Semantic Roles and Diatheses for Functional Discourse Plans

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Abstract. In this paper, we elaborate the notion of semantic diathesis used in the formal language of discourse plans proposed and described in [Dik03a, Dik03b]. The modern understanding of diathesis builds on the pioneer work of Mel'čuk and Xolodovič [MX70] who formalized it as mapping between the set of semantic and the set of deep-syntactic actants of a given lexeme. Recently, Padučeva [Pad97, Pad02] has linked diathesis to communicative structure. We mainly follow her account, however, with the following important differences: a) instead of unstructured taxonomic characterics, we use more elaborate semantic typing with inheritance; b) rather than relying on lexical definitions, we establish basic semantic roles based on a small set of cognitively grounded proto-situations; c) a different system of communicative ranks is used; d) which is the most important, in our approach, semantic diatheses are a means of semantic and discourse planning rather than a means of lexical derivation.

Семантические роли и диатезы для функциональных дискурсивных планов. В настоящей статье мы уточняем понятие семантической диатезы, как оно используется в формальном языке дискурсивных планов, предлагаемом в работах [Dik03a, Dik03b]. Современное понимание диатезы восходит к новаторской работе Мельчука и Холодовича [MX70], которые формально определили диатезу как соответствие между семантическими и глубинно-синтаксическими актантами данной лексемы. В недавних работах Падучевой [Pad97, Pad02] вводится понятие семантической диатезы, определяемое в терминах коммуникативных рангов. Мы применяем весьма близкий подход, но со следующими принципиальными отличиями: a) слабо структурированные таксономические характеристики заменяются более гибкой и точной системой семантических типов с отношением наследования; b) основные семантические роли определяются не на основе лексикографических толкований, а исходя из небольшого набора когнитивно обусловленных прото-ситуаций; c) применяется иная система коммуникативных рангов; d) что важнее всего, в нашем подходе семантические диатезы являются средством семантического и дискурсивного планирования, а не средством лексической деривации.

1 Semantic types and compositionality

DISCOURSE PLANS described in [Dik03a, Dik03b] represent the course of event conceptualization by a speaker. They are *functional* in the following sense. Plans are *terms*, i. e. tree-like functional compositional structures. *All* elements (*semantemes*) of these structures, with the only exception of special empty primitives (zero values, empty lists) have arguments and are functions. Ordered naturally top to bottom, left to right, the nodes of a plan form the plan's *sequence of points*.

Semantemes have functional types, defined from primitive types, of which there are four *initial basic types*: $\mathbf{n}$ (nominators, i. e. 'things' in the most general sense), $\mathbf{s}$ (sententiators, i. e. 'actions', 'processes', 'events', 'facts', etc.), $\mathbf{q}$ (qualifiers, 'meanings qualifying nominators'), and $\mathbf{c}$ (circumscriptors, 'meanings qualifying sententiators and qualifiers'). Basic types are extended by their specific instances. Thus the complete set of basic types is partially ordered under the *specific / generic relation* $\prec$. For instance, in §3 we will see the following types: $\mathbf{n_a} \prec \mathbf{n}$ (animated nominator, e. g. $\langle\!\langle$*hearer$^{\mathbf{n_a}}\rangle\!\rangle$, $\langle\!\langle$serpent$^{\mathbf{n_a}}\rangle\!\rangle$), $\mathbf{n_{mass}} \prec \mathbf{n}$ (mass nominator, e. g. $\langle\!\langle$TV$^{\mathbf{n_{mass}}}\rangle\!\rangle$, $\langle\!\langle$milk$^{\mathbf{n_{mass}}}\rangle\!\rangle$), $\mathbf{q_{qnt-mass}} \prec \mathbf{q_{qnt}} \prec \mathbf{q}$ (quantifier of mass nominators, e. g. $\langle\!\langle$much$^{\mathbf{q_{qnt-mass}}}\rangle\!\rangle$), $\mathbf{s_{attr}} \prec \mathbf{s}$, $\mathbf{s_{percep}} \prec \mathbf{s_{eff}} \prec \mathbf{s}$ (situations of attribution, direct perception and effect, e. g. $\langle\!\langle$be$_{\text{attr}}{}^{\mathbf{s_{attr}}}\rangle\!\rangle$, $\langle\!\langle$kiss$^{\mathbf{s_{eff}}}\rangle\!\rangle$, $\langle\!\langle$watch$^{\mathbf{s_{percep}}}\rangle\!\rangle$). These basic types are similar to the conventional classes of semantic compatibility (cf. *sočetaemost'* of [Apr74], *T-category* of

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[Pad97, Pad98], or *semantic class* of [Mel04a]). The difference is that the basic types of discourse plans obey strict compositionality rules (see below).

