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Frame Semantics for Motion Verbs  
with Application to Metaphor<sup>1</sup>.

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I want to propose a method of doing descriptive semantics for motion verbs. The basic tool I will use is called a graph of interaction. These graphs have been introduced by the topologist Rene Thom. They represent simple models of interactions which can be used to specify a basic framework for understanding the invariant properties of motion verbs. Let me give an example. In (1) I present a graph Thom calls "the gift." The graph describes an interaction between three actants, each represented by a line. We may say that each actant performs a role in the interaction. In (1) we have a sender, S, the bottom line; a receiver, R, the top line; and line G that goes from S to R, representing the transferred actant. Time is thought to move from left to right in (1).



It is easy to use (1) to specify the content of motion verbs such as give and put. Following an observation of Leonard Talmy, (1) specifies the content of give provided the receiver role is filled by an animate noun, but if the receiver is inanimate (1) represents put. Examples are in (2) and (3).

- (2) I gave flowers to Alice.  
(3) I put the flowers in a vase.

I will call this specification the basic frame of give and put. Other, less literal uses will be derived by substitutions of one sort or another. We will come to these after presenting some evidence in support of my analysis.

There are six verb-particle constructions in English in which give and put correspond in just the manner I have claimed, animate versus inanimate receiver.

- (4) away a. I gave my worldly goods away to the poor.  
b. I put my books away in the bookcase.  
(5) back a. I gave the pen back to Bill.  
b. I put the pot back on the stove.  
(6) off a. The flowers gave off a pungent perfume.  
b. I put off my work until tomorrow.  
(7) out a. Ziegler gave false information out to the press.  
b. I put the clothes out on the line.  
(8) over a. I gave my gun over to the policeman.  
b. My contribution put the total over the goal.  
(9) up a. Mary gave her gun up to the policeman.  
b. John put strawberries up in jars.

A few comments on (4)-(9) are necessary. First, the pronoun test shows these are all verb-particle constructions. That is, if a pronoun is substituted for the noun in direct object position (here corresponding to the actant G), it must come between the verb and the preposition. I verify this for (4) in (10); the rest are similar.

- (10) a. I gave away my worldly goods.  
         I gave them away.  
         \*I gave away them.  
       b. I put away my books.  
         I put them away.  
         \*I put away them.

Notice that in (10) I have suppressed the phrase designating the receiver. Yet any representation of the acceptable sentences in (10) must include mention of the receiver actant. This can be argued in two ways. First, a discourse as simple as (11) is incoherent unless we infer the presence of a receiver actant, and that it is the table<sub>j</sub> rather than John.

- (11) I put away my books<sub>i</sub>. John picked them<sub>i</sub> up off the table<sub>j</sub>.

A second argument comes from the anomaly in (12); we cannot cancel the receiver actant. The cancellation test is a good way to find an unmentioned actant.

- (12) \*I put my books away nowhere.

It should be noted in connection with this test that its application to (6a) gives a version of a traditional philosophical question, as in (13).

- (13) \*The flowers gave off a pungent perfume to noone.

To be sure a philosopher might argue that (13) makes sense, but a science fiction writer might make a similar claim for (12). In either case the important linguistic fact is that these starred sentences require very considerable discourse support to undo the anomaly.

One of the functions of frame semantics is to identify various levels of anomaly. Anomaly can only be defined with respect to a given context. The notion of context embodied in my theory is the graph of interaction. Metaphors, which are considerably less anomalous than (12) and (13), result from substitutions in the basic frame of these verbs. These substitutions leave the graph of interaction invariant. One way of characterizing the badness of (12) and (13) is that they express contradictory information about the structure of the interaction described. Metaphors are merely ontologically peculiar. Already in (6a) we have had a sentence in which an inanimate subject is being said to give something. Let us consider some other simple metaphors using give and put.

- (14) I gave in to temptation.  
 (15) John gave himself to the theater.  
 (16) Bill put strange ideas in Mary's head.  
 (17) I put the question to Bill.

