

Remarks on Relational Nouns and Relational Categories

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1 Introduction¹⁾

It is sometimes suggested that a certain kind of common nouns have their own “arguments,” at least at some conceptual level. For example, in recent research [8, 9] (cf. [2]), Gentner and her colleagues claim that nouns such as *victim*, *barrier*, *gift* have their own arguments. Such nouns are called “relational nouns,” distinguished from “object/entity nouns” that do not have their own arguments. A useful analogy “relational nouns: entity nouns:: verbs: nouns” [9, p. 154] is proposed to test for argumenthood. The distinction is based on their hypothetical distinction between “relational categories” and “object/entity categories.”

A similar distinction was independently proposed in [13] between “role(-denoting) names” and “object(-denoting) names,” which echoes Gentner’s distinction between relational categories and object categories. In Kuroda-Isahara’s theory, role-denoting nouns refer to either “situational roles” (specific to a “situation”) or “functions” (specific to “components” of an object), while object-denoting nouns refer to objects as “entities.”

From a different perspective, Nishiyama proposed a relevant distinction between “saturated” and “unsaturated” nouns [18] and “referential” and “nonreferential” nouns [19], both of which seem to be somehow related to Gentner’s and Kuroda-Isahara’s distinctions.

¹⁾This is a revised version of our paper presented in Proceedings of the 23rd Annual Meeting of the Japanese Cognitive Science Society (JCSS 23). One important correction deserves a mention here. In the original version, we misrepresented that Gentner [8] characterized *victim* as a relational role category with arguments, which turned out to be nearly false. Unlike Asmuth and Gentner [2, p. 163] explicitly says “*barrier* is a relational (role) category with three arguments,” Gentner didn’t characterize *victim* in this (loose) way. Rather, she carefully characterized *victim* as one of the relational role categories, along with other role categories like *thief*, *valued goods*, as serving as “arguments” of *robbery*, a relational schema category. So, part of our arguments against Gentner-style analysis was wrong. We would like to thank Yoshikata Shibuya (NICT) for his comments and corrections on the earlier versions of this paper.

In this paper, we will try to present a unifying perspective based on Kuroda-Isahara’s theory of roles [13], from which all the relevant phenomena are understood in terms of the generalized “part-of” relations.

2 Co-argument(ation) Effect

2.1 Relational categories, relational nouns

Gentner [8, p. 245] says:

- (1) By *relational categories*, I mean categories whose meanings consist either of (a) relations with other entities, as in *predator* or *gift*, or (b) internal relations among a set of components, as in *robbery* or *central force system*.

She goes on to say the following on [8, p. 246]:

- (2) Gentner and Kurtz [9], roughly following Markman and Stilwell [14], divided relational categories into *relational role categories* (or *role categories*), and *relational schema categories* (or *schema categories*). Role categories, such as *thief*, are defined by extrinsic relations: Their members all play the same role in a relational schema. Schema categories, such as *robbery*, are defined by *internal relational structure*. Schema categories denote relational systems, and they generally take arguments. Role categories often serve as the arguments of implicit or explicit schema categories.

But this is slightly different from what is said in Asmuth and Gentner [2, p. 163]:

- (3) This paper explores the psychology of relational nouns. Relational nouns refer to relational categories; categories whose membership is determined by common relational structure (including extrinsic relations to other entities, rather than by common properties (see Gentner and Kurtz [9]). For example, for X to be *a bridge*, X must connect two other points or entities; for X to be *a carivore*, X must eat animals. Relational categories contrast with entity categories like *radish* or *penguin*, whose

members share many intrinsic properties.

[...] Relational nouns have some commonalities with verbs and prepositions, in that their meanings are centered around extrinsic relations with other concepts. Relational nouns are also similar to verbs in that they are semantically unsaturated (i.e., they take arguments). A relational nouns takes an argument (often not obligatory) and assigns a thematic role. For example, *barrier* implies three arguments, not all of which need be explicit: a figure, something that blocks access, and a goal. This greater syntactic complexity more closely approximates the behavior of verbs than of entity nouns.