Every basic type $\mathbf{u}$ has a corresponding *optional* version $\mathbf{u}^{(0)}$ signifying optional arguments of this type. In addition, circumscriptor and qualifier types have *iterative* versions $\mathbf{u}^{(\omega)}$ (zero or more objects of type $\mathbf{u}$). Together, basic, optional and iterative types constitute the set of *primitive* types. Finally, the primitive types serve to form complex *functional types* $(\mathbf{u_1} \dots \mathbf{u_k} \rightarrow \mathbf{v})$ ($\mathbf{u_1} \dots \mathbf{u_k}$ and $\mathbf{v}$ being respectively the argument and value types). For instance, the situation ⟪pour out⟫ has the type $\left(\mathbf{c}^{(\omega)}\mathbf{n_a}\mathbf{n}^{(0)}_{\mathbf{lqm}}\mathbf{n_{ctr}} \rightarrow \mathbf{s}\right)$, where $\mathbf{n}^{(0)}_{\mathbf{lqm}} \prec \mathbf{n_{mass}} \prec \mathbf{n}$ is the optional liquid matter nominator and $\mathbf{n_{ctr}} \prec \mathbf{n}$ is the container nominator type.

Compositionality is restricted by the condition that a subplan with the value of type $\mathbf{t_1}$ may be substituted in another plan of type $(\mathbf{u_1}\bar{\mathbf{u}} \rightarrow \mathbf{v})$ in the place of the argument of type $\mathbf{u_1}$, to obtain a composite plan of type $(\bar{\mathbf{u}} \rightarrow \mathbf{v})$, only if $\mathbf{u_1} = \mathbf{t_2}$ or $\mathbf{u_1} = \mathbf{t}^{(0)}_{\mathbf{2}}$, and either $\mathbf{t_1} = \mathbf{t_2}$ or $\mathbf{t_1}$ is a case of $\mathbf{t_2}$ (denoted $\mathbf{t_1} \preceq \mathbf{t_2}$). In classical lexicographical terms, this means that the class of semantic compatibility of $\mathbf{u_1}$ is a superclass of that of $\mathbf{t_1}$, or that $\mathbf{u_1}$ is optional $\mathbf{t_1}$.

2 Roles of situation actants

We distinguish traditionally two basic classes of semantemes: *situations* and *monads*. A situation is a function, with one or more arguments, called *actants* and identified by their *(semantic) roles* (different arguments of the same situation have different roles). Arguments without roles are called *circumstantials* (cf. §2.3), and semantemes without actants are called monads. Most verbs express situations: *John*$_{\text{SBJ}}$ *gave the letter*$_{\text{OBJ}}$ *to Fred*$_{\text{DST}}$; Fr. *Il*$_{\text{SBJ}}$ *me*$_{\text{OBJ}}$ *dérange par son chant*$_{\text{INS}}$ /He disturbs me by his singing/. By contrast, most names, adjectives and adverbs do not express situations, so that their meanings are represented by monads. The most generic type $\mathbf{t}_C$ of a circumstantial C of a situation S is uniquely determined by the value type $\mathbf{t}_S$ of S. Nominator-value semantemes ($\mathbf{t}_S = \mathbf{n}$) have qualifier-type circumstantials (i.e., $\mathbf{t}_C = \mathbf{q}$). For all other types of semantemes, circumstantials are circumscriptors ($\mathbf{t}_C = \mathbf{c}$). Grouping the circumstantials of a semanteme S into a list, we obtain its generic circumstantial argument of the corresponding iterative type: $\mathbf{q}^{(\omega)}$ for $\mathbf{n}$-semantemes and $\mathbf{c}^{(\omega)}$ for semantemes of other value types. For instance, the generic type of verbal situations is $\left(\mathbf{c}^{(\omega)}\bar{\mathbf{u}} \rightarrow \mathbf{s}\right)$, where $\bar{\mathbf{u}}$ represents the sequence of actant types of a situation.