The distinguishing basic frame properties of the verbs give and put have been reversed in (14)-(17). We need to express facts such as this in our theory. I believe the best way to capture the essential quality of these metaphors lies in the "case" notions of Fillmore. I will generally follow the 1971 version, but with the variations that are called for. By the term "case frame" for a verb, I understand a list that includes the interaction described and case assignments for each actant. A basic frame is then a particular case frame in my expanded sense of that term. The basic frames for give and put are given in (18) and (19) respectively.

- (18) give: gift interaction, S=Agent, G=Object, R=Experiencer  
 (19) put: gift interaction, S=Agent, G=Object, R=Goal

Sentences (14) and (15) have inanimate nouns in the receiver role. This changes the case frame from (18), the receiver is a Goal in the metaphorical expressions instead of an Experiencer. Similarly (16) and (17) differ from (19) with an Experiencer instead of a Goal. One might want to go further in characterizing the metaphors by representing the semantic transformation itself as part of the meaning. By this I mean that (14) and (15) could be said to "personify" the receiver nouns. This might be considered a residue of the basic frame, the animateness somehow hangs on, survives the substitution. I will not explore this refinement. It is more important to discuss substitutions in the sender role.

We already have in (6a) an expression with give that does not have an Agent in the sender role. The case of flowers in (6a) is Source presumably, because there is no intention in the interaction. But this assignment requires that we stretch Fillmore's original notion quite a bit. Source was intended to be temporal or spatial. Perhaps the latter sense applies to (6a), but this solution will not work for more abstract senders. I give some examples of this phenomenon below; (20) is taken from Georgia Green (1974).

- (20) Mary's behavior gave John an idea.  
 (21) Poverty gave John a saintly feeling.  
 (22) Mary's behavior put John uptight.  
                                   on guard.  
                                   in seventh heaven.

If we want to stay within Fillmore's inventory of cases, the subjects of (20)-(22) must be assigned Source. But these sen-

tences involve a notion of psychological motivation that does not naturally fit into the spatial/temporal notion of Source. A variety of solutions are possible for this problem. I will outline one which seems attractive to me.

Sentences like (20)-(22) and (23) and (24) involve a kind of causality that is qualitatively different from that associated with the notion of Agent.

- (23) Ambition drove John to greatness.  
 (24) John is given to abominable practices.

The standard causal situation involves only one locus of intention, situated in the animate actant Agent. The metaphors I have been considering complicate the standard situation in one way or another. In (20) one might argue that either two intentional actants are present, or that the causality resides in the abstraction "behavior." A similar complication is involved in (21)-(24). I propose that we add to the inventory of cases a category for non-standard causation. This idea has been suggested in a different context by Huddleston (1970), who suggested that the case "Force" be introduced to handle non-intentional activity such as (25).

- (25) The wind opened the door.

The version of a non-standard causality notion that I prefer may be called Agitator. By this term I understand a broader notion than non-intentional Force, but one which includes the latter. As I will use the term Agitator is something of a wastebasket. I throw into it anything that will not fit into the standard causal situation. The advantage to making up this new category is that we can use properties of the graphs of interaction to characterize properties of the Agitator case. It will take some argument to get to this point. For now, I will begin by looking again at (20)-(24).

What is needed to characterize the semantic structure of these metaphors is a concept like incitement, inducing motion in an actant. The psychological term motivation, after all, means to cause to move. It is not clear whether Huddleston means his Force case to designate compulsion, but such an interpretation would not go happily with (20) or (21). Agitator should be thought of as involving degrees of compulsion. Some degree of constraint is implied by (22)-(23). The grammar of (24) is elusive on this point. (24) looks like a passive, but the former subject of the sentence has become so unemployed as to be absent. Presumably, however, a reason clause, i.e. an abstract sender, is the missing actant. In (26) I suggest some possibilities.

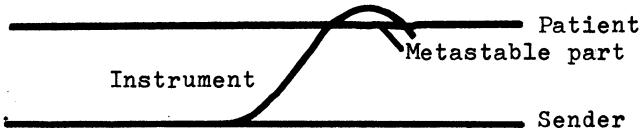
- (26) John is given to abominable practices due to \*nothing  
 witchcraft  
 insecurity

Again the case we assign to the sender in (24) and (26) must specify the psychological source. Moreover we understand that John is not entirely in control of the situation described by these sentences. Wood, in his helpful collection English Verbal Idioms, glosses expressions like (24) and (26) as conveying addiction. Perhaps if abominable were changed to harmless the notion would be closer to inclination. In any event, the causal character of these sentences can be indicated by assigning Agitator to the sender.

