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. Introduction. The history of thematic roles (alternatively called 'case roles/relations' (Fillmore, 1968) and 'thematic relations' (Gruber, 1965)) in recent linguistic theory is one filled with varying conceptions of what these are, if indeed they exist at all.<sup>1</sup> They have at times been conceived of as purely syntactic objects (e.g. the 'theta roles' of Chomsky, 1981; the "case relations" of Fillmore, 1968), as names for parts of lexical/conceptual structure (e.g. Jackendoff, 1987), as purely semantic objects (Dowty, 1991; Parsons 1990, Carlson, 1984), or as epiphenomena (Ravin. 1990). The question of whether thematic roles are objects made reference to by a linguistic theory has been examined and re-examined with mixed results (Jackendoff (1972, 1987), Nishigauchi (1984), Dryer (1985), Bresnan (1982), Ladusaw and Dowty (1988), Ravin (1990) ). This is perhaps not surprising since thematic roles would appear to be dispensable entities in the sense that it is easy to conceive of how to write a lexicon, a syntax, a morphology, a semantics, or a pragmatics without them. Still, the observations surrounding thematic roles are just tantalizing enough to take notice, and make one wonder what they might be.

In this paper, I explore one possible answer to the question which moves them beyond the realm of linguistic theory. I am going to propose that we think of them as entities that play a conceptual role in the individuation of events. This paper, then, is an attempt to explore what kinds of results we get when we merge what have been to date two quite distinct concerns, the analysis of thematic roles in linguistics (though see Parsons, 1990), and issues about event individuation from philosophy.

Puzzles and assumptions about roles and events. In Carlson (1984) the question is raised as to why there is no verb like "skick" in English. The verb "skick" means about the same thing as "kick" except that it has an extra argument position, so that the sentence, "John skicked the

ball Bill" means that John and Bill (each) kicked he ball. In thematic terms, it would mean that both John and Bill are agents. The puzzle is intended universally, the implicit claim being that there is no verb of any language that acts like the apocryphal verb "skick". To my knowledge, no convincing counterexamples have appeared. The puzzle of course does not disappear for anyone who wishes to deny the existence of thematic roles. But countenancing thematic roles yields, I believe, a potentially interesting explanation.

In discussing "thematic roles", I am going to couch things in terms of a somewhat fictionalized "classical" conception of roles, and address refinements at a later point in the paper. The basic idea that there is a smallish, finite number of distinct roles with names like "Agent, " "Instrument," "Goal," "Patient," "Location," and so forth that have direct semantic import, which are "assigned" to the arguments of verbs in the lexicon. Each describes the "mode of participation" in an event for each argument of a verb or predicate. Bresnan (1982) summarizes the canonical pattern of thematic role assignment to arguments:

1. Coherence: no two distinct roles are ever assigned to the same argument
2. Completeness: each argument is assigned some role
3. Uniqueness: each argument of a verb is assigned a unique role (with respect to the other arguments of that same verb)

Most accounts of thematic roles reflect this pattern. This "classical" theory of roles has never quite been able to produce an exhaustive listing of roles or their names, nor any sure means of distinguishing or identifying them across instances. Still, enough is clear about the core ideas that make them worth talking about. However thematic roles become encoded, their inclusion has at least one theoretical merit: they place an extremely strong constraint on possible verb meanings in a language. Consider "thematic roles" as being distinguished entailments of argument positions of verbs, and that there is a relatively small number of them (say, somewhere between 12 and 50). There is the requirement that an entity  $a$  in a given argument position must satisfy the entailment that  $P(a)$ , where  $P$  is one of a small number of properties (see Dowty, 1991, for a possible listing of such properties). So, for instance, the requirement that the subject of the verb "feel" be sentient is



married Sue, then it has to be the case that Sue married Bob. A good indicator of whether a verb is symmetrical is whether there is a form with conjoined subjects that entails two nonconjoined forms:

1. Bob and Sue married.

--> Bob married Sue.

--> Sue married Bob.

