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## Agents, Instruments and Predication Theory\*

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0. Towards the end of his classic paper on case grammar, Fillmore (1968) suggested that there may be dependencies which obtain directly between deep 'case' roles not mediated by the (meaning of the) main predicate of the clause in which they appear. As an example, Fillmore suggested that the occurrence of benefactives is primarily dependent on whether or not there is an agent in the clause. Fillmore did not empirically defend this and the sentences in (1) suggest that the strongest version of this putative dependency would be untenable. However, a weak version which states that benefactives can appear if, but not only if, an agent is present seems quite plausible, in view of the sentences in (2).

- 1.a. The sun shines for rich and poor alike.
- b. The parachute wouldn't open for Reginald.
- 2.a. Mary danced for Susan.
- b. Mary watched the ducks for Susan.

Fillmore brought this matter up in a section in which he was questioning the wisdom of employing phrase structure rules in his base component. Instead, he speculated, it might be more illuminating to posit a generative device which first placed subcategorized cases into a predicate's frame and then added other cases compatible with the subcategorized cases. This idea brings to mind a metarule like that in (3) which would seem to pretty much allow one the best of both worlds (the orderliness of PS rules, plus the correct dependency statement).

3.  $P \rightarrow V...A... \Rightarrow P \rightarrow V...A...B...$

Remote from Fillmore's concerns in time and perspective, Williams (1981) has proposed a view of predicate-argument structure in which every predicate has whatever number of "internal" arguments plus zero or, more usually, one "external" argument. I have neither the space to discuss nor disposition to adopt all the details of Williams' theory, but the following points are noteworthy. First, the 'internal-external' dichotomy is an allusion to the placement of the argument in an X-bar constrained syntactic tree; internal arguments are dominated by the maximal projection of their predicate while external arguments c-command the maximal projection of their predicate. Second, the list of predicational maximal projections includes, but is not on Williams' account limited to, NP, VP, AP and, most important for this paper, PP. (Note that VP is  $v_{max}$  on this account.) Finally, and very importantly, one predicate's external argument can simultaneously be an internal or external argument of some other predicate in the clause. Several of the system's uses and complexities can be seen in (4), where the

underlined and indexed Mary's are the external arguments of the various bracketed and co-indexed predicational XPs.

- 4.a. Mary<sub>i</sub> [likes Susan]<sub>i</sub>
- b. Mary<sub>i</sub> has become [a terrific dancer]<sub>i</sub>
- c. Susan considers Mary<sub>i</sub> [fun to be with]<sub>i</sub>
- d. Susan found Mary<sub>i</sub> [on the beach]<sub>i</sub>

In this paper I will adopt both Fillmore's and Williams' ideas in somewhat revised form and apply them to the much cited agent-instrument dependency. I will then compare my analysis with analyses from Fillmore (1968), Lakoff (1968) and Bresnan (1982). I will then close with some speculations on how the instrumental use of with compares and contrasts with other uses, offering a tentative but hopefully plausible direction for lexical semantic research.

#### 1. The Agent-Instrument Dependency Analyzed

The sentences in (5) show a familiar pattern. Briefly put, when an instrumental with-phrase occurs in a simple active sentence, the subject NP must be construed as an agent, even if the main verb allows nonagent subjects.

- 5.a. Mary broke the window.
- b. Mary broke the window with a chisel.
- c. The hammer broke the window.
- d. \*The hammer broke the window with a chisel.

This pattern has inspired some elaborate theorizing on the organization of grammar, some of which I will critique below. I believe, however, that there is an extremely simple semantic basis for the dependency. First, instruments are instruments only when someone is using them as such. Second, the only entities to which one attributes the capability of using something as an instrument are those entities to which one is willing to attribute the capability of volitionally affecting and controlling objects in their environment in general. Animates have this capability, inanimates do not. Therefore, (5b) contains no anomaly, whereas (5d) perversely suggests that the hammer is volitionally controlling the chisel.

Note that on this account of what it means to be an instrument, the subject of (6) is not necessarily an instrument. If the rock simply dislodges from a cliff, falls on the windshield and breaks it, the rock is not an instrument. I believe that this is the correct view to take and such a view was taken in Chafe (1970).

