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On the Economy of Interpretation:
Semantic constraints on SE-reflexives in Dutch[*]

1.   SE- and SELF reflexives in Dutch

Semanticists of natural language and linguistic logicians have paid embarrassingly little attention to the rich variety of ways in which reflexivity is expressed in natural languages.[1] The reference of reflexive pronouns is commonly thought of as a matter of purely syntactic concern with little interesting consequence for semantic interpretation. Yet there are quite interesting puzzles to be accounted for in a logical interpretation of natural language, if only we look at the famous Russell barber paradox in Dutch, one of the many natural languages that has both simple SE-reflexives (*zich*) and morphologically complex SELF-reflexives (*zichzelf*). Whether the barber shaves himself arises as a paradoxical issue only if the ordinary transitive verb *scheren* (to shave) takes the SELF-reflexive, *zichzelf* as direct object. The simple SE-reflexive *zich scheren* does not require the subject to do his own shaving, as it may be true of someone who gets himself shaven by a barber. Consider first the Dutch data in (1).

(1)   a.   Jan scheert zich.
              Jan shaves SE
              'John shaves.'
       b.   Jan scheert zichzelf.
              John shaves SELF.
              'John shaves (on his own?/does his own shaving?).'

[1]   Noticable exceptions are the papers by Salmon and Safir in Linguistics and Philosophy 15.1 (1992). See also Salmon and Soames (eds.) (1988).

c. Jan scheert zich nooit zelf.
    John shaves SE never self.
    'John shaves, but he never does the shaving himself.'

In (1c) John is described as someone who always lets someone else shave him, paraphrased in ordinary English with a rather more complex reflexive circumlocution with auxiliary *do*-support. Though (1a) and (1b) appear to be true in the same situations, (1b) suggests that someone else could have shaven John, but noone else but John did, whereas (1a) leaves it quite undetermined who is doing the shaving of John, John himself or someone else. In a society where men ordinarily do their own shaving, it is of course easily taken for granted that (1a) means John shaves John. But it would be far too simplistic to assume that any occurrence of *zich* could be substituted with preservation of meaning (not just extensional truthconditions) by the referential subject NP.

To develop these initial Dutch data a little further, consider the behavior of SE- and SELF reflexives in auxiliary light verb constructions.

(2) a. Jan laat zich scheren
         John let SE shave
         'John lets himself be shaven'/'John$_i$ let someone shave him$_i$'
     b. ?Jan laat zichzelf scheren
         John let SELF shave
         'John lets himself shave himself'

In (2b), if it is at all acceptable in Dutch, John must allow himself to do the shaving of him. This would require rather unusual background circumstances, for instance, if John were injured, not having been able to do his own shaving for a while.

Consider now the Dutch barber paradox data in (3).

(3) Russell's barber paradox in Dutch.
     a. De barbier scheert iedereen die #zich/zichzelf niet scheert.
         the barber shaves everyone who does not #SE/SELF-shave.
         'The barber shaves everyone who does not shave himself.'
     b. Iedereen die #zich/zichzelf niet scheert laat zich/*zichzelf scheren door de barbier.
         everyone who does not #SE/SELF-shave let SE/*SELF-shave by the barber.
         'Everyone who does not shave himself lets himself be shaven by the barber.'
     c. Iedereen die #zich/zichzelf niet scheert laat de barbier hem scheren.
         everyone who does not SE-shave lets the barber shave him.
         'Everyone who does not shave himself lets the barber shave him.'

Where (3a,b,c) have been marked with # for the SE-reflexive, they are syntactically and even perfectly interpretable sentences, but they expresses a necessary falsehood, a logical contradiction, as the barber shaves everyone who do not shave.

In other words, any man who does not SE-shave (*zich scheren*) must be growing a beard, for noone shaves him, not even he himself. But someone who does not SELF-shave (*zichzelf scheren*) may or may not be growing a beard, depending on whether he lets someone else shave him. Hence each of (3a–c) with the SELF anaphor logically

entails that everyone is shaved one way or another, for anyone who does not SELF-shave is shaved by the barber. But now the paradox-inducing question arises whether the barber shaves himself. There are two cases to consider, one in which the barber does his own shaving, the other where he does not.

Suppose, in the first case, that the barber does his own shaving, then he is excluded from the domain restricting the universal subject NP *iedereen die zichzelf niet scheert*, as it includes only those who do not do their own shaving. In that case the barber does *not* shave himself, for the barber shaves only the non-SELF-shavers. Contradiction! In the second case, suppose that the barber does not do his own shaving, then he is included in the domain of restrictor of the NP and hence he *is* shaven by the barber, which he is himself. Contradiction again!