It has often been noted that many verbs which would appear to be symmetrical at first sight in fact are not symmetrical. So, for instance, many verbs have symmetrical entailments with conjoined subjects, but the nonconjoined versions do not. Consider, for instance, the verb in (2), discussed by McCawley (1970):

2. John and Mary embraced.

--> John embraced Mary

--> Mary embraced John.

However, the sentence "John embraced Mary" does not itself entail that Mary also embraced John.

Thus, the two-place relation "embrace" is not a symmetrical relation.

In other cases, the entailment seems to go through with certain types of arguments, but not others. Consider the verb "collide" (Gleitman, 1969):

3. The car and the bus collided.

Thus, the two-place verb "collide" is not a symmetrical predicate, either. Similar argumentation eliminates from consideration many other apparently symmetrical predicates, such as "meet," "argue," "agree," and so forth.

But observations such as these still leave "marry," "match," "resemble," and others for which the symmetrical entailments would appear to hold. However, closer inspection of such predicates still yields evidence of asymmetries. Consider the verb "marry" in a sentence like:

5. Joni married Johnny.

On a thematic roles analysis of (5), Joni is considered the agent and that Johnny would be a non-agent. Joni, from the perspective of (5), is the one who can intentionally bring that state of affairs into being--as if her side of the arrangement is under discussion. The nominalized version makes things even clearer: in "Joni's marriage to Johnny" the preposition "to" marks Johnny as a GOAL, and it is Joni's, and not Johnny's marriage-act under discussion. Thus, even "marry" seems to posit an asymmetry between participants in its transitive version.

Even in the domain of states, substantial psychological research has revealed the elicitation of judgments of asymmetry even with predicates like "similar" and "identical". Tversky and Gati (1978) have shown that people rate differently sentences such as:

6. a. North Korea is similar to Red China.

b. Red China is similar to North Korea.

indicating that even "similar", and even "identical", are not symmetrical predicates. Similar conclusions are reached in the work of Leonard Talmy (e.g. Talmy, 1985). A linguistically-oriented comprehensive study by Gleitman et al (1993) has also recently yielded similar experimental results for a wide variety of apparently symmetrical predicates. Put informally, one might ask, if "identical" isn't a symmetrical predicate, then what is?

Now it does not follow that all of the demonstrated asymmetries in this literature are due to what we would call thematic role differences. Dowty (1991, Section 5) argues that 'perspective-dependent' asymmetries of the type discussed by Talmy (1985) among others are not true thematic role differences, but belong to another class of phenomena. Actually, given that the perspective-

dependent asymmetries still differentiate arguments, whether they are thematic roles or not does not affect the point of this paper.<sup>2</sup>

Events. We're going to turn now to a discussion of events. What I'd like to do here is to derive the absence of the verb "skick" and all such similar verbs by putting together a number of different ideas. What we are trying to get at in this section is to ask for any given sentence how many events are "under discussion". This presumes, of course, that some reference to events is a part of the semantics of a sentence, and we're going to take this for granted. The work of Davidson (1967) is probably the best-known exemplar of a view of the semantics of sentences incorporating reference to events.

A few preliminary words about events before we go any further. By "event" I intend a spatially and temporally bounded, ephemeral constituent of the world that has but a single occurrence. These are to be distinguished from event-types, which unlike (token) events may occur and re-occur. I am going to shy away from nominalized reference to events, such as "that party" or "the stabbing of Caesar by Brutus," since principles that apply to verbs and sentences might well not carry over to these expressions, a point often left aside in the literature on events. I also do not think that the noun "event" itself is a sortal. Asking how many events have occurred at a given time is like asking how many "things" there are in a room at a given time. It is only when a sortal concept is invoked that we can get clear answers to such questions (e.g. how many takings of a test, or how many people). Nevertheless, I persist in locutions asking us to count "events".

