Rhetorical Relations in Verbal Eventual Representations? Evidence from Psych Verbs

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Abstract

Psych-verbs are a relatively well-studied phenomenon in theoretical linguistics (Belleti and Rizzi (1988), Grimshaw (1990), etc.), but one for which as yet no truly satisfactory analysis has been developed.[*] This paper seeks to provide a new perspective on the semantics of psych-verbs by bringing ideas based on Asher and Pustejovsky (2000) into the discussion, namely, that the concept of rhetorical relations can be deployed at the lexical level in order to formulate well-formedness conditions between subevents denoted by a verb. The idea is that psych-verbs have a kind of lexical semantics which reflects the semantic properties of the thematic relations *Experiencer* and *Stimulus*, have a complex eventual structure, and that differences in how the subevents are related to one another via rhetorical relations account for the observed differences in interpretation for the two groups of psych verbs that have been established in the literature.

1. Introduction

"Psych-verbs" involve the denotation of mental states to one of two participants in an event. One of these participants experiences a mental state (experiencer) and the other participant is the one who *causes* it, as (1) shows.

(1) a. *Mary* fears <u>dark nights</u>.
     b. <u>The poisonous snakes</u> frighten *Mary*.

The underlined words in both (1a) and (1b) express the factor, or the *cause* of the fear in the clauses. The noun "Mary" in italics indicates the person who receives or experiences the fear and who is brought into a new mental state. These observations form the basis of several well-established analyses within the literature (Belleti and Rizzi (1988), Grimshaw (1990), Pustejovsky (1995)). However, there still remain numerous problems in the construction of the semantic representation of these verbs.

The first part of the paper presents the problematic behaviour regarding the argument realisation of these verbs and the different solutions proposed by Pustejovsky (1989) and Grimshaw (1990), along with their drawbacks. Then the paper moves on to the description of the idea that the class of psych verbs introduces two pieces of semantic information represented as propositional content labels (or πs in terms of SDRT) with an underspecified rhetorical relation between them. This can explain the behaviour of both object- and subject-experiencer predicates. The last part of the paper is devoted to argumentation about the possible non-existence of causation in the representation of the complex event expressed by psych verbs and proposes the use of a "weaker" notion of impact. This notion reflects the

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semantic effect of thematic roles and can be used as a kind of cause inserted for the inference of discourse relations, namely as a discourse permissible cause (causeD in terms of SDRT).

1.1 The fundamental problem

The use of thematic roles (e.g. Gruber (1965), Fillmore (1968), Jackendoff (1972)) for the mapping from thematic role hierarchies to syntactic positions captures many of the regularities observed with respect to the variable syntactic expression of lexical semnatic information. However, the use of thematic roles in general remains problematic. Levin and Rappaport (1995), among others, describe a number of problems and shortcomings of semantic or thematic role lists:

(a) There is a lack of reliable diagnostics for isolating precisely those arguments bearing a particular role;
(b) There is no precise definition for individual semantic roles;
(c) The semantic role inventory itself lacks any internal organization as a result of the assumption mentioned above, namely that semantic roles are unanalyzable.
(d) The association of semantic roles with arguments is proved problematic for verbs like "resemble", which appear to have two arguments bearing the same role.

Nevertheless, most theories of lexical semantics have preserved the notion of thematic roles and have tried to integrate them in a more structured way (e.g., "predicate decomposition" by Jackendoff (1972, 1990), Levin and Rappaport (1996), Tenny (1994)). Although there is a diversity of opinions as to how thematic roles could be interpreted reliably and integrated in the semantic analysis, observations about the regularity of the syntactic realisation of arguments have shown that there is a certain *prominence relation* or *hierarchy* between these thematic roles, reflecting the way they appear in the syntax:

(a) <Agent, Location/Source/Goal, Theme> (Jackendoff, 1972)
(b) <Agent, Theme, Goal, Oblique> (Larson, 1988)
(c) <Agent, Theme, Goal/Benefactive/Location> (Baker, 1989)
(d) <Agent, Benefactive, Recipient/Experiencer, Instrument, Theme/Patient, Location>
(Bresnan and Kanerva, 1989)
(e) <Agent, Experiencer, Location/Source/Goal, Theme> (Grimshaw, 1990)

According to the versions of the thematic hierarchy shown above, the role experiencer is always in the "higher" or more prominent subject position than the patient (or stimulus). Psych verbs generally can be grouped into two classes, based on syntactic differences between them (cf., Belleti and Rizzi (1988)), namely the Subject-Experiencer and the Object-Experiencer class. The following is generally assumed: in (1a), repeated below, "Mary" is the receiver of the experiencing event implied by the verb and, thus, the appropriate thematic role is *Experiencer*. The NP "dark nights", which is perceived as the *cause* of the experiencing event can be characterized as *Stimulus* or *Theme*.

(1) a.   *Mary* fears <u>dark nights</u>.
    b.   <u>The poisonous snakes</u> frighten *Mary*.