A natural way out of this paradoxical predicament for the barber is, of course, to drop the implicit assumption that there is one unique barber in the domain. If we interpret the definite description referring to the barber as a dependent one, admitting of several barbers for different choices of the universally quantified variable, one barber may shave an other. Turning the barber from the agent in a PP-adjunct in the passive VP in (3b) into the subject of the infinitival clausal complement of the light verb *let* in (3c), requires a regular pronoun to express the coreference, instead of a reflexive, as the dependency now crosses the subject in its clause, illustrating the syntactic Binding condition B.

Analogous observations are made in describing the causally odd case of the famous Baron of Münchhausen, who pulled himself out of the swamp by his own ponytale.[2] In Dutch, the odd case must be expressed again with a complex SELF-reflexive in (4a). The SE-reflexive (4b) is perfectly acceptable, but does not trigger the same causally odd interpretation, describing for instance a case where the Baron pulls himself out by taking hold of a treelimb extending out from the riverbank.

(4)   a.   De Baron trok zichzelf uit het moeras.
          the Baron pulled SELF out the swamp.
      b.   De Baron trok zich uit het moeras.
          the Baron pulled SE out the swamp.

These exploratory observations should tickle anyone working in the semantics of natural languages to study the intricate semantic differences between SE- and SELF reflexives. But there are more answers to be expected from a satisfactory syntactic and semantic account of reflexivization. For instance, why do SE reflexives not constitute acceptable short answers to *wh*-questions (5a), nor carry high pitch accents (5b), nor admit of topicalization (5c), nor behave as genuine syntactic arguments of verbs (6), all properties they share with clitics?

(5)   a.   Wie wast Jan? *Zich.
          who does John wash? *SE.

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[2]   See for this example Reuland (1997), p. 28, ex. (75ii), where reference is made to Voskuil (1991).

b. *Als Jan ZICH wast, dan mag hij naar school.
  *if John SE washes, then he may go to school.
c. *Zich heeft Maria *t* goed bekeken.
  *SE has Mary *t* looked at well.

All sentences in (5) would be perfectably acceptable with a SELF-reflexive, however. With a simple intransitive verb like *vallen* (fall), the entailment based on a light verb assigning causal control to the subject in (6) is supported, though the subject is also affected as patient by the action.

(6)   Jan liet zich vallen ⇒ Jan viel
       John let SE fall ⇒ John fell

Existential agentive subjects of transitive verbs must be implicit arguments in SE-reflexive light verb constructions, in order for the overt subject to be assigned the thematic role of patient or affected object by the lexical predicate, binding the SE-reflexive, as the entailments in (7) show.

(7)   a.   Jan liet zich scheren ⇒ Iemand (anders dan Jan) scheert Jan.
            John let SE shave ⇒ someone (other than John) shaved John
       b.   Jan liet iemand zich scheren ⇒ Iemand (anders dan Jan) schoor zich.
            John let someone SE shave ⇒ someone (other than John) shaved himself

The thematic assignments of a VP internal argument should be preserved when it scrambles to subject in (7a). Similarly, in (8a) coreference of an NP in PP with the subject scrambled over a light verb requires the SE-reflexive, as the SELF-reflexive would get bound by the agentive subjects *the children* of the lexical predicate.[3]

(8)   a.   Jan liet de kinderen voor zich werken. ⇒ De kinderen werkten voor Jan.
            John let the children for SE work ⇒ the children worked for John
            'John let the children work for him.' ⇒ 'The children worked for John.'
       b.   Jan liet de kinderen voor zichzelf werken. ⇒ De kinderen werkten voor zichzelf.
            John let the children for SELF work ⇒ the children worked for SELF
            'John let the children work for themselves' ⇒ 'The children worked for themselves.'

A proper semantic analysis of causative control, thematic role assignment and light verb constructions calls for an event-based semantics supporting these entailments. This must be deferred to Section 4 below, where at least a few of these issues will be addressed.

There are still other semantically puzzling observations regarding the use of SE- and SELF reflexives in Dutch to enlist as explananda for a semantic theory. Verbs describing mental states show different reflexivization patterns as in (9). Again, one could speculate

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[3] This important difference between SE- and SELF reflexives in PPs was pointed out to me by Jack Hoeksema, and it is often discussed in the syntactic literature. I am not aware of a semantic account of these facts.

this may have to do with differences in causal interactions, if hating is considered a mental activity with causal interactions, and being ashamed a more passive mental state induced by external events.

(9) a. Jan schaamt zich/*zichzelf/*Marie
         John shames SE/*SELF/*Mary
         'John is ashamed (of himself)'
     b. Jan haat *zich/zichzelf/Marie
         John hate *SE/SELF/Mary
         'John hates himself/Mary'

A semantic explanation of this distributional difference in mental verbs must appeal to causal relations and events causing states. Merely appealing to the syntactic fact that *zich schamen* is intransitive and inherently reflexive, whereas *haten* is neither, cannot suffice, for there are transitive mental state verbs taking SE-reflexives, like *zich/zichzelf/Maria verbazen (to surprise SE/SELF/Mary)*, as in (10).