I assume that in certain canonical cases we know how many events of a given type are under discussion. For instance, in a sentence with only singular terms such as (7), one event is "under discussion":

7. John ate the hot dog.

A canonical case of a sentence in which two events are "under discussion" is (8) where two sentences containing only singular terms are conjoined:

8. John ate the hot dog and Betty ate the apple.

In (8), despite the fact that both events are eating events, we will take it that they are different eating events. In virtue of what do we make this claim? Obviously in this case, in virtue of the difference in participants. One event has John and a hot dog in it, the other has Betty and an apple in it, and they are different objects in the world, and that is why they are different events. I take it that this is intuitive.

It is of course not always the case that a difference in the list of participants in an event will yield an intuition that different events are under discussion. Consider (9):

9. a. John ate a hot dog.

b. John ate at Zab's Eatery.

One sentence is about John and a hot dog, the other mentions John and an eating place. Yet, both could, perhaps, be used to describe the same event. It's easy to understand in this case why: the hot dog and the eating place play different roles in the event, quite unlike the case of the apple and the hot dog, or John and Betty, in (9). Thus, if two distinct entities play different roles, the events described may still be the same. These intuitive observations lead to the following observation, which I eventually wish to elevate to the level of a principle:

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(in slogan form: "Two agents, two events!")

That is, if we are considering a description of some occurrence in the world, and we observe that two distinct entities play the same role in events of the same type, then we are describing two events, and not one.

At this point, more than a little more detail is called for. We start out by assuming that it is quite possible that events may have alternative descriptions. Just as it seems reasonable to assume that the locutions "Jane Smith" and "the president of the bank" may on a given occasion be used to refer to the same individual, so too it seems reasonable that "John ate" and "John had lunch" could well be alternative descriptions of the same thing, an event. I also take it that if two events have disjoint spatial or temporal locations, they are different events. If John looked at a hot dog yesterday, and he looked at the same hot dog today, and there was a period of time between them

when he was not looking at the hot dog, then there are two distinct events even if they are of the same type and have the same participants.<sup>3</sup> But events with distinct locations have not been the focus of discussion about event individuation. Rather, the questions tend to center around cases where locations are the same, or very difficult to distinguish--it is these cases where a thematic roles analysis will prove most helpful. We will examine some cases shortly.

We have not gotten to an account of "skick" yet, though, since it is possible that verbs can denote multiplicities of events, and these multiplicities can have more than one entity playing the same role.<sup>4</sup> However, if we adopt an analysis very similar to that of Davidson (1967), we can derive the non-occurrence of "skick." Davidson's well-known analysis posits that verbs have an unexpressed additional argument place called the "event-argument" (see Kratzer (1995) for some of



In light of this, consider what the verb "skick" would have to look like. "John skicked the ball Bill" would come out as (12):

12. e [skicking(e) & Agent (e, John) & Agent (e, Bill) & Theme (e, the ball)]

This cannot define any value of e that is a singular event, since e would need to "have" two agents. But if it has two agents, it is not a singular event, and verbs express only singular events, so there is no value of e which allows (12) to be true under any circumstances.

. Pluralities. We have left a number of topics in abeyance, which we will now examine in light of the hypothesis presented above. The first concerns how we are to analyze sentences with plural noun phrases in them, since they represent prima facie counterexamples to the claim that verbs denote singular events.

In the research on plurals, it is commonly agreed that a sentence like (16) has two distinct readings:

13. Five boys carried a piano up the stairs.

(See Link (1987, 1993), Roberts (1987), Lasersohn (1995), Schwartzschild (1992, 1996) for discussions). One reading, the distributive reading, has it that each boy carried a piano up the stairs individually, and so there were five events of some piano or other being carried up the stairs. On the other reading, the group reading, the five boys collectively got together and managed to carry the piano up the stairs, and so there is just one event under discussion here (given the weight of a piano, this is the more likely scenario). Now on the group reading, there may be further entailments about what each individual of the group must have done (e.g. in this case it is tempting to think that each boy had to have helped in some way), but the group itself is what carried the piano.

