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# The Lexicon-Syntax Parameter: reflexivization and other arity operations

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## *1. Introduction*

The specific problem we address in this study is what explains the coherent cross-linguistic variation in the array of reflexive verbs. We show that a single parameter straightforwardly derives the variation. In addition, the parameter turns out to be responsible for parallel variations in other empirical arrays. Crucially, the parameter is applicable only if the grammar includes an active lexicon (Siloni 2002), which is more than a mere list of items, and allows the application of derivational operations. Evidence is presented that certain operations must take place prior to syntactic insertion. Our results cast heavy doubts on the plausibility of recent approaches that aim to eliminate the operative role of the lexicon altogether (Marantz 1997,2000, Borer 2004).

It is a standard assumption in works on argument structure that the different thematic realizations of the same thematic concept are derived from the same basic entry via universal operations. We name these operations arity operations, as they affect the arity (valence) of the predicate. In section 6, we survey briefly various arity operations, but our major focus here is on reflexivization - the operation generating reflexive verbs out of a transitive verb entry. Roughly, by reflexive verbs we mean verbs denoting an action that the Agent argument applies to itself (1a) or in certain languages, as we will see, a state of mind the Experiencer argument has with regard to itself. The interpretation of reflexive verbs can be paraphrased through the use of a reflexive argument as in (1b). We use the term reflexive verbs (or simply, reflexives) to refer to verbs denoting this meaning without realizing a reflexive argumental object (1a). For the anaphoric relations in (1b) we use the term reflexive (or syntactic) binding.

(1) a. dan hitraxec. (Hebrew)
Dan washed

b. dan raxac et acmo. (Hebrew)
Dan washed ACC himself.

Reflexive verbs appear in a certain morphological form: a particular verbal template in Semitic languages, the fifth verbal template in Hebrew, the so-called *hitpa'el* template (1a); a clitic (*se* or *si*) in Romance (e.g., French (2a)) and Serbo-Croatian (2b), or the suffix -s*'* in Russian (2c). English uses zero morphology with reflexives (see translation to the examples in (2)).

(2) a. Jean s'est lavé.
Jean SE washed
'Jean washed'

b. On se oprao.

He SE washed
'He washed'

c. Ona pomylas'
She washed(refl)
'She washed'

Importantly, cross-linguistically the same morphology can also appear with other types of predicates: with reciprocals (3a), unaccusatives (3b), subject-Experiencer verbs (3c), middles (3d), impersonals (3e) and even passives (3f), as illustrated in Italian.[1] In certain grammatical traditions this morphology is known as the reflexive morphology, and in other traditions as the medio-passive morphology (or a similar term). Although this is just a label, it may have influenced the analysis given to the various diatheses this morphology encompasses. Thus, for instance, it may have brought forth the unaccusative derivation of reflexives, which we prove untenable in section 3. We briefly discuss the different predicates bearing this morphological form in section 6, and offer a unified account of its use.

(3) a. Giovanni e Maria si sono abbracciati.
Giovanni and Maria SI are hugged
'Giovanni and Maria hugged each other'

b. La porta si è chiusa.
the door SI is closed
'The door closed'

c. Giovanni si preoccupa di questo.
Giovanni SI worries of this

d. Questi vestiti si lavano facilmente.
These suits SI wash easily
'These suits wash easily'

e. Si mangia le mele.
SI eats the apples
'One eats the apples'

f. Si mangiano le mele.
SI eat the apples
'The apples are (being) eaten'

Although reflexive verbs across languages share certain basic properties, they split into two types according to a cluster of distinctions. In our view, arity operations are universal, but the level at which they apply is a parametric choice. Thus, while reflexives are derived through the same type of operation universally, the considerable crosslinguistic variation they show

[1] The term incohative is sometimes used to refer to unaccusatives (or else it is used to refer to predicates denoting the beginning of an event). We will not use this ambiguous term here.

follows from the fact that the level at which the operation applies is a parametric choice: it can apply in the lexicon or in the syntax, as discussed in detail in sections 4 and 5. We will argue that in Hebrew, English, Russian, Hungarian, and Dutch the parameter is set onto the lexicon. In the Romance family, in Serbo-Croatian, Czech, Greek, and German it is set onto the syntax. The Lex(icon)-Syn(tax) parameter we propose is given in (4)**.**

(4) The Lex-Syn Parameter
UG allows thematic arity operations to apply in the lexicon or in the syntax.