It is not clear if all relational nouns, or relational categories, have their own arguments. All relational schema categories must do so, as suggested in the following characterization by Gentner and Kurtz [9, p. 153]:

- (4) For example, *robbery* is a relational schema category with three arguments, each of which is a relational role category:

robbery(thief, goods, victim)

The three relational role categories are thief (agent who steals), goods (the things transferred), and victim (the one stolen from).

How about relational role categories, however. Do they have arguments? We believe they don't, and we claim that relational role categories just have co-arguments, rather than arguments. This seems to be what Gentner herself suggests in (1).

[2] stated that *a figure, something that blocks access, and a goal* are (conceptual) arguments of *barrier*. We find that such terminology is somewhat misleading, if not totally wrong.²⁾ First of all, it is a loose terminology that deviates from one of the basic assumptions of a theory of argument-predicate structure, i.e., arguments are arguments of a **predicate**.

But the crucial insight illustrated by the *victim* example is quite important: understanding that someone, *X*, is a *victim* requires that an unspecified ⟨harm-causation⟩ event takes place, in which *X* suffers (from) a *harm Z* caused by a *harm-cause(r) Y*. Without harm and harm-cause(r), the concept of *victim(s)* makes no sense. In this paper, this phenomenon is called the **(conceptual) co-argument(action) phenomenon/effect** (or just “conceptual dependency” phenomenon in the sense of [25]).

²⁾Here, we interpreted *barrier* as an relational role category. If was intended as a relational schema category, nothing is wrong.

But it raises another, more interesting problem: harm-causation, against which the relational category *victim* seems to be defined, need not have a specific name: *robbery* is just a special case. This means that there is no unique predicate that takes *victim* as one of its arguments. To see this is easy. We have all varieties of cases of *victim(s)* like the following:³⁾

- (5) *victim(s)* of { *a hurricane; an earthquake; a flood, a volcanic eruption; a purse snatcher; a random killer; a bank robbery; a risk-taking activity; Iraq's invasion; Hitler's ambition; a shark attack; venomous bites; the Black Death; ...* }

This set clearly predicts a **hierarchy of harm-causative events/situations**, but how is it organized, admitting that the set of harm-cause(r)s illustrated here is not homogeneous, looking like Wittgenstein's family resemblance? How do we accommodate it with conceptual hierarchies or “ontologies”?

One of the anonymous reviewers pointed out that Pustejovsky's theory of **Generative Lexicon** (GL) [20, 21] (cf. [28, 29, 30, 31, 32, 12, 26, 27]) has been attempting to deal with this kind of issues with its theory of **qualia structure**. We are thankful to this remark, regretting that space consideration forced us to omit references to the GL literature. In GL formalism, the argument structure and qualia structure of a lexical item, α , are schematically represented as follows [21, p. 57]:

$$\left[\begin{array}{l} \alpha \\ \text{ARGSTR} = \left[\begin{array}{l} \text{ARG1} = x \\ \dots \end{array} \right] \\ \text{QUALIA} = \left[\begin{array}{l} \text{CONST} = \text{what } x \text{ is made of} \\ \text{FORMAL} = \text{what } x \text{ is} \\ \text{TELIC} = \text{function of } x \\ \text{AGENTIVE} = \text{how } x \text{ come into being} \end{array} \right] \end{array} \right]$$

where CONST, FORMAL, TELIC and AGENTIVE stand for **constitutive, formal, telic and agentive roles**, respectively. Obviously, what we call “co-arguments” in this paper are the components of those “macro” roles that make up the qualia structure. See also **extended qualia structure** [3, 23] which enlarges the original qualia roles with finer-grained subtypes.

While the argument structure of α specifies the number and type of logical arguments of it, its qualia structure gives “a structural differentiation of the predicative force for a lexical item” [21, p. 56]. We rather address

³⁾An interesting GL-based approach to the interpretation of *A-no B* (“*B* of *A*”) is conducted in [28, 29, 30, 31, 32, 12, 26, 27].

where predicative forces of lexical items come from, and **how** they are differentiated, and thereby enrich the inventory of GL’s model of qualia structure. Under this, we would like to state that we are also trying to understand, in terms of (neurally realistic) cognitive processing, **where qualia structures come from, and how**. To us, adequate formalization of the effects isn’t enough.