(10) Jan verbaasde zich/zichzelf/Mary.
      John surprised SE/SELF/Mary
      'John was surprised/John surprised himself/Mary.'

SE-surprise (*zich verbazen*) is the ordinary state of being surprised by some unspecified external cause, whereas SELF-surprise (*zichzelf verbazen*) means one surprises oneself by one's own, perhaps subconscious or unexpected actions, as if one would surprise anyone else. It is indicative that the proper expression of SE-surprise in English requires a passive, for SE-reflexive VPs are meaningfully related to genuine passives and middles. In American English the colloquial usage of reflexives with mental state verbs even seems to gain in productivity over passive constructions, as in (11).

(11) a. Jane is interested in physics/Jane interests herself in physics.
     b. The children feel that they are neglected/The children feel themselves neglected.

Merely appealing to syntactic configurational structure will not produce an insightful account of the data in (12), where extensional location PPs admit SE-reflexives, but intensional PPs concerning ways of gathering information require SELF-reflexives.

(12) a. Jan legt het boek naast zich/*zichzelf.
         John put the book next SE/*SELF
         'John put the book on his side/aside.'
     b. Jan keek naar *zich/zichzelf.
         John looked at *SE/SELF
         'John looked at himself.'
     c. Iedereen vertelde iets over *zich/zichzelf.
         everyone told something about *SE/SELF
         'Everyone told something about himself.'

    d. Jan$_i$ heeft volgens *zich/*zichzelf/hem$_i$ gelijk. (clausal PP?)
        John$_i$ has according *SE/*SELF/him$_i$ right
        'John is right according to himself.'

The rich verbal morphological prefixing in Dutch also affects the acceptability of SE/SELF reflexives. Extensional relations with direct causal interaction allow either form as well as any full-fledged NP either in PP or in internal argument position with *be*-V or *ver*-V predicates (13a–d). But verbs describing information gathering activities (13e), as *kijken naar/bekijken* — *look at*, take the SE-reflexive only in *be*-V, not in PP. The verbal derivational morpheme *be*-V cannot hence be analyzed as merely incorporating the PP.

(13) a. Jan goot water over zich/zichzelf/Marie
        John poured water over SE/SELF/Mary
        'John poured water over himself/Mary'
     b. Jan begoot zich/zichzelf/Marie met water
        John *be*-poured SE/SELF/Mary with water
     c. Jan warmde zich/zichzelf/Marie op
        John warmed SE/SELF/Mary up
        'John warmed himself/Mary'
     d. Jan verwarmde zich/zichzelf/Marie
        John *ver*-warmed SE/SELF/Mary
        'John warmed himself/Mary'
     e. Jan bekeek zich/zichzelf/Mary (cf. 12b)
        John *be*-looked SE/SELF/Mary
        'John looked at himself/Mary'

In (14) the *ver*-V morphology takes only SE-reflexives with adjectival predicates in unaccusatives (14a,b), but not with nominal predicates (14c,d). Null arguments are acceptable only with the latter. The nature of the relations between these observations may perhaps be better understood in a semantic account where the causal aspects of the meaning of lexical predicates are made explicit. Raising the temperature is a change that affects only a stage level property, while the individual whose property is changing remains stable. Turning water into vapor is a much more radical, though still reversible change, in which it is questionable whether there is any underlying individual, other than an amount of molecules, that remains the same.

(14) a. De zon verwarmde het water
        the sun *ver*-warmed the water
        'The sun warmed the water.'
     b. Het water verwarmde zich/*zichzelf/*∅
        the water *ver*-warmed SE/*SELF/*∅
        'The water warmed/heated up.'
     c. De zon verdampte het water
        the sun *ver*-vapor the water
        'The sun evaporated the water.'

    d.   Het water verdampte *zich/*zichzelf/∅

          the water *ver*-vapor *SE/*SELF/∅

          'The water evaporated.'

Finally, the idiomatic Dutch small clause constructions with SE-reflexives in (15), apparently only with resultative meaning, constitute a very productive pattern of hyperboles, semantically a highly marked context. It has supported the widely held syntactic view that SE-reflexives may head small clauses, but cannot be genuine arguments of predicates.

(15) a.   Jan rende zich/*zichzelf/*Marie rot
          run rotten/run too much
     b.   Jan viel zich/*zichzelf/*Marie een buil
          fall a bulging bruise/fall badly
     c.   Jan betaalde zich/*zichzelf/*Marie blauw
          pay blue/pay too much
     d.   Jan schrok zich/*zichzelf/*Marie een hoedje
          got scared a hat/was scared terribly
     e.   Jan lachte zich/*zichzelf/*Marie slap/krom
          laughed weak/bent/laughed very much

The small clause constructions in (15) may in aspectual class be either durative, atelic activities (15a, 15e), or durative telic accomplishments (15b), or even indivisible telic achievements (15d). Hence aspectual class does not seem to be directly affected by the choice of reflexive pronoun, nor by the interpretation of the small clause as resultative. These observations give abundant reasons for developing a semantic account of SE- and SELF reflexives that support the right entailments. Such an undertaking obviously exceeds the scope of this paper, but a first outline of a semantic event-based account is presented below.