The parameter is defined with respect to arity operations in general. We explore its working in detail regarding reflexives. However, as expected, the parameter turns out to be responsible also for the variation attested by other types of predicates, such as reciprocals and middles, as briefly discussed in section 6.

## 2. Reflexivization

### *2.1 Se is not an object clitic*

First, let us motivate the claim that the Romance clitic *se* (*si*) indeed forms reflexive verbs. As the clitic is reminiscent of object pronominal clitics, an analysis that could come to mind is that verbs with *se* are transitive verbs taking a reflexive object clitic (5b), parallel to verbs taking pronominal clitics (5a) and unlike reflexive verbs in Hebrew (5c), Russian or Hungarian which are intransitive. However, as already noted by Kayne (1975), there are good reasons to discard the object clitic analysis of the Romance clitic *se* (5b).

(5) a. Jean $le_i$ lave $t_i$.
Jean $him_{cl}$ washes
'Jean washes him'

b. An object clitic analysis: Jean $se_i$ lave $t_i$.
Jean SE washes
'Jean washes himself'

c. dan hitraxec.
Dan washed(refl)

Various arguments lead to the conclusion that *se*-verbs do not pattern with transitive verbs. The clitic *se*, then, cannot simply be the object of a transitive entry. We mention two arguments below. Consider first the context of expletive insertion in French illustrated in (6a). Kayne (1975) observes that while transitive verbs are disallowed in this environment (6b), reflexive verbs do occur there (6c).[2] If reflexives were transitive entries, we would expect them to be completely impossible in the postverbal position of expletive

[2] Judgments vary among speakers. According to Kayne (1975), example (6c) is grammatical. Some speakers judge it as marginal. Importantly, speakers agree that there is a clear difference in grammaticality between transitives (6b) and reflexives (6c).

constructions, just like transitive verbs.

(6)a. Il est arrivé trois filles.
there is arrived three girls

b. * Il $les_i$ a dénoncés $t_i$ trois mille hommes ce mois-ci.
there $them_{cl}$ has denounced three thousand men this month-here

c. ?Il s'est dénoncé trois mille hommes ce mois-ci.
there SE is denounced three thousand men this month-here
'Three thousand men denounced themselves this month'

Even more solid is the argument based on French causative constructions. These constructions treat transitives and intransitives differently; reflexives pattern with intransitives (Kayne 1975). When the verb embedded under the causative verb *faire* ('make') is a transitive verb (7a), its subject must be introduced by the preposition *à* ('to'). When the lower verb is intransitive, its subject cannot be introduced by *à* (7b).[3]

(7)a. Je ferai laver Max *(à) Paul.
I will+make wash Max to Paul
'I will make Paul wash Max'

b. Je ferai courir Paul.
I will+make run Paul
'I will make Paul run'

As is clear from (8a), when the direct object of the embedded verb is a pronominal clitic, the verb patterns with transitive entries. But when the lower verb is reflexive, its subject surfaces without the preposition (8b), just like the subject of intransitive verbs. Notice that the different positioning of pronominal clitics and reflexive clitics in the causatives of (8) suggests in itself that they deserve a different syntactic treatment.

(8)a. Je le ferai laver à Paul.
I $him_{cl}$ will+make wash to Paul.
'I will make Paul wash him'

b. Je ferai se laver Paul.
I will+make SE wash Paul
'I will make Paul wash himself'

*Se*-verbs, then, are not transitive verbs but rather reflexive verbs like their Hebrew

[3] The subject of an intransitive embedded under a causative verb is an accusative argument: when it is cliticized, the accusative clitic is used:
(i) Je le ferai courir.
I $him_{cl}$ will+make run
'I will make him run'

equivalents. It has been suggested that reflexive verbs are derived by a lexical operation (reflexivization) that affects the internal θ-role, links it to the external θ-role thereby blocking its mapping onto the object position (Chierchia 1989/2004, Grimshaw 1982, Wehrli 1986).