#### 6. The rock broke the windshield.

But consider (5) again. Even on the view that instrumenthood presupposes a user of the instrument, the contrast between (5c) and (5d) is unaccounted for unless we state a syntactic dependency rule to the effect that it is the clausal subject which must be construed as the operator of the instrument. Otherwise, one might allow (5d)

a reading in which both the hammer and chisel are being instrumentally employed by an unmentioned agent. But such a reading is clearly unavailable.

The relevant dependency can be trivially enough expressed in Williams' framework. Let us simply claim that with is an ordinary preposition (not a "case" or "role" marker) and like most (perhaps all) prepositions, it takes both an external and internal argument. Semantically, with denotes an OPERATOR:INSTRUMENT relation between its arguments. Syntactically, let us for the moment simply stipulate that its external argument is the (active) subject. Thus we get the predication structures as in (7).

- 7.a. Mary<sub>i</sub> broke the window [with a chisel]<sub>i</sub>  
 b. ?The hammer broke the window [with a chisel]<sub>i</sub>

Now, real world knowledge evaluates (7). Sentence (7a) is blameless, but since (7b) pushes the hammer into an implausible role as operator of the instrument, it is semantically deviant (not ungrammatical). So (7b) (=5d) is ruled out broadly for the same reason as the sentences in (8). Jellyfish can presumably manipulate their environment volitionally, but they can't operate chopsticks. Humans are the predominant operators of instruments, but forces like the wind are beyond even our control. Hence, both sentences are semantically implausible.

- 8.a. ?The jellyfish<sub>i</sub> ate the plankton [with chopsticks]<sub>i</sub>  
 b. ?Mary<sub>i</sub> shook the tree [with the wind]<sub>i</sub>

At this point, our predication rule successfully links the clausal subject to the instrument phrase, but merely by pure stipulation. Why don't instrument phrases get linked to direct objects or any random NP? Here I believe a Fillmorean conditioning factor may be involved. Consider (9).

- 9.a. Mary<sub>i</sub> ran [into the room]<sub>i</sub>  
 b. Susan pushed Mary<sub>i</sub> [into the room]<sub>i</sub>

Directional phrases are generally associated with intransitive subjects and transitive objects. Why? As a subtype of locative phrases, they take external arguments which in Gruberian (1976) terms play the semantic role THEME. Quite generally, though not without exception (cf. Jackendoff (1972)), semantic themes are intransitive subjects and transitive objects. Let us therefore suppose that when a predicational XP whose external argument plays semantic role R occurs in a clause, its external argument will be that argument which plays the most R-like role with respect to the main predicate. Hence, the themes of the predicational XPs are the themes of the main verbs in (9). But now consider (10).

- 10.a. Reginald<sub>i</sub> walks [with a cane]<sub>i</sub>  
 b. Reginald<sub>i</sub> smashed the poodle [with a hammer]<sub>i</sub>

Operators of instruments are agents; indeed, strongly so. Now generally it is only subjects which are construed as agents, or which at least have their agenthood in question. For instance, while Susan is not necessarily acting agentively in either of the sentences in the famous pair in (11), only (11b) seems to invite the speculation that there are certain fine deeds that Susan performs to Mary's pleasure.

- 11.a. Mary likes Susan.
- b. Susan pleases Mary.

Now consider the sentences in (12). The subject of watch does not affect the object, but is strongly volitional and in this sense highly agentive. The subject of see is equally non-affecting and not even necessarily volitional. Nevertheless, seeing is a controllable act in the sense that one can generally abstain from seeing when one wants to. The subject of fear, however, is not even in this much control of the situation. Interestingly, it is just in the case of such total lack of control that the adjunction of an instrument phrase is utterly impossible.

- 12.a. Mary watched Susan with a telescope.
- b. Mary saw Susan with a telescope.
- c. \*Mary feared Susan with NP. (pick any NP)

I suggest therefore that since the external argument of an instrument phrase is an agent, it will be the clausal subject since it is subjects which are agents if anything is. But the actual subject must in fact be at least weakly agentive with respect to the action as a whole for this argument sharing principle to apply at all, hence (12c) is hopeless. (This account is most consistent with the views of those who want to posit not monolithic semantic roles, but parameters and degrees of membership for the various roles (cf. Lakoff (1977), Delancey (1984)). But it is worth emphasizing that it is specifically a "yes" value on the parameter of controllability that governs the distribution of instrumental phrases.)