In (1a) the *Experiencer* is the subject and the *Theme* or *Cause* is the object. This is predicted correctly by the thematic hierarchies. However, (1b) represents a surprising violation of the hierarchy, since the less prominent theme is subject and the more prominent experiencer is the object. This problematic point has been addressed in several proposals in the literature, though none of them is ultimately satisfactory. Just two of these accounts are presented in the next section.
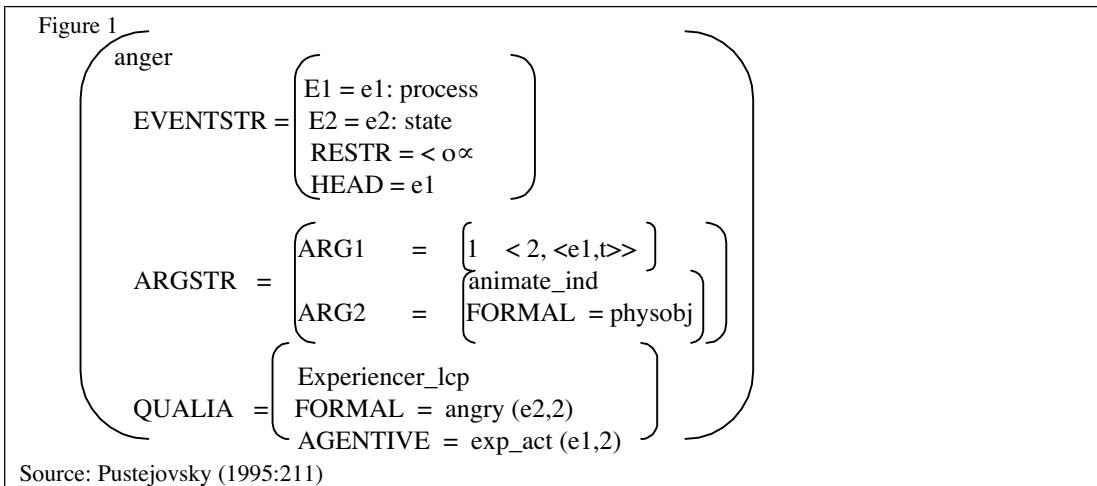
2. Causative accounts

In this section, a brief overview of the accounts proposed by Pustejovsky (1989,1995) and Grimshaw (1990) are presented. Both of the accounts see psych-verbs as purely causative and the analyses are both based on the assumption that events can be decomposed into subevents according to aspectual criteria. Both recognize the need to mention the aspectual classification of Object-experiencer psych verbs as activities or processes and of Subject-Experiencer verbs as states.

2.1 Pustejovsky's account

Pustejovsky (1989,1995) introduces the idea that complex events can be analysed in terms of subevents. Within the framework of his *Generative Lexicon*, he argues for the fact that psych verbs denote complex events with their first subevent representing a process, and the second representing a result connected with a causal link. He assumes that a specific kind of causation exists for psych verbs, called *Experienced Causation*. Based on his theory, Pustejovsky (1995) establishes the causative connection between the two subevents through semantic elements of the arguments represented in a multilevel representation.

(2) The newspaper angered Mary.

As shown in Figure 1, the event invoking the causation or the cause of the anger of Mary as in (2) is expressed in the agentive role of the qualia structure of the verb "anger". The resulting event is expressed in the formal role of the qualia structure of the verb. The complex event structure in EVENTSTR expresses the aspectual connection of the two subevents, the causing and the resulting one, in terms of the restriction that there is a temporal overlap between the head causing event e1 and the resulting event, where e1 has started before e2. The interaction of the arguments participating in the argument structure of the verb and in the experiencing event as shown in Figure 1, is reflected inside the qualia structure.

Figure 1

anger

$$
\text{EVENTSTR} = \begin{bmatrix} E1 = e1: process \\ E2 = e2: state \\ RESTR = < o\propto \\ HEAD = e1 \end{bmatrix}
$$

$$
\text{ARGSTR} = \begin{bmatrix} ARG1 & = & \begin{bmatrix} 1 & < 2, <e1,t>> \\ animate\_ind \end{bmatrix} \\ ARG2 & = & \begin{bmatrix} FORMAL & = physobj \end{bmatrix} \end{bmatrix}
$$

$$
\text{QUALIA} = \begin{bmatrix} Experiencer\_lcp \\ FORMAL & = angry (e2,2) \\ AGENTIVE & = exp\_act (e1,2) \end{bmatrix}
$$

Source: Pustejovsky (1995:211)

One drawback of Pustejovsky's approach is that a more precise definition about what is meant by an experiencing event is yet not explained, since the use of the term "experiencing causation" entails that different kinds of causation exist. This means that the coherence of the notion of causation is in danger. It would not be desirable, however, to split primitive semantic notions into subclasses each time a new exception is met. Moreover, Pustejovsky (1995) does not mention why and what effects this special kind of causation has for the Object-Experiencer verbs and how his causative account would manage to predict stative Subject-Experiencer verbs like *fear*. Although Pustejovsky (1995) mentions the importance of the aspectual properties of psychological predicates for the interpretation of the

complex event, he does not discuss any kind of connection between these properties and the problem of argument realisation for the specific verb class. He recognises that the reconstructed event type as represented by the subject influences the aspectual interpretation of the whole sentence, and assigns a precedence overlap relation between the two subevents as shown in Figure 1, but does not address the problem of the argument realisation for the whole class of psych verbs and, therefore, does not present a unified account for both groups of verbs. Additionally, the issue of argument realisation, which appears to reflect internal semantic properties of the lexical items and influences the lexical semantic representation, is not touched upon by Pustejovsky (1995) and the stative versus activity distinction of this verb class is left unexplained.

2.2 Grimshaw's account

Grimshaw (1990) adopts the subeventual analysis proposed by Pustejovsky (1989) and establishes a *prominence theory* that shows similarities to Jackendoff's (1972) approach, who assumes a two-tier representation of events and their arguments. The first dimension concerns the thematic roles and their hierarchical ordering, whereas the second one is defined in aspectual terms. This second dimension becomes more prominent in Grimshaw's theory and potentially explains the variable syntactic behaviour of psych verbs. According to her analysis, there exists a complex event, in which the first subevent describes the *cause* of the experience and the second the state *caused* by the first subevent (see Figure 2).