### *2.2 Lexical operation: the problem*

Grimshaw (1982) suggests that the reflexive clitic *se* is a marker of lexical reflexivization, which is a lexical operation binding the internal θ-role by its external counterpart, making the former syntactically inaccessible. Similarly, according to Wehrli (1986), the reflexive clitic *se* absorbs the internal argument, which is consequently unavailable to syntactic processes. The lexical option is elaborated by Chierchia (1989/2004). Chierchia assumes a lexical operation that applies to a two place relation (a transitive verb) and reduces the relation to a property. The operation turns a transitive entry such as *wash* into a reduced entry whose single θ-role is the external θ-role. To capture the reflexive reading, Chierchia assumes that a meaning postulate is associated with the operation, which requires that the resulting one place predicate be interpreted as V(x, x).

Marantz (1984) notes that a severe problem to such approaches is posed by the possibility to reflexivize into Exceptional Case Marking constructions. Marantz illustrates the problem with Icelandic examples, but the same point can be made for French. Consider the ECM construction in (9a) and its reflexive equivalent in (9b). The matrix predicate *considère* does not take a DP as its internal argument, but rather a small clause. *Pierre* in (9a), to which *considère* assigns accusative Case, is the subject of the small clause, and receives its θ-role from the adjective *intelligent*. As it is not an argument of *considère*, a lexical operation on the θ-grid of the latter cannot affect it.

(9) a. Jean considère Pierre intelligent.
Jean considers Pierre intelligent

b. Jean se considère intelligent.
Jean SE considers intelligent

On the basis of such examples, Marantz concludes that the lexical operation of reflexivization must be affecting the external (not the internal) θ-role, and that the subject of reflexives must therefore be a derived subject. Sentence (9b), according to him, would receive an unaccusative derivation as schematized in (10): *Jean*, the subject, is the internal argument.

(10) Marantz' analysis: $\text{Jean}_i$ se considère [$t_i$ intelligent]
Jean SE considers intelligent

Note first that reflexivization of ECM predicates poses a problem to any lexical analysis independently of whether it reduces the external or internal θ-role. Reflexivization entails linking two arguments, identifying them. If it takes place in the lexicon, only two co-θ-roles (θ-roles of the same predicate) can be involved. In (9b) the two θ-roles the operation applies to are not θ-roles of the same predicate. In the lexicon, there is no relation whatsoever between them. To link the two roles, lexical analyses à la Marantz (see also Bouchard 1984,

Grimshaw 1990), which reduce the external θ-role in the lexicon, have to impose a syntactic condition on an element (the external θ-role) which is not available in syntax as it was absorbed in the lexicon; such a condition is ad hoc and implausible.

This may be what led Kayne (1988), Pesetsky (1995), and Sportiche (1998) to prefer a syntactic version of the unaccusative derivation of reflexive verbs. Under the syntactic version the two θ-roles involved in reflexivization are present in syntax: *Se* bears the external θ-role and must be bound by the derived subject, which is the internal argument in (11) and the subject of the small clause in (10).

(11) Jean$_i$ se lave $t_i$ .
Jean SE washes

There is however decisive evidence against any unaccusative derivation of reflexive verbs whether lexical or syntactic. Reinhart and Siloni (1999/2004) offer a critical review of the arguments proposed by proponents of the approach, and robust crosslinguistic evidence that the subject of reflexive verbs is not an internal argument. In the subsequent section we summarize this evidence. We then turn to solve the puzzle posed by ECM reflexives.

It is nonetheless important to note already here that although the problem posed by ECM reflexivization is indeed real, it does not represent a universal phenomenon. Reflexivization of ECM predicates is not universally possible. We do not find anything of the sort in Hebrew (12a), English (13a) (Hungarian or Russian). In these languages an anaphor must be inserted in the subject position of the embedded clause to obtain the relevant interpretation (12b, 13b).