On a thematic roles analysis, then, the group itself is the sole agent of the carrying event on that reading, and so it is a singular event. But on the distributive reading, there is a different agent for each of the five events of carrying, and so there would be five distinct events. There are various formal ways of expressing this, the choice being of no immediate concern. But, for instance, on a neo-Davidsonian analysis, one might posit the following:

14. Group-reading:

e [carrying(e) & Agent(e, five boys) & Theme (e, piano)]

15. Distributive reading:

Five x [

A certain amount of support for the idea that reciprocal predicates without "each other" comes from the observation that predicates in general can have reciprocals, but only a subset of them have non-reciprocal intransitive forms. Thus, alongside (19), we have the examples of (20).

19. a. John and Mary argued (with each other).

b. Millie and Pat fought (with each other)

c. Tom and Sue married (each other)

d. The twins are similar (to each other).

20. a. John and Mary men" er).

Besides the irrelevant reading where "they" refers to a group in the context, they note that it can be taken three ways:

- (a) John told Mary that he should leave, and Mary told John that she should leave.
- (b) John told Mary that she should leave, and Mary told John that he should leave.
- (c) John told Mary, and Mary told John, "We should leave."

In the first two instances, what Heim et al call the "I" and "you" readings, the pronoun "they" is interpreted as singular in value. On the (c) reading, though, "they" receives a plural interpretation. Note that if the embedded predicate is a group-level predicate, only the last reading emerges:

- 22. John and Mary told each other that they should gather in the foyer.

(Assuming a group of two is big enough to "gather"). Only the reading corresponding to (c) above emerges, the singular readings for the pronoun being absent. If "gather" is a group-level predicate, this is to be expected.

In this light, consider the examples of (23-26) below:

- 23. a. Bill and Mary (each) thought that they had kissed each other
  - b. Bill and Mary (each) thought that they had kissed.
- 24. a. The linebacker and the fullback said that they had collided with each other head-on.
  - b. The linebacker and the fullback said that they had collided head-on.
- 25. a. Beth and Sue believed that they had exchanged glances with each other furtively.
  - b. Beth and Sue believed that they had exchanged glances furtively.
- 26. a. John and Sally wanted to marry each other quickly
  - b. John and Sally wanted to marry quickly.

In these examples, "each other" appears within the embedded clause along with a contrasting example where the reciprocal intransitive version appears instead. Compare the interpretations of (23 a,b). (23a) has the full range of the readings that (21) also did. It could be that Bill thought he kissed Mary, and Mary thought that she kissed Bill, but each is unaware of and kissing by the other. Or, on the "you" reading, each could be aware of having been kissed by the other, and

unaware of their own actions. And finally, each could be aware of the reciprocal nature of the interaction (the group "we" reading).

In contrast, consider the interpretation of (23b). There is but one interpretation there, where the reciprocal nature of the interaction is in the awareness of both individuals. This is the group-reading only. Similar observations can be made about the remaining examples (24-26). In all, the intransitive version has only the "we" reading, whereas the transitive version with the reciprocal form in object position allows all the readings.

What has been at stake all along here? Recall our claim that verbs do not in and of themselves have in their sortal domain pluralities of events. Yet, we do have sentences, as we have seen, which express pluralities of events. However, the claim is, that this ability to express a plurality of events arises from operator in the sentence, such as a plural NP, distinct from the verb itself. A problematic case becomes an example like "John and Bill met" which would appear at first sight to express a plurality. We cannot treat these as expressing a plurality in the same way we dealt with the distributive reading of an example such as (13) because these depend on a series of substitutions of singular values for entities in an open sentence like "x carried a piano upstairs." In the case of "Five boys met" though, substitution of a singular value for x in "x met" does not yield a sensible semantic interpretation (e.g. "John met" is not acceptable). Thus, two alternatives present themselves. Either a predicate like "meet" expresses a plurality of events by itself, in which case it assigns multiple thematic roles to the individuals in the group denoted by its subject NP, or else it is truly a group-level predicate denoting a singular event, in which case it need only assign a single thematic role to the group denoted by the subject NP. Evidence has been shown that in fact this latter analysis is the correct one, as predicted by the principle that singular events only are within the sortal domain of verbs.