2.   Working hypotheses

Even this cursory review of only Dutch data seems to suggest that natural languages with SE- and SELF-reflexives offer these two options to express reflexivity in different syntactic categories. SELF reflexives should be considered fullfledged NP arguments of the verbal predicate, partaking in the thematic causal structure, and semantically interpreted as generalized quantifiers with a restriction on their reference marker to corefer with the sentential subject. But SE-reflexives cannot be considered arguments of verbal predicates, but may best be analyzed as marking an incorporation operation of reflexivization within INFL. Assuming Fregean compositionality (i.e. syntactic derivation fully determines interpretation, but two different derivations may still have the same meaning), SE-reflexivization may be viewed as an effective and economical way to

encode coreference derived from ordinary transitive verbs in argument reduced form.[4] The semantic interpretation of non-reflexive pronouns constitutes a cognitively more demanding way to express coreference, for it is not purely compositionally determined, as the context or background information may play role in selecting a suitable or accessible coreferent.[5]

Since one and the same event may be described in many different ways, reflexive predicates, like unaccusatives or middles, may present a different perspective on the same event described by transitive relations. The way of describing an entity at least partly determines its pronominal and temporal dependencies, how one refers to the same entity in subsequent discourse, regardless whether the entity is an event or an individual. Given the common assumption that adverbials denote properties of events, the Leibnizian principle of event identity in (16) validates inferences about properties of events referred to in different ways.

(16) for all properties P, if P(e) and e = e' then P(e')

As will be argued in more detail in Section 4, unaccusatives and passives support inferences based on such adverbials with their underlying transitive verbs, whereas reflexive predicates in general do not. In particular, instrumental PPs require the agent argument that is optional in unaccusative and passive constructions, but absent in the corresponding SE-reflexive predicates, as it is absorbed in the reflexivization operation.

Since the semantic differences between the two reflexives seem at least partially based on causal relations between arguments, the models of our semantic system must contain events as causal sources and targets. A 'Neo-Davidsonian' event-based semantics is adopted in which internal subjects optionally scramble to the VP external position of Spec of IP for event-denoting verbs, and only subjects of stative verbs are base generated outside the VP projection, in the semantic restrictive term.[6]

Although languages may differ widely in the extent to which they express SE-reflexives, two issues to address for the languages that do express them overtly are:

(i)   which kind of relations admit of SE-reflexivization
and
(ii)   what constrains the possible meanings of SE-reflexivized relations?

But before answers may be attempted, we should consider what semantic tools may be suitable to express reflexive predicates in dynamic semantics.

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[4]   See Grimshaw (1982). But see Lidz (1996) p. 42 for arguments against the argument reduction view.
[5]   The economical aspects of reflexivization have been introduced by Reinhart (1997) and others, e.g. Lidz (1996). What exactly is meant with economy is very much subject to debate, but it should concern the syntax-semantics interface and allow for an algebraic characterization in terms of properties of the homomorphism projecting syntactic structure compositionally into meanings.
[6]   Cf. Diesing (1992).

3.   The semantic representation of reflexivity

From a logical point of view, a plethora of options are open to represent relations one has to oneself. Let's review some of the more plausible candidates, first looking a simple predicate logic and then at an event-based logic.

At first sight, the simple formula in (17) is often considered to be adequate.

(17) $\lambda x \; [R(x,x)]$ (simple reflexivity)

denoting the property of being R-related to oneself.[7] But (17) leaves entirely open the possibility that R holds between x and some other entity, corresponding to the internal argument of an ordinary transitive verb. Besides the use of SE-reflexives with TVs (e.g. *zich bekijken*–SE *watch*, *zich verstoppen*–SE *hide*), the inherent SE-reflexives express relations one can only have to oneself, due to the meaning of the predicate (e.g. *zich schamen*–SE *shame*, *zich verslikken*–SE *choke*). If one has R only to oneself, and not to anyone else, the formula in (18a) is needed. If one is the only one having R to oneself, as in *Jan scheert zichzelf/John SELFshaves*, the formula in (18b) is needed.[8]

(18)   a. $\lambda x \; [R(x,x) \; \& \; \forall y \; [R(x,y) \Rightarrow x = y]]$ (necessary reflexivity, object oriented)
         b. $\lambda x \; [R(x,x) \; \& \; \forall y \; [R(y,x) \Rightarrow x = y]]$ (necessary reflexivity, subject oriented)

In (17) and (18a,b) the referent of x could be constrained to be trace of the syntactic subject, if desired. Of course, (18a,b) each entail (17), but not vice versa.