(12) a. *dan mitxašev intiligenti.
Dan considers(refl) intelligent

b. dan maxšiv et acmo intiligenti.
Dan considers ACC himself intelligent

(13) a. *Dan considers intelligent.

b. Dan considers himself intelligent.

## 3. Against an unaccusative derivation

It is well known that the French quantitative clitic *en* can cliticize only out of the object position. It can thus serve as a test to discriminate between the internal and external argument in a postverbal position. (14a) contains an unaccusative verb; *en* cliticization is possible (15a), as its subject is an internal argument. (14b-c) constitute a minimal pair: (14b) is a reflexive verb, and (14c) is an unaccusative with the same morphology. While the latter allows *en* cliticization (15c), the former disallows it (15b).[4] This is straightforward if the subject of reflexives is an external argument, unlike the subject of unaccusatives.

[4] Recall that certain speakers already find sentences such as (14b) somewhat marginal (note 2). Nonetheless, for all speakers, sentences such as (15b) are completely impossible, whether they judge (14b) as marginal or entirely acceptable.

(14)a. Il est arrivé trois filles hier soir.
there is arrived three girls yesterday evening
'There arrived three girls'

b. (?)Il s'est lavé beaucoup de touristes dans ces douches publiques, récemment.
there SE is washed many tourists in these public showers recently
'Many tourists washed in these public showers recently'

c. Il s'est cassé beaucoup de verres dans ce lave-vaisselle.
there SE is broken many glasses in this dish-washer
'Many dishes broke in this dish-washer'

(15) a. Il en est arrivé trois hier soir.
there of+them$_{cl}$ is arrived three yesterday evening
'There arrived three of them yesterday evening'

b. *Il s'en est lavé beaucoup dans ces douches publiques, récemment.
there SE of+them$_{cl}$ is washed many in these public showers recently

c. Il s'en est cassé beaucoup dans ce lave-vaisselle.
there SE of+them$_{cl}$ is broken many in this dish-washer
'Lots of them broke in the dish-washer'

According to Guglielmo Cinque (personal communication, cited by Grimshaw (1990:184n3)), the same pattern holds in Italian, as illustrated below:[5]

(16) a. Ne sono arrivati tre.
of+them$_{cl}$ are arrived three
'There arrived three of them'

b. *Se ne sono vestiti tre.
SI of+them$_{cl}$ are dressed three

Within the Semitic family, there is also evidence that the subject of reflexives is not an internal argument. In Hebrew, the subject of reflexives is decisively an external argument; it systenatically fails diagnostics of internal arguments just like the subject of unergatives and unlike the subject of unaccusatives.

Shlonsky (1987), among others, observes that there are two types of postverbal subjects in Hebrew. One type appears in triggered inversion also labeled stylistic inversion, which is licensed by an XP immediately preceding the verb [XP V S]. These postverbal subjects will not concern us here. Another type of postverbal subjects, which do not require a preverbal trigger, is found with unaccusatives (17a) and passives (17b); these postverbal subjects are internal arguments. External arguments do not allow simple inversion [V S] (17c). As shown

[5] Italian speakers seem divided on (16b): some categorically ruling it out, and others accepting it. All the speakers accept (16a).

below, reflexives cannot appear in simple inversion (17d) just like unergatives, while unaccusatives with identical morphology do allow it (17e), on a par with other predicates whose subject is an internal argument:[6]

(17) a. nišbar mašehu.
broke something
'Something broke'

b. ne'ecru šloša xayalim ba-hafgana.
were+arrested three soldiers in+the-demonstration
'Three soldiers were arretsed in the demonstration'

c . * rakdu šloša yeladim ba-mesiba.
danced three boys in+the-party

d * hitlabšu šaloš dugmaniyot ba-knisa.
dressed three models in+the-entrance

e hit'alfu šloša xayalim ba-hafgana.
fainted three soldiers in+the-demonstration
'Three soldiers fainted in the demonstration'

Modification by possessive datives can also be used to detect internal arguments in Hebrew. Borer and Grodzinsky (1986) observe that possessive datives can only modify internal arguments. Hence, they can serve as possessors to subjects of unaccusatives (18a-b), but not to subjects of unergatives (18c). As expected, reflexives (18d) pattern with unergatives.

