

Instrument Subjects Are Agents or Causers

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1. Introduction

It has often been noticed that one syntactic argument position can be realized by elements which seem to realize different thematic roles. This is notably the case with the external argument position of verbs of change of state which licenses volitional agents, instruments or natural forces/causers, showing the generality and abstractness of the external argument relation.

- (1) a. John broke the window (Agent)
b. The hammer broke the window (Instrument)
c. The storm broke the window (Causer)

In order to capture this generality, Van Valin & Wilkins (1996) and Ramchand (2003) among others have proposed that the thematic role of the external argument position is in fact underspecified. The relevant notion is that of an *effector* (in Van Valin & Wilkins) or of an *abstract causer/initiator* (in Ramchand). In this paper we argue against a total underspecification of the external argument relation. While we agree that (1b) does not instantiate an instrument theta role in subject position, we argue that a complete underspecification of the external theta-position is not feasible, but that two types of external theta roles have to be distinguished, Agents and Causers.¹ Our arguments are based on languages where Agents and Causers show morpho-syntactic independence (section 2.1) and the behavior of instrument subjects in English, Dutch, German and Greek (section 2.2 and 3). We show that instrument subjects are either Agent or Causer like. In section (4) we give an analysis how arguments realizing these thematic notions are introduced into syntax.

2. Two arguments against underspecification

2.1 The morpho-syntactic independence of Agents and Causers

There are at least three contexts showing the morpho-syntactic independence of Agents and Causers because only one of the two is licensed there. The data in (2) demonstrate that the Greek passive licenses Agents but not Causers or causing events (cf. Zombolou 2004 and Alexiadou et al. 2006).²

- (2) a. Ta mallia mu stegnothikan apo tin komotria (Agent)
the hair my dried-Nact by the hairdresser
'My hair was dried by the hairdresser'
b. ?*Ta ruxa stegnothikan apo ton ilio / apo toaploma ston ilio (Causer)
The clothes dried-Nact by the sun / by the-hanging-up under the sun
'The clothes were dried by the sun / by hanging them up under the sun'

¹ The idea that a distinction has to be made between Agents and Causers goes back to at least Gruber (1965). More recently, this idea has been implemented in various ways, see e.g. Jackendoff (1990), Davis & Demirdache (1995), Reinhart (2002), Kallulli (2005), Folli & Harley (2005) among many others. Here we apply this dichotomy to instrument subjects. The formal implementation in section (4) differs from these analyses. In our approach the two roles are not in a subset relation, as in e.g. Kallulli and Jackendoff; neither are they introduced by different eventive vs (v)DO, (v)CAUSE as in e.g. Folli & Harley. Rather the two types of external arguments are introduced by Voice, as in Kratzer (1996), expressing two independent thematic relations between the subject and an event.

² See Doron (2003) who describes a similar situation for the Hebrew passive.

A similar phenomenon is reported for Jacaltec, a Mayan VSO language spoken in Guatemala (see Craig 1976). While subjects of intransitive verbs may be animate as well as inanimate, subjects of transitive verbs are restricted to animate Agents. Inanimate Causers must be introduced via a preposition.

- (3) a. speba naj te' pulta (human Agent)
close cl./he cl. door
'he closed the door'
- b. *speba cake te' pulta (Causer)
close wind cl. door
'the wind closed the door'
- c. xpehi te' pulta yu cake (Causer-PP)
closed cl. door by wind
'the wind closed the door'
(lit.: the door closed by the wind)

Finally, it has been observed by a number of authors that anticausatives across languages do not license Agents but license Causer-PPs. (5) shows this for English. While the English *by-phrase* is not licensed in anticausatives (4), Causers and causing events but crucially not Agents can be introduced in English anticausatives via the preposition *from* (5) (see Talmy 1976, DeLancey 1984, Piñón 2001, Kallulli 2005, Alexiadou et al. 2006). Alexiadou et al. 2006 report a similar situation for German and Greek anticausatives. Kallulli (2005) reports it for Albanian anticausatives.

- (4) *The window broke by John / by the pressure / by Will's banging
- (5) a. The window broke from the pressure / from the explosion / from Will's banging
b. *The window broke from John

2.2 Restrictions on instrument subjects

The underspecification view cannot explain apparent restrictions on the appearance of instrument subjects. While it is typically claimed that English licenses instruments in subject position, as in (6), it is reported in the literature that not all languages allow for instruments as subjects (van Voorst 1988, Guilfoyle 1995, 2000). The Dutch counterparts (7) of the English examples in (6) are judged to be ungrammatical in Guilfoyle (2000) and van Voorst (1988).