But apart from these coreference conditions by formal identification of variables in logical form, properties can be defined where some function f determines to what x holds the relation. For instance, in (19)

(19) $\lambda x \exists f [R(x,f(x)) \; \& \; x \approx f(x))]$ (dependent coreference)

the property is given of being R-related to something which functionally depends on x, determined by the function f. This $f(x)$ is $\approx$-related to x, interpreted possibly as a weaker similarity or resemblance relation. It could also be specified to pick a physical part or temporal slice of x, or be an deictic act of demonstration, or determine something else appropriately functionally related to x, e.g. its counterpart in some alternative hypothetical situation, for instance. But f could also be understood as a variable assignment function, as is sometimes done in dynamic semantics, chosing an alternative referent for x in another context, given the referent of x in the current context. In that case (19) expresses that the referent of x fixed by the given assignment is identical/similar/ resembling the referent f picks for x. In other words, two assignments coincide in a model on their value for x; a very liberal form of coreference dependent upon the model.

Elaborating this semantic line a bit further, (20) defines the set of relations between x and y that corefer under some assignment in the model. Note that x and y may corefer

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[7] (17) is called binding in Reinhart (1997) and considered the economical way to encode reflexivity.
[8] The characterization of SELF as exhaustive identification of sets of DPs in Rooryck and Vanden Wyngaerd (1997) is logically expressed in (18b).

under an assignment f, possibly different from the one for which R holds between them. This option may prove to be useful in analyzing various duplication puzzles, as in the Baron of Münchhausen predicament (see (4) above).[9]

(20) $\lambda x \lambda y \exists f[R(x,y) \ \& \ f(x) = f(y)]$ (contingent coreference)

To take away the dependence on an arbitrary assignment of coreference in (20), in (21) it is required for x and y to corefer under any assignment, where f is universally quantifying over all possible assignments. In a dynamic semantics, f could be constrained to all extensions of the given assignment, if desired.

(21) $\lambda x \lambda y \forall f \ [R(x,y) \ \& \ f(x) = f(y)]$ (necessary coreference)

Finally, an altogether different strategy uses a propositional operator of type $<t,t>$ to encode reflexivity, reducing a binary relation to an unary reflexive property R_i in (22).

(22)   operator $O_{<t,t>}$: $\lambda x \ O_x(R(x,x)) = \lambda x \ SE - R_i \ (x)$ (syntactic reflexive reduction)

This may perhaps offer the best option for a lexical reduction account of the inherently reflexive relations, satisfying condition (18a) above.

So far, we have only considered simple predicate logical properties, but the tools offered for natural language semantics are richer and more varied these days. Before we look at an event-based semantics where causal relations and thematic roles may be specified, let us review the strategy of Discourse Representation Theory (DRT), as expounded in Kamp and Reyle (1993). DRT incorporates syntactic constraints on pronoun interpretation within the construction rules for the representation of the content of clauses in Discourse Representation Structures, which determine the truth-functional aspects of meaning, as well as the availability of reference markers for pronoun resolution. The DRT account may be adapted to reflexive pronouns as follows. The DRT definition of the class of discourse referents identified with a given discourse referent is given below (K&R 1993, p. 235/6).

(23)   Definition. Class of markers identified with **x** in DRS K
       $[\mathbf{x}]_K =_{def.}$ is the smallest class Y such that
       (i)   **x** is in Y
       (ii) if **z** is in Y and either **z** = **u** is in K or in a subDRS K'
             or **u** = **z** is in K, then **u** is in Y.

The local binding condition on reflexive pronouns can now be expressed as requiring the marker for a reflexive pronoun to be identified with any accessible marker in $[\mathbf{x}]_K$, if **x** is the marker for the subject in its clause. This constitutes a meta-constraint, forcing identity conditions at the DRS level, as the subject marker remains obviously accessible in the process of representing no matter what object NP. The constraint allows for the marker of the second occurrence of a reflexive pronoun, for instance in a coordinated VP, to be identified with the marker for its preceding first occurrence, instead of with the marker for the subject NP, cf. (24).

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[9]   The definition in (20) may be compared to covaluation in Reinhart (1997).

(24) a. Jan vroeg zich af wat het te betekenen had, maar verbaasde zich niet.
      b. John asked SE off what it to mean had, but surprised SE not
      c. 'John wondered what it could mean, but was not surprised.'

If there is any empirical gain in this liberalization, it should be a case with an inaccessible subject marker, while other markers identified with it remain accessible to the marker for the reflexive pronoun. Perhaps the interesting English example of kataphoric pronoun + reflexive in (25) from Reinhart (1997) is a case in point.

(25) Only he himself still thinks that Max is a genius.