An argument for the necessity of this additional case must be based on examples that cannot be handled without it. All our examples so far would be called Instrument by Fillmore. The crucial evidence involves interactions more complicated than (1). The sentence (27) describes an interaction of excision whose graph is given in (28).

(27) I sliced off a piece of salami with a knife.

(28)



The basic frame for verbs like slice, cut-off and wash is an animate Agent in the sender role, an inanimate Instrument, the Patient role filled by an Object NP and the Goal case assigned to the Metastable (or excised) part. (27) exhibits this basic frame and so does one reading of (29). There is

(29) The boy's arm knocked the glass off the table.

a reading of (29), however, in which the action is unintentional. On this reading we cannot call the boy an Agent, so we say he is the Agitator. The importance of this example is that it removes one of Fillmore's objections to Huddleston's Force. Fillmore says that Force is unnecessary because it never co-occurs with either Agent or Instrument. On the unintentional reading of (29) we have a counter-example to this claim. Rejecting a notion like Force or Agitator makes it impossible to represent the two senses of (29) or any other sentence in which intentionality is unspecified.

It will be instructive to compare a frame analysis of a non-basic excision with the analysis of traditional case grammar. Consider (30).

(30) The wind threw me against the aerial, breaking it off the car.

The clausal complexity of (30) suggests breaking it down into a higher sentence in which wind is Instrument and the pronoun is Object. In the lower sentence the pronoun is the Instrument.

The result of such a standard analysis is that the actant named by the pronoun is assigned two cases, Object and Instrument, albeit in different clauses. The net effect of this procedure is to code the dual notion of Agitator onto this actant. If there is an Agitator, there must be an Agitatee also. The double case role of me is nothing other than a way of saying that its instrumental function is due to an outside influence; in short, that it is agitated into action. Let us consider another non-standard excision as in (31).

(31) The governor inspired the chancellor to slash the budget by dropping the Linguistics Department.

I will confine myself to the interpretation of (31) in which the dropping is done by the chancellor. Then (31) maps onto (28) in a simple way: governor is the Agitator and sender, the chancellor is in the Instrument role and case, budget is Object and the Goal is Linguistics Department. Again there is a representation of this in the standard analysis. This time the Agitatee gets assigned Goal in the higher sentence and Agent in the lower. I conclude from such comparisons that a notion like Agitator is already present in case grammar, but it is buried in too narrow a notation. My quarrel is not with assigning more than one case to a noun, that will be inevitable for sentences like (32).

(32) Bill had me give him a gift.

The difficulty with the standard solution for (30) and (31) is that it does not generalize.

The kind of frame semantics I have been advocating allows the Agitator case to be assigned to a range of examples in a principled manner. As an approximation to a rule of Agitator assignment, I offer (33).

- (33) Assign  $NP_i$  to Agitator case if either
- i) an animate  $NP_i$  intentionally emits a non-coreferential animate actant  $NP_j$ .
  - ii) a non-concrete, non-intentional actant  $NP_i$  emits any actant.

(33) will account for all examples of non-standard causality that have been discussed here. There are examples of sentences for which (33) is not perfectly clear; one such is (34).

(34) Mary gave up John to those abominable practices.

Although (34) meets (33i) I am not entirely comfortable with labelling Mary's role to be that of Agitator. I will not pursue this matter here. The important thing about a formulation such as (33) is that it allows case to be assigned on the basis of a property of the graph of interaction and well known semantic



distinctions such as animateness, concreteness and intention. Moreover this formulation allows some metaphorical expressions to be brought into the framework of semantic theory. Metaphors and idiomatic uses of motion verbs are still quite a difficult problem, but some of their problems can at least be formulated by the use of the graphs of interaction.

A rule like (33) shows that frame violations do not have to be treated one at a time, but that generalizations about non-literal meaning are possible. This possibility depends upon the assumption that models of interaction play an essential role in semantics. Such an assumption amounts to a claim about the structure of the lexicon. I formulate a naive and too strong version of this claim in (35).