This result is minorly surprising in that it predicts that the semantics of "John and Bill met" is different from the seemingly synonymous "John and Bill met each other." In the former sentence, it is a matter of lexical entailment that John met Bill and Bill met John, whereas in the latter, that John met Bill and Bill met John is what is directly expressed by the sentence, thanks to

the presence of the reciprocal expression in the VP. Nevertheless, there is some support for believing in fact they are distinct in just this way. The notion that verbs have in their sortal range only singular events can also be gotten from observations about the distribution of NP's containing "same" and "different" as discussed in Carlson (1987). There, it is observed that NP's like "different men" or "the same movie" can only appear in sentences where there is some independent pluralizing operator. No verb of the language appears to be able to directly take these NP's as arguments (on the so-called "sentence-internal" reading, that is). This is to be expected if verbs alone express only singular events, whereas "same" and "different" require pluralities of events, and is in conformity with the views expressed here. See Carlson (1987) for details.

Some philosophical consequences. Thus far, I have been assuming a somewhat fictional "classical" theory of thematic roles. However, the work of Jackendoff, Culicover and Wilkins, Dowty, and others has explored other alternatives to the classical ideas. For instance, Jackendoff (1987) and Culicover and Wilkins (1986) have suggested that thematic roles are "tiered" and may

argument positions for a verb, a number which is probably in the range of 3-5). However, the usefulness and interest of the notion that thematic roles help individuate events does depend to a large extent on what the precise inventory of roles turns out to be. However, let us explore some consequences of the analysis presented so far.

Let us consider the well-worn example of Caesar's demise. Consider first:

27. a. Brutus killed Caesar.

b. Caesar died.

In this case, the thematic role assigned the object of "kill" is the same as the role assigned the subject of "die," so these could be the same event. Now, let us ask whether:

28. Brutus stabbed Caesar

is the same event as either. We take Brutus to be AGENT here, as we do with "kill," and Caesar to be the LOCATION (could also be THEME or PATIENT) associated with "stab." Thus, they could be the same event. Note, however, that if we include an instrument in the killing and the stabbing, and they are distinct entities, what our intuitions are:

29. a. Brutus stabbed Caesar with a dagger.

b. Brutus killed Caesar with a length of rope.

Note suddenly we get the very clear intuition that the stabbing has a very different relationship to the killing, an intuition we did not have about the previous examples where the instruments were left undisclosed.<sup>5</sup> If (29b) is in fact an accurate description of things, then (29a) cannot be. Thus, it leaves open the possibility that the killing, the death, and the stabbing, all constitute the same event. A thematic roles analysis is never going to tell us if two descriptions of events are definitely identical (since spatio-temporal locations must be the same), it will only be able to tell us if they are distinct. Let's look at such an example.

30. a. We are engaging in a conference.

b. Goblins are engaging in a battle.

Since we are not goblins, and a conference is in fact distinct from a battle, the verb "engage (in)" assigns whatever thematic role it does to two distinct subjects, and to its two distinct objects.

Hence, there must be at least two events described by these sentences. Or, consider the argument that two events can have the same location, where a metal ball rotates 35 degrees in a given minute, and warms 25 degrees, in that same minute. If there is a thematic role for the measure phrase, let us call it EXTENT, and we take it that 35 degrees of angle is distinct from 25 degrees of temperature, then surely these are different events.

Now consider a type of example due to Goldman (1970), which he describes as "level-generation" of events. Consider whether the two following events would be identical in a situation where John is driving a car:

31. a. John signaled a left turn.

b. John stuck his arm out the window.

If both objects are THEME, and a left turn is not an arm, then the events would have to be distinct. But we can elaborate on these examples some. Consider where John has a poorly functioning left arm:

32. a. John signaled a left turn with a broomstick/with his left arm.

b. John stuck his left arm out the window with a broomstick.

Note that the addition of the INSTRUMENT phrase in each shows that the signaling event is distinct from the sticking-arm-out event. The broomstick cannot be the instrument of both events described and be understood as describing the same situation. If it is the one imagined, the broomstick could be the instrument in sticking the arm out the window, but the arm, and not the broomstick, is the instrument of signaling.