Figure 2

event

activity   state

Source: Grimshaw (1990:26)

Grimshaw (1990) visualises the interpretation of Object-experiencer psych verbs as purely causative, whereby the participants in this causative construction are defined as participants in the two subevents. The obvious implication of these ideas are made clear by Grimshaw (1990) as shown in figure 3:

Figure 3

Experiencer   Theme → Thematic prominence

Causer   Causee → Aspectual prominence
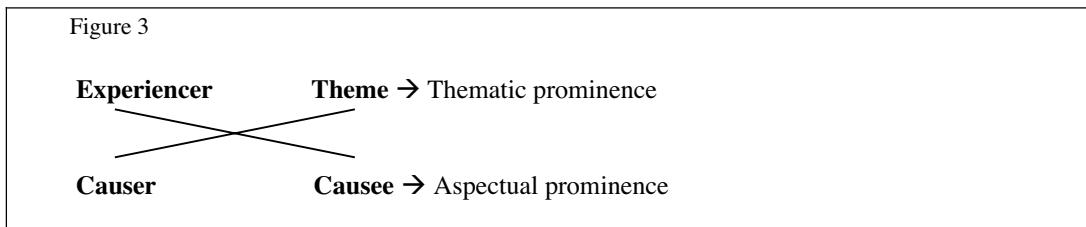
The left elements in Figure 3 on both dimensions are more prominent than the ones to the right. As illustrated above, the aspectual dimension is not in line with the thematic one and this fact leads to the lack of agreement between the two dimensions as to which argument should be realised in the subject position, and which in the object position. Grimshaw's analysis assumes that the aspectual dimension is more prominent the thematic one. For (1b), the epiphenomenal violation of the prominence in the thematic dimension is explained because the subject realizes the *causer* and participates in the more prominent eventuality according to the aspectual dimension. However plausible this account may seem, there are shortcomings for the class of Subject-Experiencer verbs as in (1a) (predictable according to the single thematic prominence approaches). The verb "fear" is stative and this verb now violates the prominence relation of the new dimension, since the *causee* argument is realized in the more prominent syntactically subject position, and the experiencer follows the prominence of the thematic dimension,

which is supposed to be inferior. Additionally, Grimshaw (1990) assumes that this aspectual dimension is always present in parallel to the thematic one, and as mentioned, this new dimension is not sufficient to explain the argument realization in the case of the stative psychological predicates. This misalignment between the aspectual properties of the two groups of the same verb class could lead to the conclusion that psych verbs are split into two subclasses with no coherent semantic representations and properties. This means that no lexical entry can be provided for both groups of the same verb class and no real explanation is available for why one should argue for a different semantic representation in these cases; namely, why we should assume different semantics for (3a) and (3b):

(3) a. Mary fears snakes.
     b. Snakes frighten Mary.

Grimshaw (1990) admits this complication and essentially leaves the phenomenon unexplained:

"The case of psychological state verbs like the *fear* class is considerably more delicate. The desired result will follow if their Experiencer qualifies as the aspectually most prominent argument, since the two semantic dimensions will then coincide. Hence, members of this verb class have external arguments. This result seems to be the right one for Italian (Belletti and Rizzi (1988)) and for English, as I will argue. However, it must be admitted that in this case there is no independent evidence that the aspectual analysis will give this result, so for present purposes we must simply stipulate it. It is clear, then, that while the proposed two-dimensional view strongly entails that a verb in the *frighten* class has no external argument, it does not strongly entail the a-structure analysis of the psychological state predicates." (Grimshaw, 1990:27-8)

2.3 Observations

It is not desirable to assume a non-coherent lexical semantic representation for these groups of the same class, since both Subject- and Object-experiencer verbs share some basic common semantic characteristics:
  • They involve a complex event structure leading up to a mental state;
  • Their argument structure involves two participants, one of which appears to take the form of the experiencer and the other of the stimulus.

Further evidence for the underlying coherence of the semantics of this verb class comes from Greek. In Greek, there is only one lexical entry corresponding to the English "fear" and "frighten" psych verbs. This single verb stem in combination with morphology distinguishes between Subject- and Object-experiencers, as shown in (4), (5).

(4) a.   φοβ -αμαι → Subject-experiencer verb (=fear)
             fov -ame
             fear -Non-active[1]

     b.   φοβ -ιζ -ω → Object-experiencer verb (=frighten)
             fov -iz-o   fear-causative-1.Sg

(5) a.   φοβαμαι τα φιδια.
             fov-amai ta fidia.
             fear-Middle.1.Sg Det snakes.Acc
             'I am afraid of snakes' or 'I fear snakes.'

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[1] This acts as a middle and has variously been referred to as reflexive and passive in the literature.

b.   τα φιδια με φοβ -ιζ -ουν.
        ta fidia me fov–iz oun.
        Det snakes.Nom 1.Sg.Acc fear-Caus-3.PL
        'Snakes frighten me.'

The Greek data leads us to conclude that a unified analysis of psych verbs is indeed necessary. The next section shows that the aspectual properties of the complex event assumed for psych verbs play a major semantic role and that the insertion of two different rhetorical relations in the lexical representation explains the behaviour of the Object- as well as the Subject-experiencer predicates. In this way, a unified lexical representation is ensured for both types of psych verbs.