Unfortunately, it would lead us here too far astray to discuss the issues of focus, presupposition and negation, arising in (25), in all requisite detail. It should be remarked however, that in DRT names remain always accessible to any occurrences of pronouns.

The need to refer to and quantify over events has been clear in the discussion in Section 1. The simplest way to implement an event-based semantics is to assume events on a par with first order individuals, and allow them to be identified and quantified over. Just like an individual, one event may be described by different clauses that corefer. Coreference of events is expressed by identification of event-variables. Distinct events may be causally related as source and target, considered thematic roles realized only by events. For instance, a raining event is the causal source of the event of the streets getting wet as causal target. Causal relations realizing change must relate different event-variables, and cannot relate arguments of one verbal predicate. To explain under exactly what worldly conditions a causal relation obtains is not a concern germane to natural language semantics. But it is important for semantic theory and natural language reasoning to account for the relations between various light verbs and causal statements. For this purpose, English light verbs are represented with logical predicate constants DO, LET, MAKE, relating individuals to events. But due to their auxiliary semantic status, light verbs do not carry their own event argument, as opposed to the ordinary lexical stage level predicates that do have event-arguments.

Furthermore, thematic roles may relate an argument of a predicate to its event-variable, recognizing here for simplicity sake at least the roles of 'agent', 'patient' and 'experiencer'. Since coreferring event-variables are identified in the models, one and the same individual may realize different thematic roles when associated with two event-variables. This provides us with the tools to analyze the constructions of reflexive predicates with light verbs and their inferences, describing one and the same individual as realizing different thematic roles in two descriptions of one event. This is explained in detail in the next section.

4. Entailments with light verbs

Light verbs have very little descriptive semantic content, although they carry tense and aspectual inflections. In the account proposed here light verbs refer to the same events as the ones referred to by descriptive predicates in their complement. Ordinary lexical

descriptive stage-level verbs have an event argument as external argument. Light verbs introduce an event-argument to corefer with the event-variable associated with their infinitival complement, not unlike definite NPs that require their referent to be familiar. Furthermore the primary semantic function of light verbs is to assign thematic roles to their arguments, which must differ from the ones assigned to coreferential arguments by the lexical predicate. This semantic characteristic property of light verbs is implemented in the meaning postulate on light verbs in (26), where $th(x)$ represents the thematic role assigned to x.

(26) If P is an element in the set of light verbs {DO, MAKE, GET, LET}, then

$$\forall P \ \forall Q \ \forall x \ \forall y \ \forall e \ \forall e' \ [P(x,e) \ \& \ Q \ (e',y) \ \& \ e = e' \ \& \ y = x \Rightarrow th \ (x) \neq th \ (y)]^{10}$$

The meaning of the light verb *laten* 'to let' is a relation P between its agent argument x and an event argument e, to be identified with a coreferential event argument e' and one of its arguments y, related by the property Q, denoted by the infinitival complement, as in (26). The resolution of reflexive pronouns in light verb contexts remains subject to (26), and requires overt arguments for identification.

(27) $\lambda Q \lambda y \lambda x \ \exists e, e'[LET \ (x,e) \ \& \ agent \ (e,x) \ \& \ Q(e',y) \ \& \ e = e']$

The analysis of the entailment in (6a) above is now accounted for simply, in (28).

(6) a. Jan liet zich vallen ⇒ Jan viel
        John let SE fall ⇒ John fell

(28) a. $\lambda P \ P \ (john) \ \lambda y \lambda x \ \exists e, e'[LET \ (x,e) \ \& \ agent \ (e,x) \ \& \ FALL \ (e',y) \ \&$
           patiens $(e',y) \ \& \ y = x \ \& \ e = e']$ reducing to
      b. $\exists e, e'[LET \ (john,e) \ \& \ agent \ (e,john) \ \& \ FALL \ (e',john) \ \& \ patiens \ (e',john) \ \&$
           $e = e']$

which obviously entails the simple

(28) c. $\exists e'[FALL \ (e',john)]$

The semantics of the SE-reflexive identifies the subject of the falling with the subject of the letting, as the two associated thematic roles remain distinct. The same principle is applied when the infinitival complement is a transitive verb with an implicit subject argument, as in (7b). But the identification of the existentially closed implicit subject of the infinitival complement with the SE-reflexive is not possible. The constraint in (26) accounts for the correct inferences in (2a), given in (29).

[10] Properly speaking, the argument identified with the agent of the light verb may be any argument of a infinitival complement, regardless of how many arguments it takes. (26) should be generalized accordingly, allowing identification of the variable only when it bears a distinct, i.e. non-agent, thematic role. Formally this is best expressed by stating the constraint with a variable as element in a sequence of variables.