- (6) a. The key opened the door
b. The stone broke the window
- (7) a. *De sleutel opende de deur
The key opened the door
b. *De steen brak het raam
The stone broke the window

Guilfoyle (2000), following van Voorst, argues that a parameter exists that distinguishes between two types of languages: In languages of *type A* the external argument position is closely associated with the initiator of the event (Dutch); in languages of *type B* the external argument is associated with a participant in the event, and does not necessarily need to be an initiator (English).

Focusing on the behavior of instrument subjects in English, Dutch, German and Greek, we argue against the existence of such a parameter in the next sections. A closer investigation of their properties reveals that instrument subjects behave alike in all these languages and are acceptable only under two conditions which, we argue, force a Causer or an Agent interpretation of the instrument respectively. We thus provide further arguments in favor of a formal distinction between Agents and Causers. The close look at instrument subjects provides us also with hints as to what the labels '*Agent*' and '*Causer*' mean.

3. Instrument subjects across languages³

The claim that instrument subjects exist goes back at least to Fillmore (1968). His argumentation runs as follows: since Agents are subjects in the active and appear in the by-phrase in the passive (8) and since *the key* in (9a) is an instrument, and (9a) and (9b) could refer to the same scenario, *the key* must be an instrument in (9b) too.

- (8) a. The janitor opened the door
 b. The door was opened by the janitor *If 'janitor' is an Agent here,*
- (9) a. The janitor opened the door with a key
 b. The key opened the door *'key' should be an instrument here*

But the situation in English is not so clear cut, see (10) from Levin (1993):

- (10) a. John loaded the truck with a crane/pitchfork
 b. The crane/*pitchfork loaded the truck

Thus the question is why only some instruments are licensed as subjects. Building on and modifying work by a number of authors, we argue that there are two interpretations under which an “instrument” can function as a subject, see e.g. Cruse (1973), Talmy (1976), DeLancey (1984, 1991), Schlesinger (1989), Rappaport Hovav & Levin (1992), Kamp & Rossdeutscher (1994), Kearns (2000). Under interpretation (A) instrument subjects pattern like natural forces (Causers) in that they are conceptualized as eventive/involved in an event. Under interpretation (B) the coming about of the event is in a non-trivial way dependent on a property of the instruments; we argue that these instrument subjects are like Agents.⁴

3.1 Interpretation (A): Eventivity

3.1.1 Two types of instruments

Kamp & Rossdeutscher (1993:143ff.) distinguish between two types of instruments, *pure instruments* and *instrument Causers*. The former are instruments who are conceived as strictly auxiliary to the action of the Agent by whom they are being employed (11a, 12a). The latter are instruments which can be conceived as acting on their own, once the Agent has applied or introduced them (11b, 12b). Only the latter type of instrument can become subject.

- (11) a. Der Arzt heilte den Patienten mit dem Skalpell
 The doctor cured the patient with his scalpel
 b. Der Arzt heilte den Patienten mit Kamille
 The doctor cured the patient with camomile
- (12) a. #Das Skalpell heilte den Patienten
 #The scalpel cured the patient
 b. Die Kamille heilte den Patienten
 The camomile cured the patient

We follow Kamp & Rossdeutscher in assuming that these instruments, when they are subjects, are *Causers*. We will generalise this notion. They are *Causers* by virtue of their being involved in an event,

³ We would like to thank Jonny Butler and Tom McFadden for their English judgements, Hans Kamp, Marc van Oostendorp and Jan-Wouter Zwart for their Dutch judgements. The Greek and German judgements are the authors' own.

⁴ We would like to note that the grammaticality judgements to be discussed are very subtle. In most cases we are not dealing with sharp ungrammaticality, but with gradience in acceptability. The reason for this is that speakers manage to map each subject to one of these abstract and idealised interpretations with variable success. Crosslinguistically, instruments that are compatible with one of the two interpretations make better subjects than those that aren't.

without being (permanently) controlled by a human Agent. The fact that this involvement in an event might be the result of a human agent having introduced these Causers is a fact about the real world, not about the linguistic structure.

The following sentences show that machines in contrast to pure instruments make good subjects. One could argue that this is because they can act on their own and are therefore eventive.

- (13) a. The crane picks up the crate (from Schlesinger 1989)
 b. #The fork picks up the potato
- (14) a. The piper plane sprayed the fields
 b. #The spray gun sprayed the field

3.1.2 Pure instruments in an eventive construal

DeLancey (1984) observes that (15a) with a pure instrument in subject position is strange; ‘*the axe*’ can be the subject just if it is made clear overtly how it could have the effect: in virtue of some (acquired but independent) (kinetic) energy (as in (15b, c)).