3.   Lexical Information in the Service of Discourse Interpretation

Asher and Lascarides (1995, 2003) and Asher and Pustejovsky (2000) propose that the semantic composition at the inter- and intrasentential level should be undertaken under the umbrella of a common "flat" underlying logic. This flat logic takes care of the exploitation of knowledge stemming from different sources, and is contributed by as much linguistic evidence as possible. This system assumes that the lexical entry provides as much grammaticalised knowledge as possible for the purpose of sentential and intersentential interpretation. The account presented below for psych verbs is based on Asher and Pustejovsky (2000), who presuppose that the lexicon defines the meanings of lexical items as active factors in the semantic composition in the sense of a generative lexicon. This generative lexicon admits a multilevel representation for lexical meaning and permits interactive relations between them. The argument structure defines the qualia structure of the verb directly or at least indirectly; the event structure consequently is also influenced by the aspectual character of the subevents and, inevitably, there is space for exploration about the nature of these relations.

Asher and Pustejovsky (2000) conclude that there is a certain similarity between the discourse rhetorical relations introduced by SDRT, and the relations between the elements of the different structures of the lexical representation. Asher and Pustejovsky's (2000) idea of adding rhetorical relations to lexical entries opens the door for specifying the information flow between the lexical and discourse level. This could be useful for: a) inferring the right rhetorical relation in the intersentential level or at least contributing substantially to this task; b) for disambiguating word senses in other cases (Asher and Lascarides (1995,2003)).

Asher and Pustejovsky (2000) propose a formal way of permitting the discourse logic to interact with the *composition logic*, which is viewed as the logic responsible for the construction of logical forms for clauses. The evidence for complex event structures motivates the examination of the necessary coherent connection developed between the subevents of a verb. Particularly, causative verbs like "sink" (Asher and Lascarides 2003) or "break" (Levin and Rappaport 1995) prove that the lexicon provides useful information for the construction of relations between two events. The analysis of causative verbs is of interest in the context of the current discussion because Object-Experiencer could receive an analysis similar to that of a causative verb. Asher and Pustejovsky (2000) claim that in a lot of cases, discourse relations can be inferred with the help of the lexical semantic representation of the causative verbs. Essentially, this happens because the lexicon includes knowledge about certain relations between the two different bits of semantic information implied in a causative construction and transfers this knowledge to the discourse level by assuming rhetorical relations at the lexical level and accessing the sublexical meaning.

One of the most interesting consequences of viewing discourse and lexical meaning as interdependent is that each bit of semantic information including an eventuality is assigned a π or *speech act discourse referent*, which represents a propositional content token (and not type) and allows for compatibility with intersentential information (Asher and Lascarides (2003)). By labelling the different bits of information with πs included in the lexical entry, one avoids the identification with either the proposition implied, or the events expressed by them. The fact that the semantic content of the πs is not interpreted directly in the logic of information content but in a "flatter" labelled language (which is able to express underspecification) provides the flexibility of keeping the two logics responsible for the discourse interpretation task separate: the logic of information content or evaluation

of the content and the logic of information packaging or logic for the inference of rhetorical relations and for the discourse update. At the same time, this approach allows these two logics to interact with each other in a limited and restricted way (Asher and Lascarides (2003)).

3.1 The analysis of psych verbs

According to Asher and Pustejovsky (2000), psych-verbs follow a pure causative analysis and they express "some underspecified action on the experiencer resulting in a psychological state". Of course, the focus of their work is guided purely by the interest in finding an adequate representation of psych-verbs under the assumption that lexical knowledge interacts with discourse knowledge, without examining the mismatch between the syntactic realisation of the arguments and lexical semantics. The representation they propose is illustrated in Figure 4 for the verb "frighten", (following Asher and Pustejovsky's (2000) representation for the verb "annoy").

Figure 4

$\lambda y \lambda e1$:

$\pi, \pi 1$

π :

e

Exp (e, x, y)

$\pi 1$:

afraid$(e1, y)$
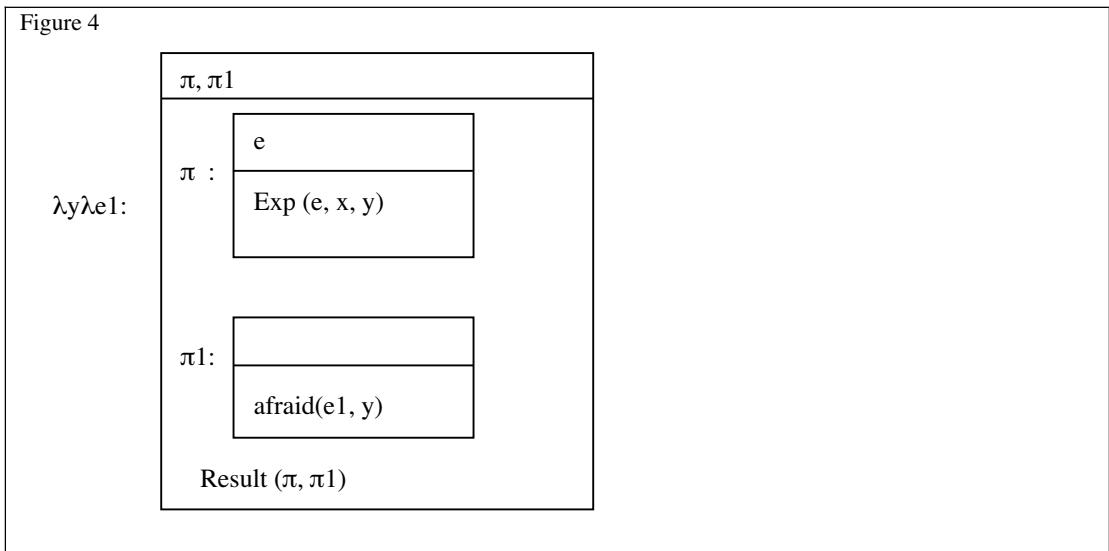
Result $(\pi, \pi 1)$

The manifestation of the idea that psych-verbs are causative in nature, as represented by Pustejovsky (1995), is realised by the *rhetorical relation* "Result", which connects the two subevents. The one subevent that causes something is connected to the experiencer and the other subevent is connected to the state of "being afraid" in $\pi 1$. Aspectual information plays a significant role as to which of the πs is realised as the first argument of the rhetorical relation *Result*.