Finally consider a puzzle presented by Lombard (1985). He presents three sentences:

33. a. John flipped the light switch.

b. John illuminated the room.



c. John alerted the burglar.

The idea is that John turns on the room lights, alerting the burglar, and the question is whether there is but one event here that is variously described in these three ways, or whether there is more than one event here. The question we would pose here is whether any of the roles necessary here get assigned to two or more distinct entities. If, for instance, each of the direct objects in these sentences is assigned PATIENT, and this was the correct thematic analysis, then we would have to

"moderately large" number of events in the world. There are far fewer events than available descriptions, but still, in general, we find that:

i) When one event supervenes on another, as in sticking one's arm out the car window and signaling a left turn, the events are distinct.

ii) Such converses as buying and selling require that two logically dependent but nevertheless separable events take place.

iii) In cases such as A and B colliding, being married, etc, again, two distinct events are required.

Finally, if this view has any merit, it follows that event individuation logically depends upon individuation of entities that play roles in events.

#### Footnotes

1. Versions of this paper have been presented at SUNY/Buffalo, Yale University, and the University of Rochester. This paper has gained markedly from comments at these presentations. I wish to thank Peter Lasersohn, Hana Filip and Jim Higginbotham for some very helpful discussions. Preparation of this paper was generously supported by NSF grant IRI-9503312.

2. Still a brief comment may be in order. Consider the predicate 'be near', surely a symmetrical predicate, though it displays asymmetries, e.g. "The bicycle is near the garage" is preferable to "?The garage is near the bicycle." Note that this asymmetry depends upon the assumed size and stationariness of the object itself. If, for instance, the garage under discussion is a small plastic play object and the bicycle is normal size, then the intuitions are reversed. That is, mobility would seem to be a factor here in subject selection. If the objects are equally mobile, then no preference emerges (e.g. "The boy is near the girl" vs. "The girl is near the boy."). However, IF there is a mobility distinction, then it is the subject position that expresses the more mobile object, and the object of "near" is the more fixed object.

Similar observations can be made about certain verbs. Take "disconnect" (also mentioned by Dowty). Now, if we are disconnecting two objects of roughly the same mobility, no preference difference emerges: "

i) John disconnected the amplifier from the CD player

ii) John disconnected the CD player from the amplifier

However, if mobility differences come into play, the direct object expresses the more mobile object:

iii) John disconnected the hose from the house

iv) vs. ??John disconnected the house from the garden hose

Now, according to Dowty, this distinction is not a thematic difference despite the fact that motion is a feature of both proto roles (though his analysis would appear to predict that the direct objects should be the more stationary). It is not clear what predictions would be made regarding sentences like "John disconnected the CD player and the amplifier" on Dowty's analysis. However, on the analysis offered in this paper the conjoined direct object requires that the thematic role properties in the conjunction be satisfied also in both the entailed non-conjoined versions. Thus, "John disconnected the CD player and the amplifier" is fine because both (i) and (ii) are fine. However, "?John disconnected the house and the hose" is predicted to be just as strange as (iv), which seems about right. See also Delancey (1991) for another type of discussion of this issue.

3. Actually, on the analysis of episodic predicates in Carlson (1980), even these cases would involve different participants and hence be different events.

4. I intend, multiplicities of events of the same type. However, Peter Lasersohn and Hana Filip have brought to my attention examples like

i. John hit the ball over the fence.

ii. Jane cracked the walnuts into the bowl

which plausibly describe multiple events of different types (e.g. in the first, the hitting of the ball and it going over the fence, in the second, the breaking of the walnuts and their falling into the bowl). See Goldberg (1991), Fillmore (1977), and Levin and Rappaport Hovav (1995).

5. It is entirely plausible to assume that distinct events only emerge from having distinct entities playing the same role. Thus, part-whole relations do not result in distinct entities, nor, it would seem, in distinct events. For instance, if Brutus stabbed Caesar with a knife in the back, to say there was another event of him stabbing Caesar in the upper back with the blade of the knife (etc) would promise to yield way too many events. If part-whole relations do not count as creating distinct entities, however, then in this case we have alternative descriptions of the same event.

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