs, if present is an external argument. The passive *by*-phrase is treated by Jackendoff as an adjunct, i.e. a satellite which is co-indexed with an implicit Actor in the conceptual structure. Therefore, unlike in FG, the association of an overt argument Actor with the subject is not a preference rule, but an absolute requirement. The Patient/Beneficiary may be either an external argument or a first object. The Theme may occur in any of the three syntactic positions. The locational θ -roles are split up in terms of the spatial and identificational semantic fields due to the fact that the linking possibilities of the two differ. The spatial Source, Goal and Reference Object occupy only the first object, while the Identificational Goal and Reference Object may be linked to both the first and second Object.

The linking relations concerning the Actor, Patient/Beneficiary and Theme can be read off the TH in a similar fashion to the FG SFH. But those involving the other θ -roles cannot. Note in particular that the θ -roles to the right of the Theme in the TH in (54) are never associated with the external argument as the dominant θ -roles, which is what precludes subsuming the two hierarchies into one.

From the FG perspective, the most striking aspect of the semantic-syntax correspondence captured in Jackendoff's TH and LH is that the θ -roles found to be manifest in the syntax are basically those of the action tier, which as we have seen, correspond to the FG A1 SFs or to the Goal. Note that the Agent is not even included in the hierarchies, the reason for this being that it invariably coincides with either the Actor or the Patient/Beneficiary.

The fact that it is the action tier rather than the thematic tier that is reflected by constant syntactic positions can be appreciated on the basis of the examples in (56); the θ -roles of the thematic tier are given in normal type and those of the action tier are in bold.

- (56) a. Emily (**Agent/Actor**) threw the ball (**Theme/Patient**).
 b. The car (**Theme/Actor**) hit the fence (**Goal/Patient**).
 c. The teacher (**Theme/Actor**) left the classroom (**Source**).
 d. The smoke (**Theme/Actor**) entered the chamber (**Goal**).
 e. Max (**Agent/Actor**) hit the cat (**Goal/Patient**).
 f. The sodium (**Source/Actor**) emitted electrons (**Theme**).
 g. Larry (**Goal/Beneficiary**) received a present (**Theme**).
 h. Sally (**Source/Patient**) lost the money (**Theme**).
 i. Robert (**Agent/Actor**) emptied the sink (**Source/Patient**).
 j. Vicky (**Agent/Source/Actor**) gave Ted (**Goal/Beneficiary**) the photographs (**Theme**).
 k. Bill (**Agent/Actor**) lost Harry (**Source/Patient**) his job (**Theme**).
 l. The book (**Agent/Actor**) made Rushdie (**Theme/Patient**) a fugitive (**Identificational Goal**).

As shown in the above examples, the Agent is invariably the subject irrespective of the nature of the θ -role borne by the other constituent or constituents, Theme as in (56a), Goal as in (56e) or Source/Patient as in (56i). However, as evinced by (56c) and (56h), in predications containing a Theme and Source, either the Theme may be subject as in (56c) or the Source as in (56h). The same applies to predications with a Theme and Goal, as demonstrated in (56b), (56d) and (56g). And likewise with respect to the object. In (56j) the Goal rather than the Theme bears the object function, while in (56l) the reverse is the case.

The action tier θ -roles, by contrast, display a regular alignment with syntactic positions. If there is an Actor, it is invariably the subject. If there are both Actor and Patient/Beneficiary, the latter is invariably the object. If there is a Patient/Beneficiary and no Actor, the Patient/Beneficiary bears the subject function. It is important to note that the Source in (56c), Goal in (56d) and (56l) and Theme in (56f), (56g), (56h), (56j) and (56k) lack action tier θ -roles. This is the reason for the presence of the non-action tier θ -roles in the LH. In accordance with the LH, the Source in (56c), Goal in (56d) and Theme in (56f), (56g) and (56h) are mapped onto the first object, and the Theme in (56h) and (56k) and the Goal in (56l) onto the second object. Of the above mappings the mapping of the Source in (56c), Goal in (56d) and Source/Patient in (56j) with the first object and that of the Theme in (56k) and Goal in (56l) with the second object are not covered by the FG SFH.