The above account, based on the aspectual properties of the experiencing complex event, is not able to represent the semantics of Subject-experiencer predicates. The aspectual prominence of a resulting state is not reflected by English Subject-experiencer predicates and the lexical entry in Figure 4 could not, therefore, apply to this group of verbs. Following the above representation one would have to assume a complex event structure for the causative Object and a single stative representation for the Subject-experiencer verbs. This has the consequence that psych verbs would be divided into two subclasses for Subject- and Object-experiencer verbs with no apparent connection between their lexical entries. However, there is no obvious criterion that could justify a classification which does not provide a generalisation for the class of psych verbs as a whole.

3.2 An alternative account

A possible solution to this conundrum is to argue that in the case of Subject-experiencer verbs, the resulting state is highlighted and the cause is still there, but not prominent. This approach still allows rhetorical relations to access the lexical semantic representation along the lines of Asher and Pustejovsky (2000), and targets a consistent representation and interpretation for the class of psych

verbs. Additionally, it assumes that there is always a causal connection between the subevents of the complex event of the psych verbs, whereby the causing activity precedes the caused one. The reasons for the apparent violation of the aspectual prominence dimension can be sought in the kind of rhetorical relation that is established between the πs assumed already by the lexical entry. The methodology of SDRT for building the logical form of the discourse or SDRSs gives a clear explanation for the difference between these two groups of verbs. If the two bits of information are connected in a different way, which captures the inversion in the temporal structure of the complex event, then two different rhetorical relations with different semantic effects are inferred for the two subclasses. In English at least, Subject and Object-experiencer verbs should include and not infer in their lexical entry a rhetorical relation, which is considered to be "hard-wired", since the argument structure specifies monotonically in the syntax-semantics interface what kind of temporal and causal connection is created between the bits of lexical knowledge.

The relation that captures the semantics of Subject-experiencer verbs and expresses the violation of the aspectual dimension is *Explanation*, which is the dual relation to *Result*, in that it entails the predication of *causeD* (Discourse Permissible Cause) but by placing the arguments in the inverse order from that of *Result*. For Subject-experiencer predicates, the interpretation of *Explanation* expresses the temporal inversion of the events as desired (as is shown in Figure 5).

Figure 5
- Temporal Consequence of Explanation
 i. $\Phi explanation(\alpha,\beta) \Rightarrow (\neg e\alpha < e\beta)$

  ii. $\Phi explanation(\alpha,\beta) \Rightarrow (event\ (e\alpha) \Rightarrow e\beta < e\alpha)$

Source: Asher and Lascarides (2003:160)

Explanation is a veridical rhetorical relation in terms of SDRT (Asher and Lascarides (2003)), whereby the semantic effect of the particular rhetorical relation, namely the inversion in the temporal structure of the complex event is ensured in the fully specified dynamic interpretation of the logical form of the discourse in the logic of information. Briefly, the temporal consequence of *Explanation* states that if *Explanation* has been inferred in the discourse tree then a) the eventuality of the first utterance cannot precede the eventuality of the second and that the aspect of the eventuality of the second utterance is always an event and precedes the eventuality of the first one.

The lexical entry for the Subject-experiencer verbs would, thus, be represented as in Figure 6. The syntax-semantics interface is straightforward and the semantic effects are interpreted correctly. Note that the manner of semantic composition is irrelevant for our purposes. As long as the mapping from grammatical to thematic information is ensured and justified, any manner of composition would be compatible in the framework assumed, one could either use lambda operations or base oneself upon any kind of constraint-based framework (e.g., HPSG, LFG).

Figure 6

$$\lambda x\lambda e :$$

$\pi, \pi 1$

π :

afraid(e1,y)

$\pi 1$:

e

Exp (e, x, y)

Explanation $(\pi, \pi 1)$
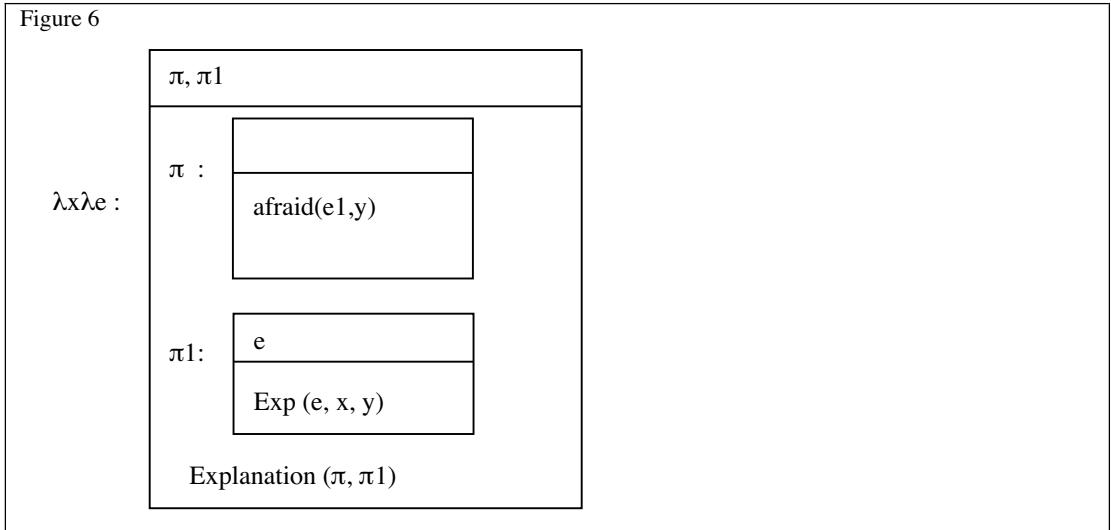
3.3 Underspecification

The evidence from Greek provided in (4) and (5) strengthens the argument that the verb class under analysis is a coherent and unified one, where the morphology indicates which eventuality is aspectually more prominent and which is less. The Greek data points to the existence of an underspecified rhetorical connection between the subevents, where the temporal order of the eventualities is left underspecified, until the morphology specifies it. In English, on the other hand, the two groups of psych verbs have been lexicalised, so that the underspecification has already been resolved.