All in all, the most crucial problem would be this: **What necessitates co-argumentation effect**, even if it is a side-effect of conceptual dependency? This is the question we want to address in the following.

2.2 Origin of co-arguments

Based on the problems discussed above, we suggest that it is desirable to distinguish “co-arguments” from “(proper) arguments.” If nouns $\{n_1, \dots, n_n\}$ are proper arguments of a predicate $p(a_1, \dots, a_n)$ ($n_i = a_i$), they are all “co-arguments” to one another, relative to p .

Thus, *robber*, (*valued*) *goods*, *victim* are (proper) arguments, or “conceptual constituents” that satisfy the “part-of” relation in *rob(bing)* or *robbery*, which is identified as a “relational schema category” by [8]. To make this definition work, we then assume the following property of “conceptual argumenthood,” largely based on Frame Theory [15] and Conceptual Dependency Theory [25]:

- (6) X is an “argument” of Y if and only if X is strictly “part” of Y , given that X and Y are in the relation of Gestalt.

By Gestalt, we mean the property that a whole and its parts are given at the same time, namely the modularity of the parts does not hold.

The definition in (6) gives us a very general, schematic statement like the following:

- (7) Generic: Substructures x_1, x_2, \dots, x_n are arguments of a whole structure Y
if and only if x_1, x_2, \dots, x_n constitute Y , if x_1, x_2, \dots, x_n and Y are in the relation of Gestalt.

The Gestalt property used in the definition is roughly the same as the property of conceptual dependency.

(7) is a general—and arguably too general—scheme that has two major classes like the following, depending on the property of Y :

- (8) Concrete cases: “components” are arguments of an “object.” For example, (a) *doors*, *seats*, *engine*

are arguments of a *car*; (b) *legs*, *top plate* are arguments of a *table*, but *windows* are not an argument of a *table*. (c) *handle*, *window* are arguments of a *door*; (d) *shore*, *bay*, *surface* are arguments of *sea*;

- (9) Abstract cases: “roles” or “functions” are arguments of a “situation.” For example, (a) *predator* and *prey* are arguments of the situation/event of *predation*. (b) *barrier* and *passenger* are arguments of the situation/event of *blocking* while *moving*. (c) *shield*₁ and *view* of a *viewer* are arguments of the situation/event of *occultation*. (d) *shield*₂ and *enemy’s attack* are arguments of the situation/event of *protection*.

As evident in the definitions above, the *part-whole* relation, with a Gestalt-like property, is a crucial criterion to define argumenthood, and it would be desirable, at least terminologically healthy, to disallow X ’s “argument” to refer to X ’s “external” structures (*doors*, *windows*, *seats* are external structures of the *engine* of a *car*), by limiting its reference to X ’s internal structure.

In this paper, we don’t provide evidence for the differentiation of “event-level” conceptualizations relevant to (7) from “object-level” conceptualizations relevant to (8). We will just try to show when the differentiation is useful and how it is done.

2.2.1 Resolving the functional polysemy of *shield*

A *shield* is arguably a relational noun: it denotes a function/role. What is messy about it is that it refers to multiple roles/functions, and is “relationally polysemous.” This poses a sense disambiguation problem—How is it possible to disambiguate among possible relational categories? The event-level generalization we proposed allows the sense of *shield* to be disambiguated relative to a set of concrete situations. The term is disambiguated to *shield*₁ if it refers to its role in the *occultation* situation, whereas it is disambiguated to *shield*₂ if it refers to its role in the *protection* situation. This way, we hope the proposed situation-based characterization of relational categories handles the disambiguation problem effectively. Virtually, no closed set of functions can be defined to any object.

Additionally, this kind of relational polysemy, in our sense, is crucially made use of in comprehension of metaphoric expressions, as argued in [16]. Their result is quite compatible with [2].