It may seem now that I have undercut my own analysis of the pattern in (5). Hammers cannot control their actions, so cannot be even weakly agentive in this sense. So why not simply rule out (5d) as a case where argument sharing cannot apply? There are both technical and formal reasons not to take this step.

On the technical side, it is not the capabilities of the referents of subject NPs, but the controllability of the action denoted by the VP which is in question. Note that the referent of the subject of (12c) is human, hence eminently capable of controlling an instrument. So the wretchedness of (12c) cannot be pinned on the subject's agentive potential, for it is quite high. Rather it is the uncontrollability of "action" denoted by the VP which precludes the presence of an instrumental phrase. Conversely, breaking things is in principle controllable action, hence VPs headed by break can in principle support instrumental phrases. It is only after the adjunction of the instrumental phrase that the sentence is deemed

semantically deviant. The two sorts of ill-formities are quite distinct.

Empirically, only the specification of a direct OPERATOR:INSTRUMENT relation could explain the funniness of (8). It would therefore be unparsimonious not to extend the analysis to (5d). There may be differences in degree of plausibility among these sentences, but not in kind of unacceptability. Furthermore, consider (13). This sentence cannot mean that Mary agentively tossed the bottle and that it broke when it happened to land on a rock. Rather, Mary must be acting agentively with respect to the rock in any scene describable with (13). So the direct relation must be upheld.

13. Mary broke the bottle with a rock.

So I suggest that we meet Fillmore's suggestion on the distribution of additional arguments in this case part way. The sentences in (12) show that instruments can be added to participant frames only if the main predicate allows an at least weakly agentive argument. But instruments do not come for free. Rather, they come as internal arguments of a secondary predicate with whose external argument must be strongly agentive with respect to the instrumental act. Hence, some instances of adding an instrument will give rise to semantically bizarre OPERATOR:INSTRUMENT pairings even if the original participant frame was semantically above reproach. Thus, a Fillmorean conditioning rule augmented by a Williamsesque conception of argument sharing leads to a simple and semantically natural explanation of both (5d) and (12c).

## 2. Previous Analyses

Fillmore's (1968) early version of case grammar offered a considerably different account of (5). Verbs of the break class were given case frames like that in (14), hence could surface as in (15).

14. [\_\_ (A) + (I) + O]

- 15.a. The glass broke. (O)
- b. The hammer broke the glass. (I+O)
- c. Mary broke the glass. (A+O)
- d. Mary broke the glass with a hammer. (A+I+O)

An important step in the mapping from deep case frames to surface structures was the subject selection process which followed the principle in (16).

- 16. If there is an A, it becomes subject; otherwise, if there is an I, it becomes subject; otherwise, O becomes subject.

Now we can make a clever deduction. Let us agree that the with-phrase in (5d) is an instrumental phrase. Note that it is not subject. Hence, someone must have beaten it out in the competition for attaining subjecthood. According to (16), only agents beat out in-

struments, so the hammer must be an agent. But hammers can't be agents, so the sentence is ill-formed.

This analysis leans on the hammer in (5c) and (15b) being analyzed as an instrument. This I reject (see above), thus I reject the analysis. More importantly, this analysis does not generalize to the anomalies in (8). Consider (8b). If natural forces are analyzed as instruments, the sentence should be fine. If they are not, natural forces must somehow be prevented from co-occurring with agents. If they are analyzed as agents, then (8b) could be ruled out by a no-more-than-one-agent-per-clause condition. But then they should co-occur unproblematically with instruments, but they don't. So this route would be both unparsimonious and empirically inadequate. If natural forces are given some third case role, they would still have to be barred from co-occurring with either agents or instruments by some other means of even more dubious motivation. On my account, natural forces cannot volitionally control their environment, nor can they easily be controlled. Hence they are semantically implausible members of either slot in the direct OPERATOR: INSTRUMENT relation.

Consider, too, the sentences in (17). Sentences (a) and (b) show a familiar alternation (see Fillmore (1977) and Richardson **BLS** (1983)). But something has gone awry between (c) and (d). However one analyzes the alternation in the argument structure of verbs like bang, it appears that a case grammarian would have to stipulate that when an instrument phrase appears, the subject must be an agent and not merely a force. But this would amount to an admission that the agent-instrument dependency is a direct one. Once this is recognized anywhere, one ought to state it outright and invoke it everywhere.