A situation is specified by its *profile*, which includes the situation functor, the argument types, the situation value type and the role of each actant. Thus, the additional feature provided by our account is that actants may be decorated by optional types $\mathbf{u}^{(0)}$ and in this way obtain the status of optional actants. E. g., the situations *give* and *déranger* have the profiles: $\left\langle\!\left\langle \text{give } \left(\text{SBJ}^{\mathbf{n_a}}, \text{OBJ}^{\mathbf{n}}, \text{RCP}^{\mathbf{n_a}}\right)^{\mathbf{s_{caus-mov}}} \right\rangle\!\right\rangle$ and $\left\langle\!\left\langle \text{déranger } \left(\text{SBJ}^{\mathbf{n}}, \text{OBJ}^{\mathbf{n_a}}, \text{INS}^{\mathbf{n}^{(0)}}\right)^{\mathbf{s_{eff}}} \right\rangle\!\right\rangle$. Given such a profile, one can easily reconstruct the complete functional type of the situation. For instance, the complete type of ⟪give⟫ is $\left(\mathbf{c}^{(\omega)}\mathbf{n_a}\mathbf{n}\mathbf{n_a} \rightarrow \mathbf{s_{caus-mov}}\right)$ ($\mathbf{s_{caus-mov}} \prec \mathbf{s_{eff}}$ is the type of 'caused movement' situations; $\mathbf{c}^{(\omega)}$ stands for a possibly empty list of circumscriptors: circumstantial arguments of ⟪give⟫).

A formal definition of discourse plans does not require any preliminary definition of roles, types and situation actants, which can be designated as DP signature elements. However, to develop these structures in practice, one must dispose of *linguistic criteria* for assigning particular roles and types to situation arguments and ultimately to decide, for a given situation, what its arguments are, and which among them are actants. Since the 1970s, these criteria are in the center of lively debates (see [Mel04a, Mel04b] for details). Essentially, there are two different approaches, both originating from the pioneer works of Fillmore [Fil68, Fil77] on Case Grammar, and of Gruber [Gru65]. The one, *functional syntactic* approach tries to deduce actants and their roles from the universals of case/adposition marking of surface-syntactic verb arguments. The other, *lexicographic* approach (cf. [Apr74, Mel04a]) derives the actants and roles from syntactic government patterns and from lexicographic definitions. The main drawback of the first approach is its inherent incompleteness. The second suffers from the absence of a minimal common

base of lexicographic definitions (whence the overwhelming abundance and ambiguity of roles proposed by different authors). Below, we outline a different way to approach this problem: one founded on a cognitive hypothesis consistent with both of these approaches.

We suppose that semantic roles originate from the profiles of several cognitively grounded proto-situations (see §2.2). In addition, roles may be assigned as a result of applying diathetic shifts (§3). Meanwhile, to define diatheses and diathetic shifts, we need some more notions.

2.1 Communicative ranks

Two main instruments of event conceptualization are (1) choosing semantemes from the dictionary to reference an event and its participants and (2) assigning the speaker's point of view on the relative salience of participants (COMMUNICATIVE STRUCTURE). Concerning communicative structure, we mainly follow the account of [Pad97, Pad02], but with significant alterations due to the data and discussion in [Lam94]. The minimal communicative structure in a plan, which we dub *communicative group*, coincides with a situation, and consists of its functor and *all* arguments (not exclusively actants). Each element of a communicative group is assigned a *communicative rank*. We distinguish two THEMATIC ranks: *topic continuation* and *implied* and three RHEMATIC ranks: *focus*, *background* and *periphery*.

Topic continuation (denoted $\vec{\mathsf{T}}$). Assigned to the member of the communicative group to which the new (rhematic) information will be relativized. It corresponds to a referent initialized or previously evoked in the discourse context, which becomes, in the current plan point, the main entity under consideration. E. g.: *Those girls, they*$_{\vec{\mathsf{T}}}$ *giggle when they see me*.

Implied (O). Assigned to a member of a communicative group if its referent is embedded and extremely salient due to deixis, anaphora, etc. (often it is elided in the surface form). E. g.: *Remember Mark?* (= *Do you*$_{\mathsf{O}}$ *remember Mark?*).

Focus ($\odot$). Assigned to the member of a group which conveys the new (as opposed to given or presupposed) information (cf. [Lam94, §2.3 and esp. §5.1]). See example below.

Background ($\oplus$). Assigned to those members of a group which convey other pertinent information (and so cannot be dismissed). E. g.: *I*$_{\vec{\mathsf{T}}}$ *touched the stick*$_{\oplus}$ *against the fence*$_{\odot}$.

Periphery ($\ominus$). Assigned to the members of a group which become non-salient and should be dismissed. E. g. in the answer to *Do you sell your car? – I'm sorry, it's already been bought*, the figure of the buyer obtains the rank $\ominus$.

Rank assignments obey certain constraints:

1. At least one group member should obtain a rhematic rank (= there must be some new information in the utterance);
2. there should be exactly one focused member [1];
3. the semanteme functor may obtain only $\odot$, $\oplus$ or O;
4. no more than one member may have the rank $\vec{\mathsf{T}}$ (although there may be multiple Os).