- (15) a. #The axe broke the window
 b. The axe fell off the shelf and broke the window
 c. As I was swinging the axe over my head it hit the window and broke it

Talmy (1976:53) observes that (16a) “does not fare so badly besides” (16b). He goes on to argue that a sentence like the former “always seems to imply a larger form with a causal event specified”, as in (16b, c).

- (16) a. A ball broke the window
 b. A ball’s sailing into it broke the window
 c. A ball broke the window in/by sailing into it

(16a) implies what in (15) has to be expressed overtly. The difference between (16a) and (15a) relates to our conceptualization of these instruments: axes are prototypically under permanent control by a human being, while this is not the case with e.g. balls.

3.1.3 Natural forces as prototypical Causers

The behavior of eventive instruments mimics the nature of natural forces; the latter are (self-) energetic by definition. Talmy (1976) argues that forces as in (17) can be analyzed as arising by the conflation of a deeper clause that specifies a whole event, as illustrated in (18). While this assumption of a syntactic conflation process is probably a bit outdated we nevertheless want to argue that forces are inherently eventive in a linguistically relevant sense.

- (17) a. The wind/the rain(fall)/cracked the window
 b. The window cracked from the wind/the rain(fall)/a fire
- (18) a. ... from [air blowing on the FIGURE] = from the wind
 b. ... from [the rain(water) falling on the FIGURE] = from the rain

3.1.4 Eventive instrument subjects in other languages

We have seen that instruments make good subjects in English if they are eventive/involved in an event, thereby mimicking the eventive character of natural forces. This section shows that the same holds in three further languages, German (19-21), Dutch (22-24) and Greek (25-27). All these languages license machines and instrument Causers in subject position but not pure instruments (19, 22, 25). However, pure instruments become good subjects, if they are construed (either by context or

overtly) as being involved in an (autonomous) event (20, 23, 26); this, we argue, makes them comparable to natural forces which also make good subjects (21, 24, 27).

- (19) a. Der Kran hob die Kiste hoch
The crane picked the crate up
- b. *Die Gabel hob die Kartoffel hoch
The fork picked the potato up
- (20) a. Die #(runterfallende) Axt zerbrach die Scheibe *eventive construal*
The down-falling axe broke the pane
- b. Der #(durch die Luft fliegende) Stein zerbrach die Scheibe
The (through the air flying) stone broke the pane (# → at least conextually)
- (21) Der Sturm zerbrach die Scheibe *force*
The storm broke the pane
- (22) a. De krat tillt de auto op
The crane picked the car up
- b. *De vork pikte de tomaat op
The fork picked the tomato up
- (23) a. (?)De steen heeft de ruit gebroken
The stone has the pane broken
- b. De vliegende steen heeft de ruit gebroken
The flying stone has the pane broken
- c. Rondvliegend puin heeft het raam gebroken
The around-flying trash has the window broken
- (24) De storm heft de deur opengewaaid
The storm has the door open-blewn
- (25) a. To hamomili giatrepse ti Maria
The camomile cured Mary
- b. *To nisteri giatrepse ti Maria
The scalpel cured Mary
- c. O geranos sikose to kivotio
The crane picked up the box
- d. *To piruni sikose tin patata
The fork picked up the potato
- (26) to tsekuri espase to parathiro #(peftondas)
the axe broke the window (by falling)
- (27) I thiela espase ta parathira
The storm broke the windows

3.2 Interpretation (B): Grounding property

However, it is not the case that all instruments that make good subjects have to be eventive. There is also a class of acceptable instrument subjects that cannot in any reasonable way be ascribed some intermittent/temporary autonomous eventivity. It has been noted that within this class of instruments a difference exists between so called tools and secondary tools (Nilsen 1973). Only the former can be subjects as is illustrated in (28-31).

- (28) a. Ashley cut the melon with a knife
- b. Casey opened the door with the key
- (29) a. This knife cuts the melon easily
- b. This key opened that door
- (30) a. Cathryn ate spaghetti with a fork
- b. Denis is drinking juice with a straw
- (31) a. *This fork ate spaghetti
- b. *This straw is drinking juice

Concentrating on the tools in (28-29), an important observation is that they are introduced by an indefinite or a definite article in (28) but in (29) where they show up in subject position they are introduced by a demonstrative which puts contrastive focus on the instrument in subject position. This

observation fits with a remark made by deLancey (1991:348) that a sentence like (32) is acceptable only if the key is being given some contrastive focus:

(32) The key opened the lock

We would like to add the observation that this focus effect is more general as any contrastive focus will improve the acceptability of tools in subject position. This is shown in (33). Secondary tools in contrast do not become good subjects under any focus, as shown in (34).