- 17.a. Mary banged the can against the wall.
- b. Mary banged the wall with the can.
- c. The wind banged the can against the wall.
- d. ?The wind banged the wall with the can.

A different explanation of (5) was offered in Lakoff (1968). Like the one I'm pushing, Lakoff's analysis involves positing a direct relationship between clausal subjects and the objects of instrumental phrases. Specifically, Lakoff proposed that the sentences in (18) have similar and perhaps identical biclausal remote structures.

- 18.a. Mary cut the bagel with the knife.
- b. Mary used the knife to cut the bagel.

Lakoff studiously avoids specifying either the remote structures or derivational rules needed for (18), so his proposal is down one round to the explicit and minimalist syntactic analysis offered here. The bout could be evened if Lakoff's proposal sheds semantic light on the agent-instrument dependency where I've been less than illuminating. In fact, however, Lakoff's proposal has severe semantic demerits.

First and quite disastrous, sentence (18b) and sentences in general of that form fail to entail that the actions denoted by the infinitival VPs were indeed accomplished, as seen in (19) vs. (20). Second and equally fatal, sentences of the form in (18b) do, but sentences of the form in (18a) do not, entail that the action denoted by the infinitival VP bzw. matrix finite VP was the subject's intention, as seen in (21) vs. (22) (read (21) as nonconsecutive actions).

- 19.a. Mary used the knife to cut the bagel, but it was too blunt.
- b. Mary used the pole to touch the ceiling, but it was too short.
- 20.a.??Mary cut the bagel with the knife, but it was too blunt.
- b.??Mary touched the ceiling with the pole, but it was too short.
- 21.a.??Mary used the knife to cut the bagel when her hand slipped.
- b.??Mary used the pole to touch the ceiling while swinging it overhead.
- 22.a. Mary cut the bagel with the knife when her hand slipped.
- b. Mary touched the ceiling with the pole while swinging it overhead.

Lakoff tried to head off the problems of (21) vs. (22) when he suggested that sentences like those in (22) involved an "intuitively related" but distinct sense of with. But with, of course, had nothing to do with it. The same sentences stripped of their instrumental phrases exhibit the same sort of volitional-nonvolitional contrast, as do all sorts of sentences completely remote from the problems at hand, as seen in (23). (Note, by the way, that (22) is further evidence that while the subjects must be strongly agentive with respect to the instrumental act, they need not be even volitional with respect to the end-result of the action denoted by the VP, as mentioned above concerning see.)

- 23.a. Mary cut the bagel (so it fit the toaster/when her hand slipped).
- b. Mary touched the ceiling (to prove she could/despite leaning over).
- c. Mary thought about Susan (obsessively/when she noticed the scarf).
- d. Mary rolled down the hill (for sport/when she tripped).

The source of Lakoff's troubles is easy to locate. Infinitival VPs chomsky-adjoined to finite VPs are read as objectives and objectives are necessarily intended but not necessarily accomplished, as seen in (24). Matrix finite VPs are asserted as facts, though they needn't have been intended, as shown above. So Lakoff's proposal obscures as much as it illuminates concerning the semantics of instruments.

- 24.a. Mary left to spite her friends, but nobody missed her.

- b. Mary kissed Susan to put off Bill, but it only excited him more.
- c. Mary went to the store to buy oranges, but they were sold out.

Finally, Bresnan (1982) cited facts not unlike those in (5) as evidence for a valency increasing lexical rule of the form in (25). Bresnan does not bother to show why patterns like (5) support lexical rules like (25). Rather, she cites Bresnan (unpublished) as containing the answers. So there is no reason at this point to take Bresnan's "analysis" as anything more than a mysterious promissory note.

- 25. If P is an n-place predicate, there is an n+1-place predicate P-WITH whose n+1st argument is thematically an instrument.

Bresnan's other bit of "evidence" for (25) is equally mysterious. As noted in Lakoff (1968), sentences containing more than one instrumental with-phrase are generally infelicitous. Bresnan seems to believe that (25) predicts this. But, as I read it, it is a recursive rule which would in fact predict exactly the opposite. Furthermore, according to Levin (1982), rules akin to (25) are responsible for the occurrence of benefactive and comitative phrases. These phrase types, however, do "stack", as seen in (26). Also, some speakers (including me as well as Jim McCawley who gave me the datum) accept (27). So it is totally unclear what (25) gets you that a recursive phrase structure rule couldn't accomplish. The only possibility would be that ruling out the co-occurrence of instrumental phrases with fear-class verbs might be better stated lexically than syntactically, though (25) itself mispredicts here, too. Pending further word from Bresnan, her proposal buys one nothing.