2.2 Proto-situations and proto-roles

We believe that there is a small base of PROTO-SITUATIONS stemming from cognitive origins. Every concrete situation obtains its profile through projection onto one proto-situation (or more, in complex cases). Through this projection, the situation inherits the cognitive construal and thus the roles of its proto-situation (this inheritance is denoted the same way as for semantic types, $\prec$). It is not our goal in this short paper to elaborate such a base, or to found its completeness. We just illustrate the principle by a representative sample of proto-situations whose cognitive nature is rather evident.

All proto-situations in the sample have a selected actant which is the cognitive FIGURE. Its semantic proto-role is SBJ. The situation functor and the other actants constitute the GROUND.

[1] We do not discuss here the case of presentational constructions classified in [Lam94, §5.2.4] as communicative groups with neutralized focus.

Focalized predication, with the *ground* consisting only of the functor: $\langle\!\langle functor(\text{SBJ}^{\mathbf{n}})^{\mathbf{s_{fpd}}} \rangle\!\rangle$. E. g. *She*$_{\text{SBJ}}$ *cheered up.*

Attribution is one in which the only *ground* actant is some attribute of SBJ assigned by the situation. The role of this actant is DFS (*definiens*), and may have any type of nominator attribute: $\langle\!\langle functor(\text{SBJ}^{\mathbf{n}}, \text{DFS}^{\mathbf{n_u}})^{\mathbf{s_{att}}} \rangle\!\rangle$ ($\mathbf{n_u}$: a nominator attribute type). E. g. *She*$_{\text{SBJ}}$ *is busy*$_{\text{DFS}}$; Rus. *On*$_{\text{SBJ}}$ *stal vračom*$_{\text{DFS}}$ /He.NOM became doctor.INSTR/.

Movement, representing any evolution. It has three optional *ground* actants whose roles are ORIG (origin, initial point), PTH (path), and DST (destination, final point): $\left\langle\!\left\langle functor(\text{SBJ}^{\mathbf{n}}, \text{ORIG}^{\mathbf{n}^{(0)}}, \text{PTH}^{\mathbf{n}^{(0)}}, \text{DST}^{\mathbf{n}^{(0)}})^{\mathbf{s_{mov}}} \right\rangle\!\right\rangle$ (at least one of these optional actants must be present). E. g. Rus. *Lodka*$_{\text{SBJ}}$ *otčalila ot pristani*$_{\text{ORIG}}$ /Boat.NOM unberthed from pier.GEN/; *This fabric*$_{\text{SBJ}}$ *clings to the body*$_{\text{DST}}$.

Effect, representing a dynamic cognitive state, in which an active *force* is applied to a passive *undergoer*, possibly with the help of a *mediator* (*instrument*). This proto-situation has two versions:

Nominative: $\left\langle\!\left\langle functor(\text{SBJ}^{\mathbf{n}}, \text{INS}^{\mathbf{n}^{(0)}}, \text{OBJ}^{\mathbf{n}^{(0)}})^{\mathbf{s_{nef}}} \right\rangle\!\right\rangle$, in which the *force* is represented by the SBJ role actant and the *undergoer* is represented by the OBJ actant. E. g. *Wilhelm Tell*$_{\text{SBJ}}$ *shot Gessner*$_{\text{OBJ}}$ *with an arrow*$_{\text{INS}}$; *The stag*$_{\text{SBJ}}$ *sprouted horns*$_{\text{OBJ}}$.

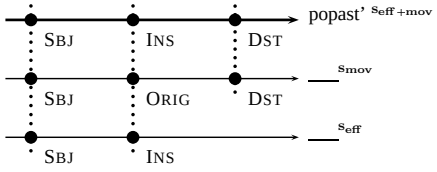
Ergative: $\left\langle\!\left\langle functor(\text{AGT}^{\mathbf{n_a}^{(0)}}, \text{INS}^{\mathbf{n}^{(0)}}, \text{SBJ}^{\mathbf{n}})^{\mathbf{s_{eef}}} \right\rangle\!\right\rangle$, in which the *force* is represented by the actant with the role AGT of the animated nominator type and the *undergoer* is represented by the SBJ actant. The examples of this kind are at best rare in Russian and English, but abundant in ergative languages, e. g. Alutor *Qutkin*$_{j}$*n*$_{j}$*aqu-nak*$_{\text{AGT}}$ *ɣ-akmi.l-lin uttə-ʔut*$_{\text{SBJ}}$ /Qutkinnjaqu-ERG+SG RES-take-RES+3SG.P club-NOM+SG = Qutkinjnjaqu took a club/ [KKM00, p. 253].