- | | | | |
|------|--|------|--|
| (33) | a. ?(?)The key opened the door
b. THIS key opened the door
c. The KEY opened the door
d. The key OPENED the door
e. The key opened THIS door | (34) | a. *The rag cleaned the table
b. *THIS rag cleaned the dishes
c. *The RAG cleaned the dishes
d. *The rag CLEANED the dishes
e. *The rag cleaned THIS table |
|------|--|------|--|

The question is why focus has this effect on the acceptability of instrument subjects. The difference between (33) and (34) suggests that it is not focus alone that is responsible for the acceptability of (33b-e), as can already be seen by the contrast between the unfocused (33a) vs. (34a). Furthermore, the fact that focus on either the instrument, or the verb or the object can have this effect suggests that it is not solely a property of the instrument itself that is responsible for the amelioration, but rather a property that relates the instrument to the VP.

We think that focus by precluding alternatives stresses the existence of a non-trivial relation between (a property of) the subject and the event expressed by the whole VP. This makes sense only if the coming about of the event is indeed crucially dependent on some characteristics of the instrument; this derives the difference between tools and secondary tools (see Schlesinger 1989).

We further argue that tools in subject position are interpreted as Agents. Recall one motivation for severing the external argument from the verb in Marantz (1984) and Kratzer (1996). The specific interpretation of the Agent depends on the whole VP complexes in (36), that is it is a relationship between the VP and an entity in the subject position.

- (35) a. kill a cockroach
b. kill a conversation
c. kill an evening watching TV

This is parallel to what we find in the case of instrument subjects where the relationship is stressed via focus. Humans are the typical realisation of the Agent relation and hence normally do not require special licensing (focus).⁵ As the examples below show, German shows the same amelioration of tools in subject position under contrastive focus. Dutch and Greek behave alike.

- | | | | |
|------|---|------|--|
| (36) | a. ?(?)Der Schlüssel öffnete die Tür
The key opened the door
b. Dieser Schlüssel öffnete die Tür
This key opened the door | (37) | a. *Der Lappen wischte den Tisch ab
The rag wiped the Table off
b. * Dieser Lappen wischte den Tisch ab
This rag wiped the table off |
|------|---|------|--|

We have argued that machines can be Causers in virtue of their inherent eventivity. However, machines are designed in order to fulfil a specific job; they have a job-related property by definition. Therefore they could just as well be subsumed under our Agent label. This seems to be the right analysis for the machines in the following sentences from Schlesinger (1989) which demonstrate that machines are good or bad subjects depending on the specific job the VP describes.

⁵ Contrastive focus is not the only way to stress the relevance of the relation, the use of Verum Focus (i), focus particles, modals (ii) and modification (iii) yields grammatical sentences as well.

i. To our great surprise the key OPENED/DID open the door

ii. Only an electronic key can open this door

iii. His key opened the door without delay

(from König & Mauner 2005)

(from Schlesinger 1989)

- (38) a. Sheila extracted the square root of 1369 with paper and pencil /with the pocket calculator
 b. *The pencil extracted the square root of 1369
 c. The pocket calculator extracted the square root of 1369

4. Towards an Analysis

We follow Marantz (1984) and Kratzer (1996) in the assumption that external arguments are not arguments of verbs but are introduced by a Voice head. Specifically, we assume the structure (39) for (anti-)causative verbs which was developed in Alexiadou et. al. 2006.⁶

- (39) [(Voice) [CAUS(e) [Root + Theme]]]

The external argument relation and causation are syntactically represented in terms of distinct functional heads. CAUS is taken to introduce a *causal relation* between a causing event (the implicit argument of CAUS) and the resultant state denoted by the Root + Theme complex. The existence of CAUS in anticausatives can be detected by the licensing of Causer-PPs (*from*-phrases and their counterparts in the other languages, see section 2.1). Voice introduces the external argument. Causatives and anticausatives have a CAUS head but differ in that only the former has Voice. On our view, the external argument is not introduced by an eventive predicate (DO); as in Kratzer (1996) we assume that Voice simply denotes a relation (R) between an NP and event as expressed in (40a). In order to represent the two thematic notions Agent and Causer we need to define two different Voice relations R(Caus) and R(Agent) with the semantics depicted in (40b) and (40c):

- (40) a. Voice: $\lambda P.\lambda x.\lambda e. (R(x,e) \ \& \ P(e))$
 b. R (Caus): the NP names the causing event (following a proposal in Pytkäinen 2002)
 c. R (Agent): (a property of) the NP grounds the coming about of the event

As discussed in Alexiadou et al. 2006, Voice comes in an active and a passive version and a language might select only one of the two possible relation in the active or passive. This explains the restrictions about the Greek passive and Jacaltec active shown in section 2.1.