The analysis of patterns such as the one found in Greek can be couched quite straightforwardly in terms of hole semantics (Bos, 1996). For instance, one could assume that there is always a rhetorical "hole" in the semantic representation of these verbs, which is to be filled by either the rhetorical relation *Explanation* or *Result* as shown in Figure 7. This hole is determined by the placement of the arguments in the causeD predicate. In languages like English, this hole is not transparent, since the choice between the two relations has already been determined. For languages like Greek, the morphology provides the information necessary for a specification of the rhetorical relation. The lexical entry for the Greek verb 'fear' would therefore have to contain the information that the rhetorical relation is to be inferred monotonically and that the underspecification is to be resolved deterministically as soon as the morphology contributes to its inference axiom.

Figure 7

Explanation   Result

The contribution of the morphology to the inference of either Explanation or Result needs to be encoded in an indefeasible axiom, which determines the placement of the arguments of the causeD - This also reflects the aspectual prominence and temporal position of the subevents. In the case of Greek, the two following axioms have to be assumed,, which deal with the contribution by the morphology to the argument positioning of the two subevents in the predicate causeD:

(6) a. complex-psych-event(α, β) $\land$ psych-verb-stem(x) $\land$
additional-suffix(x, causative) $\rightarrow$ causeD (α, β)

b. complex-psych-event(α, β) $\land$ psych-verb-stem(x) $\land$
additional-suffix(x, non-active) $\rightarrow$ causeD (β, α)

By the time the aspectual prominence is defined, the inference of the rhetorical relation is monotonically and indefeasibly ensured, as shown in (7). The difference between this kind of inference of rhetorical relations and the one provided by the defeasible axioms in the discourse is that lexical underspecification needs information from the morphology in order to be resolved once and for all, namely monotonically. That means that the rhetorical relations at the lexical level are hard wired and cannot be revisited by the time they are inferred.

(7) a. $(?(\alpha, \beta, \lambda) \wedge_{\sigma} Top(\sigma, \alpha) \wedge causeD(\sigma, \beta, \alpha) \wedge Aspect(\alpha, \beta)) \rightarrow Explanation(\alpha, \beta, \lambda).$
   b. $(?(\alpha, \beta, \lambda) \wedge Top(\sigma, \alpha) \wedge causeD(\sigma, \alpha, \beta) \wedge Aspect(\alpha, \beta)) \rightarrow Result(\alpha, \beta, \lambda).$

The rhetorical structure enriches the discourse representation and affects the interpretation in different ways for each rhetorical connection. In this way, a reliable explanation is provided for the variation in the argument realisation of psych verb and it is ensured that all psych verbs preserve a complex event structure between their subevents and represent two different πs, which are connected rhetorically in a different way depending on the argument realisation.

Pustejovsky (1995) assumes that experiencing events constitute complex events and include a special causative connection between their subevents, since psych verbs do not follow the behaviour of classic causative verbs like "break" or "bake". There is linguistic evidence that the decomposition of the experiencing event is probably due to a different connection between the two subevents. The next section provides argumentation that could justify the idea that the notion of causation is too strong for psych verbs. One of the main aims of the following section is to trigger a refinement in the analysis initially adopted by Asher and Pustejovsky (2000) and Asher and Lascarides (2003).

4. Questions about Causation
4.1 The non-existence of causation!?

The first problematic point for most of the approaches that proposed solutions for the syntax-semantics interface of psych verbs is derived by the questionable usage of the term *cause* and the "costless" statement about the existence of causation lying in the interaction of the two relevant subevents expressed by the verbs. Starting with the basic assumption that the lexical entry should include linguistically relevant knowledge and is determinable in accordance and interaction with the context, one first consequence would be to see causation as a linguistically justified phenomenon and, thus, lexicalised in English. It remains a very critical and at the same time difficult task to separate the essential knowledge needed in the lexicon and the knowledge provided by sources expressing world knowledge. Causation is a dynamic relation signified and met in almost every action reflected in the world, rendering the task of representing lexical knowledge very difficult. One important criterion for including the relevant lexical information needed for the semantic representation lies in the syntactic (surface) realisation of the language expression. The verb's argument realisation in the syntax offers a stable argument for judging whether regularities are violated, or whether new ones are to be created. Diathesis alternations comprise the most important field for observing or even "testing" whether assumptions taken on board are linguistically implausible or not. A quick look at the behaviour of psych-verbs at the syntax-semantics interface shows that these verbs do not follow the exact behaviour of other typical causative verbs. One major point is that they do not licence the causative/inchoative alternation typical of causative verbs This fact is apparent in at least English for both of the subclasses in (8) and (9).

(8) a. The snakes frightened Mary.
   b. *The snakes frightened.

(9) a. Mary feared the snakes.
   b. *Mary feared.