Some simple projections are 'metaphorical extensions' of proto-situations. E. g. situations of direct perception are (in many languages) a species of effect; the normal situation of possession in English (X_{SBJ} *has* Y_{OBJ}) is a species of effect, while in Russian (*u* X*-a*$_{\text{LOC}}$ *jest'* Y_{SBJ}, /at X.GEN is Y.NOM/) it is a species of stative location (see below); the English benefactive construction (*give* X_{OBJ} *to* Y_{DST}, etc.) is a species of (caused) movement, while the Japanese one is arguably a species of (caused) stative location (X_{LOC} *ni* Y_{OBJ} *o kudasaru,* /X LOC/DAT Y ACC give.HON/). The above basis of proto-situations is probably incomplete. For two extremely important classes of situations the question remains open whether they are basic proto-situations or just their derivative abstract situations:

Modal / phasal situations ($\mathbf{s_{mph}}$, a tentative species of $\mathbf{s_{nef}}$): $\langle\!\langle functor(\text{SBJ}^{\mathbf{n}}, \text{OBV}^{\mathbf{n_s}})^{\mathbf{s_{mph}}} \rangle\!\rangle$. OBV $\overset{?}{\prec}$ OBJ is the *goal*, or *objective* of the situation, and $\mathbf{n_s}$ is a 'deverbal noun' type, specialized in English by $\mathbf{n_{inf}}$ (infinitive). E. g. I_{SBJ} *must* $\{$*help you*$\}_{\text{OBV}}$; *She*$_{\text{SBJ}}$ *began to wonder*$_{\text{OBV}}$; *They*$_{\text{SBJ}}$ *managed to* $\{$*get through*$\}_{\text{OBV}}$.

Stative location ($\mathbf{s_{loc}}$, a tentative species of $\mathbf{s_{attr}}$): $\langle\!\langle functor(\text{SBJ}^{\mathbf{n}}, \text{LOC}^{\mathbf{n_l}})^{\mathbf{s_{loc}}} \rangle\!\rangle$. LOC $\overset{?}{\prec}$ DFS is the *locus* of the situation and has the type $\mathbf{n_l}$ (nominator of place): *It*$_{\text{SBJ}}$ *happened in Paris*$_{\text{LOC}}$ */ yesterday*$_{\text{TMP}\prec\text{LOC}}$; Jap. $\{$*Takusan no o-tera*$\}_{\text{SBJ}}$ *ga Nikk*$\bar{o}_{\text{LOC}}$ *ni arimasu.* /Many GEN temple NOM Nikko LOC is = Nikko has many temples/.

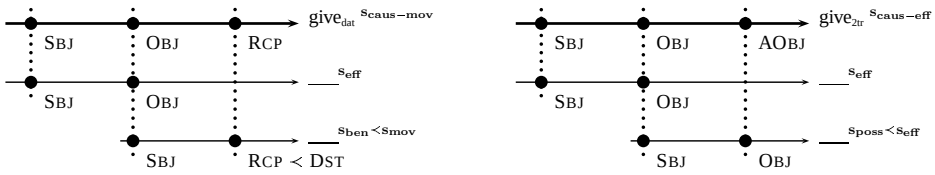
Many concrete situations are projected onto more than one proto-situation. A rather characteristic example of this kind of situations is the Russian verb *popast'* /hit/, which superposes movement onto effect: *Wil'gel'm Tell' popal streloj iz arbaleta prɪa̋mo w ɪa̋bloko* /Wilhelm Tell.NOM hit arrow.INSTR out-of crossbow.GEN directly into apple.ACC/:[2]



The above projection superposes proto-situations while mapping SBJ onto SBJ. This, however, should not always be the case. There is an extremely broad class of *causative* situations, where the

[2]The emergence, in Finnish, of a similar, albeit much more systematic pattern of construal superposition is observed in the article [KL04].

undergoer of an effect proto-situation is mapped onto the subject of another proto-situation: modal / phasal (e. g. Rus. *On zastavil menıa̯ ujti* /He.NOM forced I.ACC go.INF/, cf. *Ia̯ dolžen ujti* /I.ACC must go.INF/), attribution (Pol. *IBM mianował go dyrektorem* /IBM.NOM appointed he.ACC director.INSTR/, cf. *On je dyrektorem* /He.NOM is director.INSTR/), stative location (*I put the book on the shelf*, cf. *The book is on the shelf*). As to caused movement and caused effect, they are best exemplified by the case of English dative alternation: *Eve gave the apple to Adam* vs. *Eve gave Adam the apple*. The difference between these two sentences is somewhat subtle and can be loosely described as follows (cf. [But04, p. 100] and references cited therein): in the former sentence, Eve causes the apple to change hands and *pass to* Adam, while in the latter she causes Adam to *have* the apple. Therefore, the first case is that of *caused movement*, and the second case is that of *caused effect*:



2.3 Circumstantials vs. actants

Whereas the profile of a given situation S entirely defines the logical meaning of every actant X of S through X's role, the only semantic information in the profile regarding circumstantials is their generic type. It is only in the course of planning that circumstantials receive their logical meaning. The formal markers which identify these meanings and which plans assign to circumstantials are called *attributes*. In addition to this, another fundamental difference is that the logical semantics $sem\,[X]$ of an actant X is an argument of the function $sem\,[S]$ representing the logical semantics of the situation S. On the contrary, the logical semantics $sem\,[C]$ of a circumstantial C of S is a *higher-order function applied to* $sem\,[S]$. Due to lack of space, we limit ourselves to the following short example. Discourse plans express the noun phrase *your intellect* with the monad $\langle\!\langle$intellect$^{\mathbf{n_{mass}}}\rangle\!\rangle$ whose *appurtenance* attribute $Appurt^{(\mathbf{n}\to\mathbf{q})}$ has the value $\langle\!\langle$*hearer*$^{\mathbf{n_a}}\rangle\!\rangle$. The logical meaning of this attribute is the result of applying the meaning of the preposition $\langle\!\langle$of$\rangle\!\rangle$ to $sem\,$[intellect] and $sem\,$[*hearer*]: $sem\left[\text{intellect}\left(Appurt^{(\mathbf{n}\to\mathbf{q})}\,(\text{*hearer*})\right)\right]$ $= sem\,[\text{of}]\,(sem\,[\text{intellect}]\,, sem\,[\text{*hearer*}])$. More generally:

$$sem\left[X^{(\mathbf{q}^{(\omega)}\to\mathbf{n})}\left(Appurt^{(\mathbf{n}\to\mathbf{q})}\left(Y^{(\mathbf{q}^{(\omega)}\to\mathbf{n})}\right)\right)\right] = sem\,[\text{of}]\,(sem\,[X]\,, sem\,[Y])$$

More precisely:

$$sem\left[\lambda X^{(\mathbf{q}^{(\omega)}\to\mathbf{n})} Y^{(\mathbf{q}^{(\omega)}\to\mathbf{n})}{}_{\bullet} X\left(Appurt^{(\mathbf{n}\to\mathbf{q})}\,(Y)\right)\right] =$$
$$\lambda X^{(\mathbf{q}^{(\omega)}\to\mathbf{n})} Y^{(\mathbf{q}^{(\omega)}\to\mathbf{n})}{}_{\bullet}\, sem\,[\text{of}]^{\mathsf{e}\to(\mathsf{e}\to\mathsf{t})}\,(sem\,[X]^{\mathsf{e}}, sem\,[Y]^{\mathsf{e}})$$

3 Diatheses and diathetic shifts

Technically, our notion of semantic diathesis is very close to that of [Pad97, Pad02].[3] The difference stems from the role diatheses play in discourse planning: they *specify the intended change in communicative ranks with respect to the prototypical rank assignment in the dictionary* and possibly a new value type. The *prototypical* assignment is as follows: thematic ranks are assigned only to SBJ; $\odot$ is assigned to the rightmost argument (in the order of plan points) which is not otherwise assigned a thematic rank (or to the situation functor, if no such argument exists); other arguments are assigned $\ominus$. A SEMANTIC DIATHESIS of a situation S can be defined as a function assigning to the members of the communicative group of S their new ranks. It goes without saying that the function satisfies the constraints 1–4 on p. 3.

[3] An account compatible with that of Padučeva can be found in [Cro91, pp. 247–260], where changes of voice are described in terms of expanding, shrinking, and moving the 'verbal segment' (contained between the two most topical referents, the subject and the object) against the frame of the 'causal chain' of an event.

Semantic diatheses are implemented by *semantic diathesis shifts*. A diathetic shift licensed by a diathesis D is the minimal transformation of the situation profile that accomplishes all changes specified in D. We address the reader to [Dik03b] for a description of the general form of diathetic shifts. Here, we limit ourselves to several examples.

For every situation, the dictionary defines, in addition to its profile, a list of diathetic shifts which apply to it (and, of course, some other semantic and lexical derivatives, such as lexical functions). In order for a DP to be realizable, the rank assignment for every situation in the plan must match the definition of a diathesis in the dictionary and must be implementable by one of the shifts licensed by this diathesis. A (toy) example of a realizable DP is given in the gerund example below.