(18) a. ha-sefer nafal le-dan.
The-book fell to Dan
'Dan's book fell'

b. ha-simla hitkamta le-dina.
the-dress wrinkled to-Dina
'Dina's dress got wrinkled'

c. * ha-kelev šaxav le-dina.
the-dog lay to-Dina

d. *ha-xatul hitgared le-dina.
the-cat self-scratch to-Dina

[6] Additional factors, such as focus, affect the choice of postverbal subjects, and may therefore make certain examples less acceptable than others. Arguably stylistic inversion involves V-raising out of IP (Shlonsky and Doron 1992), while in simple inversion, the subject stays in its VP-internal position, and SpecIP is filled by a null expletive. Hence, by and large simple inversion is a trait of pro-drop languages. If a null expletive is not selected, the subject has to raise to SpecIP due to the Extended Projection Principle (EPP).

In Russian, genitive of negation provides a test to detect internal arguments. When a predicate is negated, its internal (but not external) argument can bear genitive Case (Pesetsky 1982). The predicates in (19a-b) appear both with the same morphology. Importantly, while (19a) is grammatical as the predicate is unaccusative, and hence due to the sentential negation its subject can bear genitive Case, (19b) is ungrammatical, as the predicate is reflexive; its subject disallows genitive Case just like the subject of any unergative (19c):[7]

(19)a. Ne objavilos' studentov.
NEG showed up students(GEN)
'Students did not show up'

b. *Ne pomylos' studentov.
NEG washed students(GEN)

c. *Ne tancevalo studentov.
NEG danced students(GEN)

Finally, even in English it seems that there is evidence that the subject of reflexives is an external argument. Agent nominals, also known as *-er* nominals, can be derived only from predicates with an external argument (as their name suggests); hence, the contrast between (20a) and (20b). As expected, reflexives can give rise to Agent nominals, as their subject is an external argument (20c):

(20) a. She runs so fast because she is an experienced runner.

b. *She moves so gracefully because she is an experienced mover.

c. She dresses slowly because she is an elegant dresser.

An unaccusative derivation of reflexive verbs, then, is simply impossible. The existence of ECM reflexive verbs must be accounted for in a different manner. We show that the view that reflexives across languages are derived by an operation that affects the internal argument is tenable and coherent. We reformulate the operation of reflexivization and propose it is subject to parametric variation. Our proposal predicts the behavior of reflexive verbs across languages. It accounts not only for why certain languages show ECM reflexives, but also for why other languages do not allow them. Moreover, we derive the notorious incompatibility of reflexivization with passive and raising predicates (often mentioned as an advantage of the unaccusative derivation), and reveal a cluster of distinctions, which follow from the distinct parametric setting.

[7] Judgments vary among speakers as Genitive of negation is not equally productive for all Russian speakers.

## 4. The Lexicon-Syntax Parameter.

We have seen that reflexive verbs across languages do not have a derived subject. They are the outputs of an operation that prevents mapping of a θ-role of the complement domain onto its canonical syntactic position. The answer to the question of why certain languages allow ECM reflexives and others do not lies in the realm of parametric variation. We suggest that UG arity operations, namely, operations that affect the syntactic valence of the verb, are allowed to apply in the lexicon or in the syntax. This is formulated by the Lex(icon)-Syn(tax) parameter (4) repeated in (21).

(21) The Lex-Syn Parameter
UG allows thematic arity operations to apply in the lexicon or in the syntax.

The operation of reflexivization, then, can be lexical or syntactic. As we shall see, among our sample of languages, the parameter is set onto Lexicon in Hebrew, English, Dutch, Russian and Hungarian. It is set onto syntax in Romance languages, in German, Serbo-Croatian, Czech, and Greek.[8] It is crucial to bear in mind that when we talk of languages with syntactic reflexivization or briefly syntax languages, we mean languages that form reflexive verbs in the syntax unlike lexicon languages that form them in the lexicon. Both types of languages can, in addition, form reflexive sentences by the use of reflexive anaphors (through syntactic binding). This option is orthogonal to our discussion and does not concern the lex-syn parameter.