2.2.2 Resolving terminological matters

Crucial to the characterizations in (7)–(9) is the identification of situations, which we named under ⟨ predation ⟩, ⟨ blocking ⟩, ⟨ protection ⟩ for expository purposes. What we call “situations” here are called “(relational) schema categories” and distinguished from relational categories in [9, 8].

It is important to note that a number of terms have been already proposed and used, directly or indirectly, related to the notion of “relational schema categories,” even putting researchers in this field into a pot of terminological confusions. First of all, Minsky’s “frames” [15] is a generic term given to conceptual wholes with Gestalt-like property. The notion of “schemas” in Schema Theory [1, 24] is roughly the same kind of abstractions as frames. Adopting the Minsky’s terminology, Fillmore’s Frame Semantics [5] calls a conceptual whole as a “semantic frame” and defines it as a set of “semantic roles.” Semantic roles are renamed to “frame elements” in Berkeley FrameNet terminology [7].

Note, however, that general notions like schemas and (semantic) frames just provides a very —and arguably overly— general characterization at the level of (7). This why they are all quite inefficient to distinguish cases in (8) and (9). This is probably the most important insight in the identification of relational schema categories by [8] and of situation-specific roles by [13].

If this is true, it means, as suggested in §3.2, that if “event-level” conceptualizations that result in (9) are different from “object-level” conceptualizations that result in (8), and therefore, the distinction between (8) and (9) is crucial to characterization of human conceptualization patterns, all such too general notions are ineffective, if not useless.

2.3 When object nouns behave like relational nouns

Conceptualizations like (8) result in event-ontologies, whereas conceptualizations like (7) result in object-ontologies. Many of the relations in (8) are called “meronymic” relations in WordNet [4]. But it is not clear if we can apply the notion of meronymy to event-ontology.

It is crucial to note that the ontology of “functions” does belong to the object-ontology exemplified in (7) properly. Arguably, it rather belongs to the event-ontology exemplified in (8). For example, a *car* has

an *engine* to make *power* or *force*, and *wheels* to generate a *drive* by delivering the *force* to the *ground*, *seat* to hold a driver and back passengers. In other words, all components of a *car* have specific functions. Yet names like *engine*, *wheel(s)*, *seat(s)* are not names for the functions they perform: they are just related to the functions somehow.

Exceptions are such nouns as *heater*, *cooler*. Note that *heater* and *cooler* denote instrument-class roles in *heating* and *cooling* situations, respectively, and that the two are special cases of *temperature controller*. What are classes of these terms? The *heater* and *cooler* are relational nouns without question. But the answer to the following question is not obvious: Are nouns like *seat(s)*, *handle*, *wheel(s)*, *brake*, *engine* (of a *car*) relational nouns or object nouns?

2.3.1 The dilemma

Here is a problem, or a “dilemma,” to a theory of relational categories proposed in [8] that suggests that it needs refinements. Component names such as *seat*, *wheels*, *engine* are conceptually associated with specific “functions” strongly, and are highly expected to behave like relational nouns. Another example would be the relation of *money* to *price*, *money* behaves like a relational noun, but under a close examination, it would not be. The distinction of “pseudo”-relational nouns (e.g., *money*) from “real” relational nouns (e.g., *price*) is very hard to make.

Two subclasses of entity nouns need to be recognized: one class of entity nouns, i.e., “component” names such as *eye*, *mouth*, *seat*, *wheel*, are easier to “mimic” relational nouns, and another class, i.e., “non-component” names for “independent entities,” are not.⁴⁾ Predictions of this sort were partially confirmed in experiments in [17] for Japanese.

But this is a dilemma for Gentner’s theory of relational categories/nouns, because component names, by definition, cannot be relational nouns so as long as role names such as *heater*, *cooler*, *cleaner* correspond to relational categories. In the following, we propose a hypothesis to deal with this.

⁴⁾But it is another problem if there really exist independent entities in an absolute sense: even a *lake* and a *mountain* can be components of a *landscape*.