Example: English passivization. Passivization occurs when the OBJ actant of an effect situation is promoted to the rank of topic. There are multiple semantic diatheses satisfying this description (it should be noted that they do not directly correspond to voice diatheses of [Mel94, §§II.ii.4.6–7]). In particular, we distinguish the *f-passive* and the *p-passive* which differ in what communicative rank (*f*ocus or *p*eriphery) they assign to the SBJ of the situation. Both passive diatheses are implemented by diathetic shifts that make the former OBJ to the new SBJ and the former SBJ to Passive Agent (PAGT), an oblique role, manifested by the preposition *by*. In both cases, the value type of the diathetically shifted situation shall be $\mathbf{s_{psv}}$ (its place in the type system and the nature of the role PAGT is a complex issue which falls outside the scope of this paper). However, the p-passive, unlike the f-passive, makes PAGT an optional actant. The profiles of the two diatheses are

$$\mathrm{dth}_{p-passive}\left(\mathrm{PAGT}^{\mathbf{n}^{(0)}} \leftsquigarrow \mathrm{SBJ}_{\ominus},\ \mathrm{SBJ} \leftsquigarrow \mathrm{OBJ}_{\vec{\mathsf{T}}}\right)$$
$$\mathrm{dth}_{f-passive}\left(\mathrm{PAGT} \leftsquigarrow \mathrm{SBJ}_{\odot},\ \mathrm{SBJ} \leftsquigarrow \mathrm{OBJ}_{\vec{\mathsf{T}}}\right)$$

Each of the two passives applies quite predictably and in the same manner to both versions of *give* (p. 5). If we take the situation which, under prototypical rank assignment, has the form *Eve*$_{\mathrm{SBJ}:\vec{\mathsf{T}}}$ *gave*$_{\ominus}$ *the apple*$_{\mathrm{OBJ}:\ominus}$ *to Adam*$_{\mathrm{RCP}:\odot}$, the diathetic shift for f-passive transforms it to *The apple*$_{\mathrm{SBJ}:\vec{\mathsf{T}}}$ *was given*$_{\ominus}$ *to Adam*$_{\mathrm{RCP}:\ominus}$ *by Eve*$_{\mathrm{PAGT}:\odot}$. The situation with the active form *Eve*$_{\mathrm{SBJ}:\vec{\mathsf{T}}}$ *gave*$_{\ominus}$ *Adam*$_{\mathrm{OBJ}:\ominus}$ *the apple*$_{\mathrm{AOBJ}:\odot}$ transforms to *Adam*$_{\mathrm{SBJ}:\vec{\mathsf{T}}}$ *was given*$_{\ominus}$ *the apple*$_{\mathrm{AOBJ}:\ominus}$ *by Eve*$_{\mathrm{PAGT}:\odot}$. P-passive optionalizes the PAGT: *The apple*$_{\mathrm{SBJ}:\vec{\mathsf{T}}}$ *was given*$_{\ominus}$ *[by Eve*$_{\mathrm{PAGT}:\ominus}$*] to Adam*$_{\mathrm{RCP}:\odot}$; *Adam*$_{\mathrm{SBJ}:\vec{\mathsf{T}}}$ *was given*$_{\ominus}$ *[by Eve*$_{\mathrm{PAGT}:\ominus}$*] the apple*$_{\mathrm{AOBJ}:\odot}$.

Example: English gerund. The gerund is brought about by the need to demote the subject actant and to change the type of the affected situation to $\mathbf{n_{ger}}$ (which reflects compositional requirements and sometimes aspect). The plan in Fig. 1 (p. 7) shows the gerund diathesis $\langle\!\langle \mathrm{dth}_{ger}\left(\varnothing \leftsquigarrow \mathrm{SBJ}_{\ominus}\right)^{\mathbf{n_{ger}}} \rangle\!\rangle$ being applied to the situation $\langle\!\langle \mathrm{watch}\left(\mathrm{SBJ}^{\mathbf{n_a}}, \mathrm{OBJ}^{\mathbf{n}}\right)^{\mathbf{s_{percep}}} \rangle\!\rangle$.

For discourse plans of this kind, we have implemented a graphical editor, providing the functionality necessary to develop and maintain meaning structure treebanks. It features menu-driven plan construction, realizability testing, graphical and typesetting language output, high-level inhertance structuring. E. g., one can define very general passive patterns and then determine their particular cases in compact and observable form.