One way of resolving the contradiction between the belief that psych-verbs are just a case of causative verbs and the fact that they do not participate in the most common and regular syntactic pattern of causative constructions, namely the causative/inchoative alternation, is to assign different thematic roles for the stimulus or "causer" in each subclass. However, by claiming that there is a certain difference in the semantic content of the stimulus argument, we simply transfer the problem to a different level, where the *fear* is not perceived in the same way in the two cases. The problem thus receives an ontological dimension concerning the notion of fear, which is not desirable, since both the verbs "frighten" and "fear" could appear in almost identical environments, where the differences are linguistic and irrelevant to the ontological notion of fear. The approaches described so far would resolve the problem by realizing two events, one of which is the causing event, whereas the other one expresses the caused event and mirrors the intuitive point of introspection as shown in (10). Essentially, (10) implies that there is always a Y representing the primitive experience type, which is caused by the stimulus; this Y is received by the experiencer and remains unexplained and stable.

(10)   x ———▶ Y
                causes
         z ◀——— Y
              receives
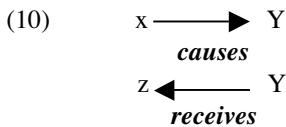
This Y implies the existence of a primitive notion of "experience", which is probably why Pustejovsky (1995) renames psych-verbs as causative-experiencing verbs.

Davidson (1969) provided a criterion for the identity of two events useful for our case: "events are identical if and only if they have exactly the same causes and effects." Although his ideas about causes are left implicit and unanalysed, it is the basis for the formal account of Lewis (1973) about causation. The main principle of his theory is based on "counterfactual implication" (Eckardt, 1998):

• Let O be a unary relation on the domain of events. O(e) is true in a world w iff e occurs in w:

An event c causes and event e, c CAUSE e, iff

       i. $O(c) \rightarrow O(e)$ and

       ii. $\neg O(c) \rightarrow \neg O(e)$.

According to the above principle, if events c and e occur in a world w then (i) if the event c occurs in that world then the event e occurs too and (ii) if the event c does not occur in that world then the event e does not occur either. One of the major disadvantages of this principle is that by the interpretation of CAUSE, it is almost unavoidable to confuse the real cause with the necessary preconditions of an event. Potentially, this approach defines a large amount of cases, which are only preconditions, as real causes for the occurrence of an event. This confusion may be seen in the case of Object-experiencer verbs, where the approaches of Grimshaw (1990) and Pustejovsky (1995) propose a causative analysis of the event structure without defining where the real cause lies.

Eckardt (1998) cites the way in which Dowty (1979) approaches the above problem. He delimits the possible causes of an event to those described by those events that, potentially, in similar worlds with few changes do not hold under the counterfactual implication. That means that preconditions are much more "consistent" through various changes, whereas the real causes tend to change under any minimal change in the actual world. Eckardt (1998) adapted the ideas of Dowty (1979) about causation in general, for the case of events.

Figure 8

$\forall w \ (w \models \neg(O(c) \wedge O(c')) \wedge w \models (\neg O(c')) \rightarrow$

                $\exists w' \ (w' \models \neg(O(c) \wedge O(c')) \wedge w' \models \neg O(c) \wedge d(w0, w') \leq d(w0, w)))$

  where d measures the distance of worlds to the actual world w0.

Source: Eckardt (1998:62)

Eckardt (1998) formally describes the fact that even if a small change in the actual world is conducted, the real cause will not be the same in contrast with the preconditions. If the above formula

were inverted then the cause would not be the same, while the precondition could survive a change in Figure 8. Besides the above clarification between the preconditions and the cause, Eckardt (1998), following an intersentential analysis of causation, further distinguishes the cases where a pseudocausal status is created. She argues that in these cases there is a certain manner of the occurrence of events that is responsible for the creation of other events as in (11).

(11) Pat's cooking spaghetti <u>late</u> caused the neighbour's calling the police.

In (11) it is not the event of cooking spaghetti that caused the calling of the police, but the event of cooking spaghetti <u>late</u>. In similar worlds where the cooking would be undertaken earlier there would be no event of calling the police by the neighbour. "Real causal statements talk about the non-occurrence of certain events. Pseudo-causal statements talk about the occurrence of events in a different manner. There is no event so fragile that it could not occur in a different manner" (Eckardt, 1998:65). The pseudo-causal statements indicate the existence of a focus property expressed by the event, which is not interpreted separately from the event.

The case of psych-verbs indicate a special kind of event; an experiencing event, where the participation of the two arguments into the event are considered to be either intentional or not. The experiencing event can be viewed equally as either controlled or uncontrolled on the part of the experiencer. This claim is proven by (12)--(14). The complexity of this event cannot be captured with the argument that an event e1 causes an event e2 in the case of the "frighten" verbs.

(12) Snakes frighten Mary.
   experiencing event:
a. unintentional on the part of the stimulus
b. uncontrolled and unconscious on the part of the experiencer

(13) John frightens Mary intentionally.
a. intentional on the part of the stimulus
b. uncontrolled and unconscious on the part of the experiencer

(14) The newspaper angered John
a. unintentional on the part of the stimulus
b. controlled and conscious on the part of the experiencer

Following the above assumptions about the nature of causation, it becomes apparent that a causative analysis could be revisited after all. If the nature of Object-experiencer predicates were purely causative, then the following formula (15), for the events expressed by the experiencer and the stimulus, x and y respectively, should hold (cf. Lewis (1973)):

(15) x depends causally on y iff $O(x)$, $O(y)$ and $\neg O(y) \rightarrow \neg O(x)$

The non-occurrence of the one event should cause the non-occurrence of the other. At this point, one question is appropriate: in what kind of events do the stimulus and the experiencer take part? The eventuality in which the experiencer takes part would be a stative one and the description would be similar to **being_afraid(k)**, where k is the participant of the event, or in other words, the argument with the thematic role of experiencer. The eventuality in which the stimulus participates could be viewed as expressing in an unspecified way that the stimulus causes the experiencing event with its presence, or as carrying a property P of an argument m representing the stimulus, namely **P(m)**, interpreted as being responsible for bringing about the stative event of being afraid. If we substitute x and y in the formula (15) with what we would assume is true and we accept the presence of a property P of the stimulus responsible for the causation, the formula (16) states that there is a property of m, namely P, responsible for the fear of k, which if does not occur, then neither does the fear of k.