- 26.a. Did you have dinner with Alice?
  - b. Yes, I had dinner with Alice with her goddam boyfriend.
  - c. Would you carry groceries for Alice?
  - d. I would carry anything for anyone for you, darling.

- 27. Ken broke the window with a pebble with his new slingshot.

### 3. Why with?

There is one respect in which I'm unhappy with my analysis as presented so far. There has been movement in recent times to analyze prepositions not as markers of specific relations but as more general things which get involved in principled polysemies or which might even be univocal markers of macroroles. Fillmore (1977), for instance, suggests that the with's in both the sentences in (28) mark a patientlike object in motion which is not, in Fillmore's terms, "in perspective" in the clause. Hence, the fact that only one of these with's is instrumental is no embarrassment to the later

theory.

- 28.a. Mary broke the glass with a rock.
- b. Mary filled the glass with beer.

I'm very sympathetic to Fillmore's reorientation, but this particular analysis won't do. Neither the instrument in (29a) nor whatever it is in (29b) is in motion. Furthermore, this analysis does not generalize to the use of with in (30), nor to comitatives.

- 29.a. Mary watched Susan with a telescope.
- b. Mary kept the jar filled with coins.
- 30.a. Mary impressed Susan with her kindness.
- b. Mary surprised Susan with her aggressiveness.

If there is a single most plausible *gesamtbedeutung* to pin on with, it is 'x and y are associated', where x and y are the external and internal arguments of with on my account. But this, of course, is ludicrously vague.

I do not have a full account to offer, nor the space to give all the pieces of an account I could now offer, but I have some ideas on (28)-(30). First consider (30). The internal argument denotes a property of the external argument (Mary). This is reminiscent, I would claim, to the relations in (31), which Fillmore (1968) tried to defuse as counterexamples to the agent-instrument dependency. Notice that sentences in both (30) and (31) can be paraphrased via a possessive construction as in (32).

- 31.a. The car rammed the fence with its fender.
- b. The ship scraped the bottom with its keel.
- 32.a. Mary's kindness impressed Susan.
- b. The ship's keel scraped the bottom.

Fillmore proposed a sort of possessor ascension account of (30)-(32), which I won't discuss except to note that it appears to violate Ross's left-branch constraint (cf. Ross (1967)). (See also Croft (this volume) for arguments against syntactic accounts of possessor ascension). However, one could plausibly say that both the possessive constructions in (31) and the with-constructions in (30)-(31) semantically specify WHOLE:PART relations, where properties are taken as abstract parts of individuals. If we can claim, then, that any WHOLE:PART relation can appear as a with-construction, then these examples are indeed not counterexamples to the agent-instrument dependency, just as Fillmore had originally claimed.

Now I believe that the instrumental use of with can be to some degree explained as an extension of this meaning. Let us say that if no 'objective' WHOLE:PART relation obtains between with's arguments, then one must reconstrue the two separate objects as a complex whole, such that the referent of the external argument is whole-defining and the referent of the internal argument is partlike. I

believe an agent using an instrument is a plausible candidate for such a complex participant and surely, so construed, it is the agent who is whole-defining and the instrument which is partlike. I offer no further motivation here except to note that an agent using his hands, i.e. a part of him/herself, is not cognitively distant from an agent using a wrench, i.e. a separate object that acts as an extension of the agent temporarily.

Finally, let us claim that it is the jar and not Mary which is the external argument of with in sentences like (29b). All such sentences would specify something like CONTAINER:CONTENTS relations between the arguments of with. If I were to look upon a container and its contents as a complex whole, I'm pretty sure that I would view the container as whole-defining and its contents as partlike. This extension in particular needs further examination, but here I merely express my intriguedness.

None of this extends well to comitatives, and I believe the proper strategy is to handle comitatives first as akin to asymmetric co-ordination and then extend this mere pragmatic asymmetry to the objective semantic asymmetries of WHOLE:PART relations. Another problem is how to constrain such associative reasoning to allow in both OPERATOR:INSTRUMENT and CONTAINER:CONTENTS relations without flooding the scene with other rationalizable but in fact unattested relations. Only future research will show whether this is tenable.

Note

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