4 Conclusion

In this paper, we develop the concept of semantic diathesis introduced by Padučeva in [Pad97, Pad02]. We seek to represent discourse planning guided by lexical choice and by argument salience preferences induced by the intended communicative structure. We extend Padučeva's semantic diatheses by compositional functional semantic types with optionality and inheritance and describe the differences in semantic interpretation of actants and circumstantials of situations. In order to arrive at a practical application of discourse plans, we outline a strategy, consistent with lexicographic definitions and typological case-based analysis, to induce linguistic criteria which would serve to distinguish between actants and circumstantials. The method consists in expanding a small set of basic cognitive proto-situations by means

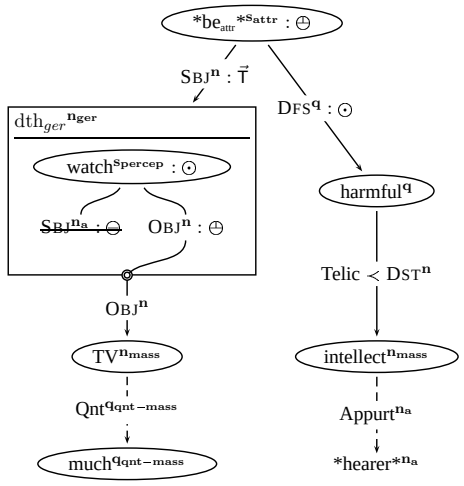


FIG. 1: Discourse plan for the utterance *Watching much TV is harmful for your intellect*.

- Ellipses signify functional semantemes.
- The box represents a diathesis (communicative rank assignment) and the corresponding diathetic shift (the crossed role signifies a deleted actant, the connections to the outside of the box, the projection of roles defined by the situation onto those defined by the diathetic shift).
- Solid lines link actants to their situations and are labeled with roles.
- Dashed lines link circumstantials to their governor semantemes and are labeled with names of attributes.

of projection operations. This aspect of our work is in a preliminary phase and requires an analysis of considerable linguistic material.

References

[Apr74] Ju. D. Apresjan. *Leksičeskaıa̯ semantika*. M.: Nauka, 1974.

[But04] M. Butt. Theories of Case. Ms. to be published by Cambridge University Press, in preparation.

[Cro91] W. Croft. *Syntactic Categories and Grammatical Relations: The cognitive organization of information*. University of Chicago Press, 1991.

[Dik03a] A. Dikovsky. Discourse Plan ⇒ Meaning. In *Proc. of the 1st International Conference "Meaning-Text Theory" (MTT 2003)*, pages 299–308, Paris, France, June 2003. ENS de Paris.

[Dik03b] A. Dikovsky. Linguistic Meaning from the Language Acquisition Perspective. In *Proc. of the 8th Intern. Conf. "Formal Grammar 2003" (FG 2003)*, pages 63–76, Vienna, Austria, August 2003.

[Fil68] C. J. Fillmore. The case for case. In E. Bach and R. T. Harms, editors, *Universals in Linguistic Theory*, pages 1–88. Holt, Rinehart and Winston, 1968.

[Fil77] C. J. Fillmore. The case for case reopened. In P. Cole and J. M. Sadock, editors, *Syntax and Semantics 8: Grammatical Relations*, pages 59–81. New York: Academic Press, 1977.

[Gru65] J. S. Gruber. *Studies in Lexical Relations*. PhD thesis, MIT, 1965.

[KKM00] A. E. Kibrik, S. V. Kodzasov, and I. A. Murav'ëva. *Ia̯zyk i fol'klor alıu̯torcev*. M.: IMLI RAN / "Nasledie", 2000.

[KL04] L. Kolehmainen and M. Larjavaara. The "bizarre" valency behaviour of Finnish verbs: How a specific context gives rise to valency alternation patterns. *Constructions 1/2004*, 2004. http://www.constructions-online.de.

[Lam94] K. Lambrecht. *Information Structure and Sentence Form: Topic, focus, and the mental representations of discourse referents*. Cambridge University Press, 1994.

[Mel94] I. Mel'čuk. *Cours de morphologie générale. Volume II*. Presses de l'Université de Montréal/CNRS, Montréal, 1994.

[Mel04a] I. A. Mel'čuk. Actants in semantics and syntax I: Actants in semantics. *Linguistics*, 42(1):1–66, 2004.

[Mel04b] I. A. Mel'čuk. Actants in semantics and syntax II: Actants in syntax. *Linguistics*, 42(2):247–291, 2004.

[MX70] I. A. Mel'čuk and A. A. Xolodovič. K teorii grammatičeskogo zaloga. *Narody Azii i Afriki*, 4, 1970.

[Pad97] E. V. Padučeva. Semantičeskie roli i problema soxraneniıa̯ invarianta pri leksičeskoj derivacii. *Naučno-texničeskaıa̯ informaciıa̯, Ser. 2*, (1):18–30, 1997.

[Pad98] E. V. Padučeva. Kommunikativnoe vydelenie na urovne sintaksisa i semantiki. *Semiotika i informatika*, 36:82–107, 1998.

[Pad02] E. V. Padučeva. Diathesis and diathetic displacement. *Russian Linguistics*, 26(2):179–215, 2002.