(16) being_afraid(k) depends causally on P(m) iff O(being_afraid(k)), O(P(m)) and ¬O(P(m)) →
¬O(being_afraid(k))

The property P(m), however, is not tractable. The immediate question is: why should one assume a property of the stimulus at all? The immediate answer would be that in certain discourses it is possible to isolate a specific aspect or even property of the stimulus's presence that could represent the property P. It is not an aim of this paper to examine whether one should assume such a property, but to clarify that the information represented by the stimulus is not comprehensible. In most of the cases the reading of psych-verbs indicates an uncontrolled and unconscious mental state that the experiencer undergoes. Therefore, if the property responsible for the bringing about of the experiencing event denoted by the verb (e.g., the experience of fear), is not clarified, then it is also not clear how the formula (16) is satisfied, namely how it can be proven that the non-occurrence of the property P will result in the non-occurrence of the stative event being_afraid. Consequently, even in similar worlds where minimal changes of the actual world are noticed, the occurrence of the cause is not specified. This is evidence for the argument that causation is probably epiphenomenal and that its occurence in the semantic construction of the psych-verbs is doubtful. The same reasoning can be applied to the assumption that psych-verbs may express pseudocausal statements, since the property P is not specified at all, or else the truth value of the stimulus is not sufficient to justify the use of causation for psych verbs.

The reason that causal approaches have appeared in the case of Object-experiencer predicates is that there seems to be a preconditional relation between the two subevents in which the thematic roles, experiencer and stimulus, take part. A new proposal could suggest that the event in which the experiencer participates develops a bidirectional preconditional relation with the one that includes the stimulus. This relation is built upon the functional nature and tendencies of the two thematic roles and implies a complex event structure, but not a causal link between the two subevents.

Though from a different point of view, Kaufmann (1995a,b) also supports the idea that there may be no real causation, but simply a false impression about the existence of *cause*. According to her, the experiencer, based on its sortal characteristics, occupies the more prominent argument in the argument structure, however, there is an implicit assumption there has to be a reason for the creation of fear, a kind of impact. Therefore, the impression is created that there is a CAUSER. On the basis of the impact hierarchy[2] the stimulus should be a more prominent argument (Kaufmann, p.c.).

Following the argumentation of Kaufmann (1995a,b), thematic relations reveal their own characteristics. In the case of "fear" and "frighten" this becomes obvious. The experiencer is the more preferable and prominent argument, which at the same time owes its existence to the impact of a stimulus. Reversing this, stimulus is the less prominent argument, but at the same time addresses its impact upon the experiencer. Kaufmann (1995a, 1995b) observes that two main semantic factors influence the thematic hierarchy: the impact and the preference. The precise understanding of these factors is based on two main questions:

1. Which role impacts upon which?
2. Which is more preferable according to its characteristics?

The obvious answer to the first question is that the stimulus is the factor that transfers its impact. The answer to the second one is that it is the experiencer. Normal causative or agentive verbs employ a prominent argument, which encompasses both these factors In the case of the verbs "frighten" and "fear", however, when the impact is highlighted, then the stimulus is more prominent and is posited in the subject position. When the more preferable argument according to its sortally defined characteristics is stressed, then the experiencer is placed in the subject position. Therefore, this asymmetric perception of prominence is reflected in the syntax and justifies the argument realisation for the cases of "fear" and "frighten". Kaufmann's (1995a,b) analysis, though couched in a different theoretical framework than the one assumed here, supports the idea that a the notion of causation should be avoided since it seems to create additional undesirable complications without also providing a reliable and coherent explanation of the syntactic and semantic behaviour of psych verb. After discussing some aspects of the usage of causation for the psych verbs in this second part, interesting questions as to how the

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[2] Kaufmann suggests that there is an impact and a preference relation between the thematic roles, which specifies the prominence relation of the thematic hierarchy to a large degree.

causeD in SDRT could be refined so that safer conclusions and generalisations can be predicted about weaker interactions between eventualities.

5.   Conclusion

The current paper has attempted to provide an explanation for the difficulty in establishing coherent semantic representations for the two groups of psych verbs; namely Subject- and Object-experiencer predicates. The idea that rhetorical relations could be integrated into the lexical semantic representation and that lexical and discourse knowledge interact and are not considered unconnected levels in the semantic composition, led to the sullogism of the current work. The way semantic representation and interpretation is perceived in terms of SDRT supplies us with the valuable tool of rhetorical connections between different bits of information at the lexical level as well and captures the semantic effects desirable for the interpretation of both groups of psych verbs. Essentially, this paper constitutes an extension of the work by Asher and Pustejovsky (2000) and Asher and Lascarides (2003) in that it assumes the lexical representation presented initially by them, but extends the analysis for Subject-experiencer verbs. It achieves a plausible representation for this group of psych verbs by inferring a different rhetorical connection between their subevents. The right rhetorical relation interprets the aspectual properties correctly. The main aim of the second part of the paper was to trigger some thoughts about how safe it is to assume that psych verbs are just a variant of causative verbs and what kind of "weaker" relations could be assumed between the subevents of the complex event of psych verbs.

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