2.3.2 Representativeness effects to rescue

Many roles have representative realization/instantiation values, or simply “representative instances/values.” This has an interesting property to conceptualization:

- (10) **Representativeness effect on noun’s reference**
(Definition): Suppose a word w denotes an entity e that is a representative instance of a role $s.r$ specific to a situation s . Under this, making reference to e by saying w performs **indirect reference** to $s.r$, i.e., the role that e is a representative value of. The stronger e ’s representativeness to $s.r$ is, the easier the reference to $s.r$ made by w is. This effect of indirect reference is called the “representativeness effect.”

Under this, we can successfully attribute relevant relational, function-denoting properties to object names like *seat(s)*, *wheel(s)*, *engine*. Take the case of *seat(s)* for example:

- (11) *seat* names an object that is designed for a ⟨ person ⟩ to ⟨ sit in ⟩. This is a situation defined as an organization of two roles: ⟨ performer of sitting in ⟩ and ⟨ the place to sit in ⟩. The former role lacks a specific name for it (“sitter” sounds awkward), which is not so surprising. The latter role has *seat* for its specific name, and *seat* is a representative value of a ⟨ place to sit in ⟩.

By this, reference to a *seat* or even a *chair* can make an indirect, but very strong reference to its function of being a ⟨ place to sit in ⟩, one of the “affordances” [10, 22] provided by such entities. The same is true of *wheels* and *engine*.

The explanation above is not truly revealing because indirect reference by *seat* to ⟨ place to sit in ⟩ is virtually exclusive. Explanations of this kind get more revealing and interesting when indirect reference to a function is made only typically, not exclusively. Such cases give more convincing examples of representativeness effect. Glucksberg’s example [11, p. 95], *Cambodia is Vietnam’s Vietnam*, would be one of them.

Let us elaborate on relevant details.

3 Roles are situation-specific

During the research on the Japanese verb *osou*⁵⁾ [17], they noticed that certain nouns are not names for enti-

⁵⁾The meaning range of *osou*-sentences is large: natural English translations of *osou* range from *assault* in cases like *The army as-*

ties, but are names for “situation-specific roles” in the sense of Frame Semantics [5, 6] or “frame elements” in the sense of FrameNet [7].

Compare the *a*- and *b*-forms in the following cases:

- (12) Those { a. *victims*; b. *people* } were attacked by { a. *robbers*; b. *a group of masked men* }
- (13) Those *people* are *victims* of a recent { a. *disaster*; b. *hurricane* }.

Note that (12a, b) can refer to the same event, but they are in different modes of predication or conceptualizations if they do so. The same is true of (13a, b). It is easy to see that *people* is an instance of *victim*, *a group of men* is an instance of *robbers*, and *hurricane* is an instance of *disaster*. But how does one justify if *hurricane* is a *disaster* or not, for example?

3.1 Thesaurus is no help

Let us start by asking if thesauri are helpful to deal with these issues. Our answer is negative: most of them aren’t really useful to define roles. Let us justify this claim with examples. Events like *earthquake*, *hurricane* and *flood*, are proper cases of natural disaster. Also, events like *dollar crash*, *downturn*, *big red figures* are quasi-instances of social kind of disaster. Events like *The Black Death* come somewhere between the two cases.

Interestingly, you don’t find such information in most thesauri. WordNet [4] version 2.0, for example, doesn’t encode it, as the following definition of *hurricane* shows:

- (14) phenomenon: natural phenomenon: physical phenomenon: atmospheric phenomenon: storm: wind-storm: cyclone: { hurricane, typhoon, tornado }

Compare this with the following definition of *disaster*: action: change: change of state: termination: destruction: disaster

If we look into the senses of its hypernym, DESTRUCTION, we get a relevant sense: event: happening: ending: destruction: disaster = noun: An event (or the result of an event) that completely destroys something

saulted the peripheral cities, to *attack* in sentences like *The shark attacked swimmers*, to *hit* in sentences like *A hurricane hit the city*, to *suffer from* in cases like *He suffered from a stroke* (but only for the passive form of *osou*: in Japanese, sentences of the form analogous to ?**A stroke attacked him* are quite acceptable, but its English counterparts are obviously less acceptable).