(2) a. Jan liet zich scheren ⇒ Iemand schoor Jan
         John let SE shave ⇒ someone shaved John

(29) a. λP P (john) λx ∃e, ∃e' [LET (x,e) & agent (e,x) & ∃y SHAVE (e',y,z) & y ≠
         x & agent (e',y) & patiens (e',z) & z = x & e = e']

reduced to

(29) b. ∃e ∃e' [LET (john,e) & agent (e,john) & ∃y SHAVE (e',y,john) & y ≠ john
         & agent (e',y) & patiens (e',john) & e = e']

which entails

(29) c. ∃e' ∃y [SHAVE (e',y,john)]

When the subject of the infinitival complement is explicit, as in (2b), the SE-reflexive
corefers with the infinitival subject as first accessible one, cf. (30).

(4) c. Jan liet iemand zich scheren ⇒ Iemand schoor zich
         John let someone SE — shave ⇒ Someone SE-shaved

(30) λP P (john) λx ∃e, e' [LET (x,e) & agent (e,x) & λQ ∃v Q (v) λy ∃z[SHAVE
      (e',y,z) & y = z & agent (c',y) & patient (e',z) & e = e']]
      ⇒ ∃v∃' [SHAVE (e',v,v)]

The reflexive may have any thematic role, other than agent, though syntactically it is
subject of the infinitival complement. This together with (26) accounts for the
observations in (31), (32).

(31) a. *Jan liet zich kijken
         John let SE look   (violates 26)
      b. Jan liet zich be-kijken
         John let SE be watched (implicit agent *be-kijken*)
      c. Jan liet zich niet meer zien
         John let SE no longer be seen (implicit agent *see*)

(32) a. *Jan liet zich schamen
         John let SE shame   (violates 26)
      b. Jan liet zich be-schamen
         John let SE be ashamed (implicit agent *be-schamen*)
      c. Jan voelde zich beschaamd
         John felt SE be ashamed (*Jan* experiencer, SE patient)

Intransitive verbs only form acceptable reflexive infinitival complements of light verb
constructions when they assign a thematic role other than agent to their subject, and
hence meet constraint (26). This explains why *zich laten vallen* (SE let fall) is acceptable,
but *zich laten kijken* (SE let look) and *zich laten schamen* (SE let shame) are not.
Furthermore, implicit subjects of infinitival complements are inaccessible antecedents for
reflexive pronouns, as was already observed in (2a) and its analysis in (29) above.

5.   Economic interpretation

Returning now to the issue of the economy of interpretation raised in the beginning of this paper, let us compare the reflexive predicate construction with its synonymous counterpart using non-reflexive, dependent pronouns. The formation of reflexive predicates from ordinary transitive verbs pays off as an economical way to express coreference in (33), when the infinitival subject is indefinite and does not require overt expression. Processing the non-reflexive pronoun in (33a), when destressed, appeals to the accessible antecedents stored in context, whereas in (33b) the meaning of the reflexive already fully determines its referent.

(33) a.   Jan liet iemand hem bekijken
            John let someone look at him
      b.   Jan liet zich bekijken
            John let SE look at

The savings in terms of the computational expense of the pronoun resolution is more obvious with quantificational NPs, as in (34). In (34a) a universally quantified subject binds the pronoun in the infinitival complement with an overt indefinite subject. This is still a perfectly acceptable binding, though tangibly less easy to understand when compared with the synonymous reflexive predicate in (34b). But when the infinitival complement has a negative (i.e. left decreasing in GQ terms) quantificational subject as in (34c), the pronoun has no access to the quantificational subject of LET. The synonymous reflexive predicate however can simply be negated. Even adverbial presupposition triggers like *niet meer*, which add the presupposition that everyone did allow someone to look at him in the past, do not affect the inaccessibility. The same holds for (34e, f) where the main subject is negative quantificational, and the pronoun has no access to it, whereas the reflexive infinitival predicate is perfectly fine.

(34) a.   Iedereen$_i$ liet iemand hem$_i$ bekijken
            everyone let someone look at him
      b.   Iedereen liet zich bekijken
            everyone let SE look at
      c.   *Iedereen$_i$ liet niemand hem$_i$ (meer) bekijken
            everyone$_i$ let nobody (anymore) look at him$_i$
      d.   Iedereen liet zich niet (meer) bekijken
            everyone let SE *neg* (more) look at
      e.   *Niemand$_i$ liet iemand hem$_i$ (meer) zien
            nobody let someone him (more) see.
      f.   Niemand liet zich (meer) zien.
            nobody let SE (more) see (= show).

This shows the economical advantage of SE-reflexivization as productive predicate formation in natural language. Contexts in which coreference with the subject expressed with ordinary pronouns would be blocked offer a fully compositional procedure to express coreference with the subject using SE-reflexive pronouns. As regards the internal

structure of INFL, reflexive formation must command aspectual and tense inflection, causal relations, as well as the polarity assignment in the verbal projection.