- (35)a. Motion verbs invariantly refer to canonical representations of interactions.  
 b. Metaphors change the ontological status of actants, but keep the interaction constant.

(35b) does not account for the elliptical quality of many idioms. For examples I return again to the verbs give and put.

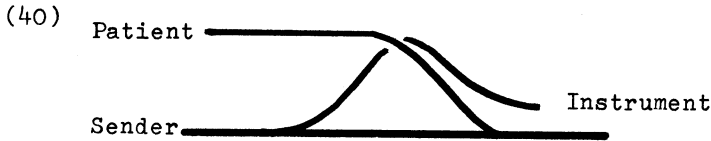
- (36) John put Bill down.  
 Mary put Harry on.  
 (37) I give up.

In (36) we know that the subject is inciting the direct object to move toward a certain goal, but there is no noun phrase to specify what that goal is. In (37) we know even less. The missing information concerns what is being given and to whom. Saying this is equivalent to trying to fill the basic frame of give. Understanding (36) and (37) requires further context, the latter is even more context-dependent than the former. If, however, we were interested in building a language understanding system that could process a discourse that contained (37), the basic frame (18) would be a reasonable heuristic to guide the search of context.

As a final caveat (35a) must be amended to account for expressions in which a motion verb gets another actant added onto the interaction. An example of this phenomenon is the verb take, which appears in its basic frame in (38) and in its "complexified" form in the expressions in (39).

- (38) I took the pencil in my hand.  
 (39) I took advantage of Bill by lying.  
 I took a picture of the baby.

The graph of (38) looks like (40). The sentences in (39), however, map onto the excision interaction (28), advantage and the picture being metaphorically removed from the patient.



I only want to raise the problem of classifying related families of interactions, rather than say anything very concrete about the principles of such a classification. Rather than considering the "complexification" of (39) with respect to (38), I will offer an example of the problem in the context of the verb see.

In his article "Look and See," Jeffrey Gruber offers a paraphrase of (41) by (42).

(41) John sees the cat.

(42) John's gaze goes to the cat.

These sentences map onto the interaction (1). Thus an actant such as gaze or glance is postulated as an incorporated element in the motion verb see, and it plays the role of gift. Now let us suppose we want to describe an act of seeing in which there is an obstacle or difficulty which complicates the action. Sentence (43) describes a situation in which the problem has been successfully been surmounted.

(43) I saw Harry through the mist.

Assuming a paraphrase of see as above, (43) may be glossed as (44).

(44) I sent a glance through the mist to Harry.

The graph which characterizes such an interaction is (45).



This interaction, called "envoyer" by Thom, has a structure that is identical to (1) with the addition of the actant called Messenger (message and gift correspond). The additional actant symbolizes the difficulty of communication and it makes (45) more complex than (1). The Messenger actant is represented in (43) by the object of the preposition through. The name Messenger suggests that this actant may also represent an aid to communication; (46) is an example of this sense.

(46) I saw Harry through the window.

The case usually taken by the messenger is Fillmore's Path,

this actant characterizes the itinerary of the motion. The subject of see takes the Experiencer case. Although (42) and (44) might suggest Agent as a more likely assignment, Gruber argues convincingly that see normally is non-agentive. In the metaphors considered below this question will emerge again.<sup>2</sup>

Let us consider a non-literal see-through expression.

- (47) a. Money saw Harry through the crisis until things got  
 Courage better.
- b. Bill saw Harry through the crisis until things got better.

If we consider the basic frame of the verb complex see-through to be that of (43) and (46), then (47) preserves only the case of the messenger and receiver. The object of through, crisis, is an abstract version of Path and the Goal in (47) is also abstract, being the state change described by the until-clause. The case of the subject is another matter. By (33ii) the subject in (47a) should take the Agitator case since the NPs money and courage are abstract in the latter case and non-intentional in the former. This seems reasonable. But (33i) also makes the prediction that the subject of (47b) should be an Agitator. This too is reasonable provided we are able to specify that Bill is inciting, not compelling.

There is an expression with see-through in which the subject is clearly an Agent; an example is (48).

- (48) I saw through Harry's disguise.