In order to examine the working of the lex-syn parameter, we must first be more precise about the formulation of the reflexivization operation.

### *4.1 The reflexivization operation*

Valence reducing arity operations always have the effect of suppressing the syntactic realization of one of the θ-roles of the verb. However, as we shall see in section 6, where we discuss the full range of the operations we assume, the operations differ as to whether the syntactically unrealized argument is eliminated altogether, or it is still available in the semantics. Thus, it is largely assumed by now that the unaccusative entry in (22b) is derived by an arity operation from the transitive basic entry *melt* (Chierchia, 1989/2004, Levin and Rappaport, 1995, Reinhart, 1996, 2002). In this respect, then, it is similar to the passive entry in (22a), which is also derived from the transitive entry by an arity operation. But as is well known, in the case of passive, the suppressed argument is still available in the semantics. There are tests for this, one of which is the fact that a passive can occur with an instrument (22a), which is generally licensed only if an Agent role is available at the semantic representation. In the unaccusative derivation (22b), in contrast, the external role of the transitive entry is fully eliminated, and correspondingly, no instrument can be licensed.

(22)a. The ice$_i$ was melted $t_i$ (with a candle).
b. The ice$_i$ melted $t_i$ (*with a candle).

[8] For Serbo-Croatian, see Marelj (2004); for Czech, (Hron 2005); and for Greek, Papangeli (2004).

The difference lies in the question whether a given arity operation reduces (eliminates) a θ-role of the verbal grid altogether, or it just disables the syntactic realization of the argument corresponding to this role, while still assigning the role in the semantics. In the case of Passives, the Agent θ-role is not eliminated. Chierchia (1989/2004) argues that the relevant arity operation, which he labels Saturation, existentially closes a variable that the role is assigned to. So, roughly the semantic representation of (22a) is *∃x (x melted the ice)*. The operation responsible for unaccusatives, which we call Decausativization, fully eliminates the external θ-role; we discuss it in some more detail in section 6.

With this distinction in mind, it is clear that the reflexivization operation (unlike decausativization) does not eliminate a role. Rather, a θ-role that is not mapped onto a syntactic argument position is present in the semantics of reflexive verbs. The standard view regarding the semantics of thematic relations is that it is impossible to capture thematic information without assuming event variables and event semantics (Parsons 1990). To be an Agent or a Theme is to bear a certain relation to a given event. Sentence (23a) is thus interpreted as in (23b).

(23) a. Max washed the child.

b. ∃e [wash(e) & Agent(e, Max) & Theme(e, the child)]

c. Max washed.

d. ∃e [wash(e) & Agent(e, Max) & Theme(e, Max)]

Similarly, the interpretation of (23c) whose predicate is a reflexive verb, involves an Agent and a Theme. What distinguishes it from (23a) is that the two θ-roles are assigned to same person, as represented in (23d).

Thus, although the reflexive verb is syntactically a one place unergative, its semantics retains the original roles of the transitive base entry. The effect of reflexivization, then, is that two available θ-roles are assigned to the same syntactic argument. To capture this, we argue that the reflexivization operation is not a reduction operation, as suggested by Chierchia (2004),[9] but rather an operation that takes two θ-roles and forms one complex θ-role. We call this operation *bundling*. The application of arity operations is typically subject to thematic

[9] The reflexivization operation proposed by Chierchia (2004) actually eliminates the internal role altogether in the lexicon in order to form a one place predicate the in syntax (see section 2.2). But since this role exists at the level of interpretation, Chierchia adds a meaning postulate that ensures that the remaining role is interpreted not as a simple Agent, but as an Agent that operates on itself (λx(V(x, x))), namely, an Agent that is also a Theme. But what does it actually mean to say that the output of lexical reflexivization has to be interpreted this way? In terms of event semantics, if the same argument is both the Agent and theTheme of the event, then the Theme role was not eliminated, although the predicate is a one place predicate. The crucial observation here is that the Theme role, which is not realized syntactically, is nevertheless present in the semantics, so we cannot view lexical reflexivization as a simple elimination of the Theme. The operation we propose provides an explicit way to capture this observation.

restrictions (as will become clear in sections 6.2 and 6.3). The prerequisite on bundling is that it operates on an external θ-role, namely, a role that obligatorily merges externally (e.g., an Agent). The term *external θ-role* is not a primitive, and is used here just as a label for thematic properties that can be defined, as we will show briefly in the next section. The operation, then, bundles any θ-role with an external θ-role, as defined in (24). (When it applies in the lexicon, the operation is allowed only in a limited subset of cases permitted by (24), an issue we return to.)