6.   Adverbial modification and auxiliary selection

In this final section it is argued that unaccusatives share their adverbial modifications with regular transitive verbs, but reflexive predicates generally do not. This makes it clear in what sense reflexive predicates provide a different perspective on the event described. Manner adverbs, specifying the way an action is executed, like *slowly*, are preserved in Dutch through light verb constructions (35b,c) unaccusatives (35d), reflexive predicate formations (35e,f), and light verbs with reflexive predicates (35g), where the agent is implicit.

(35) a. Marie opende langzaam een deur.
          Mary opened slowly a door
      b. Marie deed een deur langzaam open.
          Mary did a door slowly open
      c. Marie maakte een deur langzaam open.
          Mary made a door slowly open
      d. Een deur ging langzaam open.
          a door went slowly open
      e. Een deur opende zich langzaam.
          a door opened SE slowly
      f. Er opende zich langzaam een deur.
          there opened SE slowly a door
      g. Een deur liet zich langzaam openen.
          a door let SE slowly open

When a prepositional phrase specifies the instrument with which an action is executed, if not an argument of the verbal predicate, clearly a semantic constituent of the event (36a,b,c), the unaccusative still preserves this PP (36d), but the reflexive predicate constructions do not (36e,f). The light verb with reflexive predicate (36g) has an implicit agent performing the opening and hence does accept the PP modification.

(36) a. Marie opende een deur met een sleutel.
          Mary opened a door with a key
      b. Marie deed een deur open met een sleutel.
          Mary did a door open with a key
      c. Marie maakte een deur open met een sleutel.
          Mary made a door open with a key
      d. Een deur ging open met een sleutel.
          A door went open with a key
      e. *Een deur opende zich met een sleutel.
          a door opened SE with a key

f. *Er opende zich een deur met een sleutel.
   there opened SE a door with a key
g. Een deur liet zich openen met een sleutel.
   a door let SE open with a key

In fairytales or magical situations, it may well be that (36e, f) become acceptable, describing a door that has come to life and extends an arm holding a key to unlock its own keyhole. Such possibilities are indicative of the creative imagination overcoming the limits of common sense conceptions of causal relationships, much like the Baron of Münchhausen case. Ultimately, semantic theory should be able explain what is causally odd about such self-causal situations, that are perfectly understandable, yet never realizable in the world as we know it.

Auxiliary selection in perfect inflection shows another difference between unaccusatives and reflexive predicates, for the perfects of the transitive and unaccusative *open* take BE, whereas the reflexive predicate perfect takes HAVE, in (37).

(37) a. Er is/*heeft een deur geopend/opengegaan.
        there is/*has a door opened/opengone
     b. Een deur is/*heeft geopend/opengegaan.
        a door is/*has opened/opengone
     c. Er heeft/*is zich een deur geopend.
        there has/*is SE a door opened
     d. Een deur heeft/*is zich geopend.
        a door has/*is SE opened
     e. Een deur heeft zich (door Piet) met een sleutel laten openen.
        a door has SE (by Peter) with a key let open

In the unaccusative perfect the causal source may be optionally expressed, as in passives, with *by* NP in adjunct PP, where the NP is event denoting (e.g. *een deur is opengegaan door de storm* (= 37b + *by the storm*). The BE-auxiliary is selected as it relates the state resulting from the opening to the moment of speaking. Reflexive predicates do not allow the agent or causal source to be expressed in any way, but semantically the agent remains implicit and existentially closed, inaccessible to the reflexive pronoun as well as to instrumental adverbial modification. The auxiliary HAVE is selected as it describes a past action affecting the door as a property of itself, rather than its resulting current state. The light verb construction with reflexive predicate (37e) sides in one respect with unaccusatives and passives, for it allows optionally agents to be expressed in *by*-phrases in adjunct PP. But in another respect it sides with reflexive predicates in selecting HAVE auxiliary in perfect inflection. This is indicative of the important semantic differences between passives, unaccusatives, reflexive predicates and light verb constructions.

7.   Concluding remarks

This paper has raised some semantic issues in the interpretation of SE- and SELF-reflexives in Dutch, with an eye on addressing some new issues of meaning and interpretation where the interaction between syntax, semantics and common ground is at stake. It was argued that SE-reflexive predicate formation is an economic, compositional strategy to alleviate the computational complexity of the pronoun resolution, when coreference expressed with non-reflexive pronouns. Furthermore, SE-reflexivization offers a way out of negative domains to create bindings with otherwise inaccessible antecedents. Much more needs to be said about the entailments discussed above, about the paradoxical or contradictory forms of self-reference and about the role of morphological processes in reflexivization. Further details of a semantic account of reflexives still need to be developed in an event-based semantics, where causal relations are made explicit in terms of relations between events. This may eventually help us to design a satisfactory account of the paradoxical and causally odd forms of self-reference in ordinary language.

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