Turning to the syntactic linking possibilities of the dominant θ -roles of the thematic tier, the Theme is the only θ -role that is stated as being associated with the subject. This restriction on the θ -role of the subject is not unproblematic. It holds well for predications analyzed in terms of the conceptual state functions BE, ORIENT and EXT most, of which possess only one NP argument corresponding to the FG Zero function. Some relevant examples are given in (57) below.

- (57) a. The dingo (**Theme**) inhabits Australia (**Loc**).
 b. The triangle (**Theme**) consists of three lines (**Reference Object**).
 c. Three lines (**Theme**) form a triangle (**Reference Object**).
 d. Sandra (**Theme**) is a doctor (**Identificational Goal**).
 e. The light (**Theme**) is red (**Reference Object**).
 f. The sign (**Theme**) points to New York (**Goal**).
 g. The road (**Theme**) goes from New York (**Source**) to San Francisco (**Goal**).

However, what about the examples in (58) below, in which the subject is not a Theme?

- (58) a. The sink (Source/?Patient) emptied.
 b. The tank (Goal/?Patient) filled.
 c. The garden (Loc/?Patient) is swarming with bees (Theme adjunct).
 d. The circle (Loc/?Patient) contains a dot (Theme).
 e. John (Loc/?Beneficiary) has a book (Theme).

The only way such examples can be accommodated by the LH is if the subject arguments, in addition to their thematic tier roles are taken to possess an action tier θ -role. I presume that the θ -role in question would have to be the Patient or in the case of *have* the Beneficiary. Note that if no action tier θ -roles are posited, (58d) and (58e) would constitute a double violation of the LH, since not only does the subject bear a θ -role not linked with the subject, but also this θ -role is selected for subject in preference to an explicit argument Theme. Jackendoff (1990:180) admits that his action tier is not yet well articulated. The major issue that needs to be established is precisely which predications have an action tier and which do not. Contrary to what one could expect, the presence of an action tier is not dependent on the State vs Event distinction. And Jackendoff is reluctant to restrict it to passivizable verbs, or even to posit an action tier for every passivizable verb. The former would in effect reduce the action tier to the range of constituents covered by FG subject assignment which, as suggested above, would complicate the linking correspondences between the θ -roles of the thematic tier and syntactic positions.

In FG the above problem with the linking to subject does not arise by virtue of the fact that the A1 SFs are unique to first arguments. Therefore any of the A1 SFs in intransitive predications are assigned subject by default. The linking to object is also simpler in FG owing to the distinction between argument positions and syntactic functions which reduces the number and nature of the correspondences that need to be captured by the SFH. What is an issue for FG, and other frameworks that posit similar SFHs, is how to preclude the SFH from overgenerating. The expanded SFH for English presented earlier in (53) captures the eligibility of SFs for subject and object assignment. However, it also allows for object assignments that are ungrammatical. Note that none of the italicized phrases in the examples in (59) below can function as the subject of a passive clause.

- (59) a. Bill lost *Harry* (?Goal/?Rec/?Ben) his job (?Goal/?Ref).
 b. The book will cost *you* (?Goal/Ref) \$30 (?Ref).
 c. The job took *Harry* (?Goal/?Ref) three days (?Ref).
 d. \$100 will buy *your husband* (?Goal/?Rec/Ref) a new machine (?Goal/?Ref).
 e. I envy *Mark* (?Goal) his disposition (?Ref).

As far as I can see, of the argument SFs recognized in FG only the Goal, Recipient or Reference could be assigned to any of the above arguments. All three SFs are predicated as being eligible for subject assignment. Yet in these cases they are not.⁴

4. Lachlan Mackenzie (private communications) suggests that the A3 of the verbs in (59) could be marked in the lexicon for syntactic function.

In sum, the FG SFH and Jackendoff's LH are both still in need of further elaboration. Both are offered as primary expositions rather than full statements of the semantics-syntax correspondence, and this is also the spirit in which I have presented them. In comparing the two approaches, I hope to have renewed some interest in pursuing this line of inquiry within the context of FG.

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