(24) Reflexivization Bundling
$[\ \theta_i\ ]\ [\ \theta_j\ ] \rightarrow [\ \theta_i - \theta_j\ ]$, where $\theta_i$ is an external θ-role.

Note, next, that two independent questions arise about suppressing the syntactic realization of a given θ-role: what happens to the θ-role itself, and what happens to the Case the relevant argument would normally check. In reflexivization, the bundling operation takes care of the θ-role, by enabling the assignment of two θ-roles to one syntactic argument. But the base transitive verb has also an accusative Case that needs checking. As discussed below, reflexivization also involves Case reduction.

(24) is the general operation underlying reflexivization in both the syntax and the lexicon. However, the locus of its application determines a cluster of differences between lexical and syntactic reflexivization. Let us turn now to the way it applies, starting with reflexivization in the lexicon.

*4.1.1 Lexical Reflexivization* We conceive of the lexicon as an inventory of coded concepts, a subset of which denotes an event, takes participants in the event (bears θ-roles), and can undergo arity operations as specified by Universal Grammar (UG). There is no syntactic structure in the lexicon; this would be a superfluous reduplication of the syntactic component. Hence, no relations can be specified in the lexicon between predicates and their actual DP (or XP) arguments (nor is there any relation between distinct predicates, a property that will be very relevant in section 4.2).

Furthermore, we believe that lexical arity operations apply to the verb entry itself, which is a collection of properties/features, and not to an abstract event semantics representation (e.g., *λyλxλe(wash(e) & Agent(e, x) & Theme(e, y)*). More specifically, we assume that the event semantics representation is associated with the verb only during the derivation, and it is built compositionally on the basis of syntactic structure. The central reason for this is that the order of the λ-operators in such representations must reflect argument hierarchy, or the order of merging. While in simple cases it is possible to determine the syntactic argument hierarchy from the verb entry itself, this is not always the case (e.g., Reinhart (2002) argues that the Experiencer role can merge both internally and externally, in sensitivity to Case considerations). Attempting to build the full argument hierarchy into the lexicon would amount to duplicating the syntax in the lexicon.

Under this view of the lexicon, when the lex-syn parameter is set on the lexicon value, the bundling operation (24) applies directly on the verb's grid, bundling a θ-role with the external θ-role.[10] Turning to the question of Case, we assume, following Reinhart (2002), that the

[10] We assume the lexical grids include information about the external role, contra common assumptions that sever the external θ-role from the lexical verb and insert it syntactically via an additional verbal head (Bowers 1993, Chomsky 1995, Collins 1997 or Kratzer 1996). We refer

accusative Case feature is associated with the base transitive verb in the lexicon. But applying bundling reduces this Case feature. This is not specific to bundling. All valence reducing operations applying in the lexicon have this unified effect (see sections 6 and 7). The gist of the reflexivization operation in the lexicon is summarized in (25).

(25) Reflexivization in the Lexicon

a. Bundling: Operation (24) applies on the verb's grid.
b. Case: The accusative Case feature of the verb is reduced.

Applying (25) to the verb entry *wash* in (26a), we obtain the verb entry (26b). The new entry (26b) has only one complex θ-role to assign, and this bundle will be assigned to an external argument, *Max* in (26c).

(26) a. Verb entry: $\text{wash}_{\text{ACC}}$ [Agent] [Theme]

b. Reflexivization output: wash [Agent-Theme]

c. Syntactic output: $\text{Max}_{[\text{Agent-Theme}]}$ washed.