The problem in analyzing (48) is the possessive expression Harry's disguise. Disguise plays the role of Messenger, but it does not take the Path case. Rather the case of this noun seems to be Object. We can paraphrase (48) by (49).

- (49) I saw through the disguise to Harry.

From (49) it appears that Harry is the Goal and (48) should be thought of as another example of a single NP carrying two actants with different cases.

My final example of a see-through expression shows the heuristic value of the graph (45) for representing both ambiguity and closely related aspects of a situation. Consider (50).

- (50) Harry saw Bill's point through the example.

On one interpretation (50) looks like (48). The subject of (50) is in the sender role, the direct object NP is the receiver and the object of through is the Messenger. The case of the subject can be either Agent or Experiencer, depending on the context. Not even contrastive stress will decide which case should be assigned. The case of example is clearly Instrument, and the NP Bill's point is the Goal. Let us call this interpretation IA or IE depending on our choice of case for

Harry.

In previous examples possessive NPs have not been analyzed in a uniform manner. Sometimes such an NP is treated as a unit((20)-(22)), other times such phrases are treated as complex, as with the boy's arm in (29). The analysis is a function of the particular interaction involved. In (20) the possessive plays no role in the situation, i.e. cannot be mapped onto one of the actants. Whereas in (29) it is crucial. Excision requires an actant to "motivate" the Instrument. (50) is an intermediate example. Having just given an analysis in which Bill's point is treated as a unit, I will now show that it can be treated as complex with a subtle change in meaning.

Considering the reading of (50) in which the subject Harry is in the Experiencer case. There is another case frame for (50) besides IE also having Experiencer as subject. We can conceive of Harry as the receiver in (45). Such a choice determines a new distribution of nouns and actants, call it J. As in IE and IA example plays the messenger role. But J has Bill in the sender role and point as the message. There is a natural case frame for J, point being Object, Bill Source and example Instrument. Assigning Bill to Source corresponds to our intuition that Bill is not "doing" anything in (50). Since senders are often Agents, however, there is a related causative version of the situation J, such as (51).

(51) Bill made Harry see his point through the example.

Of course (51) is not a paraphrase of (50). Fillmore's case hierarchy correctly predicts that Bill cannot be Agent in (50).

It remains to characterize the difference between the J and IE readings of (50). In my dialect the J reading describes mental reflection and the IE reading describes an interaction occurring in real time. There are two kinds of cognitive see, one that is fast and one that occurs in slow motion. On the IE reading the presence of the Goal case emphasizes the completion of the action. But the case frame for the J reading has no Goal, but rather a Source and Object. Separating Bill from his point is a step away from the immediacy of the IE situation in which Bill is present in the Goal. The IE situation is one in which the "sight" comes quicker than with the J situation. Needless to say I do not have any way of expressing this difference as a formal rule. It is of more than passing interest however, to notice that the most non-standard versions of this interaction with respect to causality have the J distribution of nouns and actants, namely (51) and the J reading of (50). This lends some support to recognizing a category of non-standard causation.

I would like to conclude with a summary of the goals and scope of what I have been calling frame semantics. My basic claim is that metaphorical uses of motion verbs exhibit certain regular relationships to the literal sense of these verbs. The graphs I have been using to characterize the invariant elements are suggestive heuristic devices for repre-

senting case frame variations. To a certain extent rules describing metaphor structure can be given. Doing this requires some broadening of case grammar. In the future I think it would be profitable to look at the Benefactive case from this point of view. This case seems to depend upon global properties of interactions, so perhaps the frame perspective would allow a description of some of the constraints. Graphs of interaction and frames are a new and still unexplored tool. Still they allow us to describe phenomena which are ubiquitous, but which have eluded linguistic theory. This alone is sufficient reason to recommend them.

## FOOTNOTES

1. This work was supported by NEH grant F-74-156. I have profited greatly from conversations with Charles Fillmore, Wallace Chafe, and Leonard Talmy. Rene Thom has also been generous with his time. No one but the author, however, is responsible for the contents.
2. I have fudged on the exact specification of the basic frame of see-through, because one might want to say that the obstacle sense of the Messenger actant triggers an Agent in the sender role if that actant is animate. This point of this proposal is that only with obstacles can the sender be described as "doing" something, i.e. being an Agent. I have not explored this possibility.

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