If we assume that instrument subjects are licensed by one of these two external argument relations we make two predictions: first, instrument Causers should be licensed in contexts in which prototypical Causers but not human Agents are licensed. This is the case with anticausatives in English, German and Greek and is illustrated below with English data.

- (41) a. The window broke from the storm *Force*
 b. The window broke from the falling axe *“eventive instrument”*
 c. The window broke from the thrown stone *“eventive instrument”*
 d. The air quality improved from the humidifier *Machine*

Second, instruments analysed as Agents by virtue of their internal characteristics or properties (being crucially relevant for the coming about of the event) should be licensed in contexts where human Agents but not prototypical Causers are licensed. This turns out to be true in the Greek passive:⁷

⁶ Note that CAUS could also simply be seen as an eventive *v* of the type proposed in Marantz (2005). In this case the causative semantics would not be directly encoded on any verbal head but would result from the combination of an activity *v* and its stative complement (see Ramchand 2003 for related ideas).

(39) is the structure for change of state verbs. In the case of activity verbs, we suggest that the event is not CAUS but ACT. This ACT is not compatible with Causers but only with Agents. This means that in sentences like (i) the NP is an Agent:

(i) The boat is dancing on the waves

It seems to us that Causers are only possible when a stative complement is present, yielding telicity, as the following contrast from German in (ii) shows. The English counterparts of (ii) are not that clear cut:

(ii) a. Hans rollte den Ball (über die Torlinie)
 Hans rolled the ball across the goal line
 b. Der Wind rollte den Ball *(über die Torlinie)
 The wind rolled the ball across the goal line

- (42) a. *I porta anihtike apo to klidi
the door opened-Pass by the key
b. I porta anihtike apo **afto** to klidi
the door opened-Pass by this the key
c. I porta anihtike apo to **ilektroniko** klidi
the door opened-Pass by the electronic key
d. *To domatio stegnothike apo **afto** ton klimatismo
the room dried-Pass by this the air condition

Importantly, it has to be shown that the two types of interpretations are independent from one another. First, Agent-like instrument are not licensed in environments where only Causers are possible:

- (43) a. *The door opened from **this** key *Anticausatives*
b. *Die Tür öffnet sich durch **diesen** Schlüssel
c. *I porta anikse apo **afto** to klidi

Second, Causer-like instruments are not licensed in contexts where only Agents are possible:⁸

- (44) a. *I porta anihtike apo ti thiela *Greek passive*
the door openend-Nact by the strom
b. *O asthenis giatrefitike apo to hamomili
the patient cured-Nact by the chamomile
c. *To parathiro anihtike apo tin ptosi tu tsekuriu
the window opened-Nact by the fall the axe-gen

To conclude, the behavior of instrument subjects supports the independence of the two concepts of Agent and Causer.

⁷ Earlier on we pointed out that modals have the same effect as contrastive focus. One would therefore expect that instruments are licensed in the passive by-phrase in the presence of a modal. However, the relevant examples are out. The reason for this is that the modals in question are root modals and hence subject oriented.

⁸ Under the conception of Agent introduced above, the term does not include notions like *human*, *animate*, *intentional*. However, these notions seem to be relevant, as the following data show:

- (i) a. The baton is jerking nervously above the conductor's head (Schlesinger 1989)
b. *The baton is conducting Tchaikovsky's Fifth Symphony
(ii) a. The bullet killed the president
b. *The bullet murdered the president

The first thing to note is that it is the event as a whole which determines the admissibility of agentivization. This is shown in (iii) where the acceptability of an instrument in subject position depends on the make up of the whole VP.

- (iii) a. The chisel was cutting a sandalwood (Schlesinger 1989)
b. *The chisel was cutting a sandalwood into a statuette

We take these restrictions to be the result of encyclopaedic knowledge about the roots or about the VP-denotation, which sometimes demands properties like *intentional*, *human*, ...). The phenomenon is comparable to the well known variance with the causative alternation (see Levin & Rappaport Hovav 1995). In Alexiadou et. al. (2006) the data in (iv-vi) are derived in a similar way via encyclopaedic knowledge (external vs. unspecified vs. internal causation of the root or the VP-denotation).

- (iv) a. John broke the vase
b. The vase broke
(v) a. John destroyed the vase
b. *The vase destroyed
(vi) a. John broke his promise/the world record
b. *His promise/The world record broke

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