Determining if *hurricane* is a *disaster* would be an easier case. With a thesaurus like WordNet, there would be no way to tell that *a group of three masked men* is an instance of *robber*, let alone *a group of three men in tuxedos*.

Compared to WordNet, the better way to go is to consult the database of “frames” and their “frame elements” provided by FrameNet [7]. The reason is to be clarified below, though in somewhat indirect ways.

3.2 Defining roles relative to situations

Some more examples of such role-denoting nouns are those in the following:

- (15) (a) *prey* of a *predator*; (b) *target* of an *attack* or *assault* by *intruders*, *enemy*, or of a *hunt* by *hunters*; (c) *casualties* of (or in) a *disaster* or a (*tragedic*) *accident*

One important question posed by those cases is this: **Where do such “collections of terms” as { *prey*, *predator* }, { *victim(s)*, *disaster* } come from?** In what follows, we will argue that they are derived from **knowledge of situations** that come in the form of **generalizations over events**, but before elaborating on the detail of this claim, we would like to make clear what we mean by “situations” first.

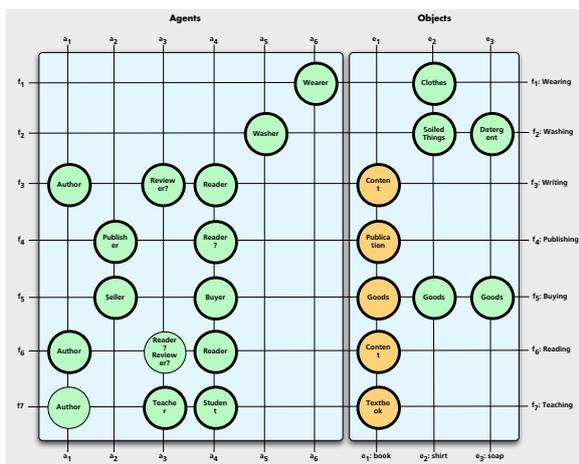


Figure 1: Role-grid: situations are arranged vertically; entities (agents and objects) arranged horizontally. Situation-specific roles such as ⟨reader⟩, ⟨author⟩ are defined where situations and entities meet. No circle indicates no definition.

Our tentative assumptions are the following: (i) situations are a natural result from a classification of events. The classification reflects human’s interests. So, a situation is given as a generalization over similar events. (ii) a situation determines what “role” and/or “function” a given object/entity has within it. In other words, the same entity can have different roles and/or functions in different situations. (iii) a situation and a set of roles determined by within it form a Gestalt, and all of them are given at the same time.

The crucial points are how to define “similarity measures” among events, and how to make them effective.

3.2.1 How entities are related to situations

There is an interesting relationship between entities and situations: their relationship is **orthogonal**, and roles are exactly what “hook” entities and situations together. The diagram in Figure 1 gives a partial specification of what roles *book* (e_1), *shirt* (e_2), *soap* (e_3) and some human agents (a_1, \dots, a_6) have relative to situations, ⟨wearing⟩, ⟨washing⟩, ⟨writing⟩, ⟨publishing⟩, ⟨buying⟩, ⟨reading⟩, and ⟨teaching⟩.

One caveat: the structure specified in Figure 1 is really partial. Situational knowledge of this form is indeed vast. Very often, situation-specific roles are defined, or “discovered,” through the “affordances” [10, 22] that entities have for agents who come to have an interaction with them.

3.2.2 Organization of a role hierarchy

Based on their detailed description of the polysemous structure of *osou*, [17] theorized that most situations have names for roles specific to them. Thus, we have role sets like the following:

- (16) (a) *predator* and its *prey* are names for the two major roles, i.e., agent-class and patient-class roles, of the *predation* situation. (b) *robber* and its *victim* with *valuables* to be stolen are names for the roles specific to the *robbery* situation. (c) *disaster* and its *victim* are names for the roles specific to *disaster* situation.

Note, however, that, as is evident with *victim*, certain role names are “generic” and shared by different situations. Actually, the *victim* role can be defined in terms of a variety of other situations. For example,

- (17) (a) *invader* and its *victim* name the role specific to the *invasion* situation. (b) *murderer* and its *victim* name the roles specific to the *murder* situation. (c) *assassin* and its *victim* name the roles specific to the *assassination* situation.

Additionally, there is a hierarchical relationship among roles. For example, an *assassin* is a special case of a *murderer*. By contrast, a *slaughterer* is another special case of *murderer*, but with a metaphoric connotation missing in *assassin*.

Another benefit from the proposed characterization of relational categories in terms of situation-specific roles is that it predicts that relational categories are hierarchically organized: if situations are hierarchically organized, so must be the roles. The only requirement to guarantee this is to assume that certain situations are at “super-ordinate” levels and situations at subordinate levels “inherit” structures from their super-ordinates. This is not a surprising property of conceptual organization but is nearly a truism about it.

3.3 If many roles are “nameless” ...

In many cases, inheritance relationship that runs hierarchically is implicit. This makes most roles “unnamed” and remain “nameless” even though they are recognized quite easily. This is an interesting point as it concerns two important issues. That is, 1) relational nouns like *victim(s)* have very large referential ranges in terms of event identification; and 2) metaphorical uses of relational nouns are so common and widespread.

As for the first point, the use of *victim(s)* is so robust in the *victim(s)* of *robbers*, *assailant*, *murderer*, *assassin*, *slaughterer*, and in a *disaster*, an *accident*, despite the fact that the role referred to by the precise meaning of *victim(s)* is different in each case. This can be easily confirmed by showing that *victim(s)* has a different representative instantiation value, a notion to be defined later, when paired with a different class of agent. The *victim* of *robbers* is most likely to be a *bank*, or a *warehouse of valuables* like a jewelry shop. While the *victim* of a *murderer* can be any human, the one of an *assassin* needs to be an important person like *politician*. The *victim* in/of a *disaster* is usually a large group of people instead of individuals. Semantic differentiation of this sort is due to the semantic co-variation on *victim* caused by its harm-causing agent.

As for the second point, we could hypothesize as follows, as a consequence of the representativeness effect

in (10):

- (18) Suppose you know what a specific situation *s* is, and you want to refer to a role *s.r* specific to *s*, but unfortunately, you don’t know the “proper” name for *s.r*. In this case, you may refer to *s.r* by (nick)naming it by another role name, *s'.r'*, that is specific to another situation *s'* if *s* and *s'* are similar enough and make no crucial differences under present considerations. In this way, a **metaphorical reference to *s'.r'* performs a “substituted” reference to an unnamed semantic role *s.r*.**

With this hypothesis it would be quite straightforward to handle what Glucksberg [11] calls “dual reference” of a metaphor vehicle, especially when it is defined as “[t]he communicative strategy of dual reference — using prototypical category member names to name non-lexicalized categories” [11, p. 95]. He is right in emphasizing that metaphor makes reference to something “unlexicalized.” In his example, *Cambodia was Vietnam’s Vietnam*, the first occurrence of *Vietman* refers to a real country, i.e., an entity, and the second occurrence, or the lexical pattern *x’s Vietman* (where *x* is a variable) for more clarity, refers to a role *s.r*, played or “realized” by a country that happens to be called “Vietnam,” in the situation *r* that happens to be called “Vietnam War.” The most important thing to note is that this *s.r* is a role of a specific situation *s* that most people find easier to give an example of than give a definition of.

4 Concluding Remarks

[8, 2] pointed out that relational nouns and object/entity nouns have different developmental profiles, the former being harder for children to acquire. This finding suggests that role-denoting nouns and object-denoting nouns are processed differently in terms of semantics and in terms of syntax as well. One piece of evidence for the former class is that, as we argued above based on the results in [16], role-denoting nouns are more ready for metaphorical use than object-denoting nouns, and that object-denoting nouns are ready for metaphorical use **only when** they behave like role-denoting nouns. This is not a trivial implication for a theory of metaphor in that it allows us to “predict” —rather than “state” in a *post hoc* way— what (kinds of) nouns are more likely to go figurative.

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