The next question concerns the interpretation of the complex θ-role. Technically, the semantic representation of (26c) is shown in (27a); but the question is, what does it means to assign a bundle of two θ-roles to one argument? We take (27a) to be interpreted as a distributive conjunction of θ-roles. So (26c) is interpreted as (27b).

(27) a. ∃e [wash(e) & [Agent-Theme](e, Max)]

b. ∃e [wash(e) & Agent(e, Max) & Theme(e, Max)]

To be precise, we assume that θ-roles and the operations on them are defined not in terms of θ-role labels, but in terms of their feature composition, as proposed in Reinhart 2002. Two atomic features compose θ-roles: [c(ause change)] and [m(ental state relevant)]. The Agent role is [+c +m], as it brings about a change and must be animate (its mental state is relevant). The Theme role is [-c –m], as it neither triggers a change nor imposes an animacy restriction.

Further, we assume the following mapping principles from the lexicon to the syntax. External mapping (merging) is preferred if possible. Hence, basic unary concepts merge their sole θ-cluster externally. For non-unary concepts, the formal properties of the clusters determine the merging order. Feature clusters containing only [+] features merge obligatorily externally; clusters containing only [-] features merge obligatorily internally. Technically, this is captured by a marking rule that assigns the former the external index (index 1) and the latter the internal index (index 2). (Using indices to mark external versus internal merger has been largely assumed since the publication of Williams 1981.) There are two mixed clusters: [-c+m] (Experiencer) and [+c-m] (Instrument). These are not assigned a merging index, and they can realize either externally or internally, depending on other specified conditions. In this system, the term *external θ-role* in the definition of bundling (24) means a [+] cluster. As we will show

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the reader to Horvath and Siloni (2004) for a critical review of such approaches.

briefly in section 4.2., there is a further requirement on bundling that this cluster be interpreted as bearing the feature /+m (we use the notation /α to refer to a (valued) feature).

Lexical reflexivization, on this view, bundles (unifies) two clusters of features (θ-clusters), as illustrated in (28). The complex role (28b) is a new one, hence unmarked for merging. As it can merge externally, it must.

(28)a. Verb entry: *wash*$[+c+m]_1$, $[-c-m]_2$

b. Reflexivization output: $wash_{ACC}[[+c+m][-c-m]]$

c. Syntactic output: $Max_{[[+c+m][-c-m]]}$ washed.

d. Interpretation: ∃e [wash(e) & [+c+m](e, Max) & [-c-m](e, Max)]

The feature system is not motivated by the problem of reflexivization. Whatever we need here for the discussion of reflexivization can be captured in the traditional way, taking labeled θ-roles to be primitive units that are somehow assigned indices 1 and 2, which mark external or internal merging. For the sake of simplicity, we will mostly continue to assume this traditional view in the presentation.

*4.1.2 Syntactic reflexivization* Turning to the way the reflexivization operation applies in the syntax, let us start with the question of Case. As mentioned, lexical reflexivization reduces the accusative Case feature of the verb (25b). But if no such operation applies in the lexicon, the verb still carries the feature, and it must be checked in the syntax. So the most immediate question is what happens with this Case, if an argument does not merge to check it. In syntax languages, we argue, the answer lies in the role of the clitic (e.g., in Romance, Serbo-Croatian, and Czech) or a parallel morphological device (such as the verbal form in Greek). Reflexivization in these languages is only possible when such an element is present. We assume (with others) that the clitic (or its equivalent) reduces Case. Hence, when a clitic is present, no Case considerations force the merging of an argument, and the only question left for the reflexivization operation is what happens to the unassigned θ-role.

In syntax languages, what is to become a reflexive verb leaves the lexicon with the same number of θ-roles, which need to be assigned, as the basic verbal entry.[11] As we noted in section 2.1, the clitic itself cannot be viewed as an argument, so the "extra" θ-role (which cannot merge as an argument owing to lack of Case) must be handled by an arity operation, in our case, bundling. We now turn to how bundling applies in syntax languages.

The syntax is the engine that builds structure from elements selected from the lexicon. The question arises whether the syntax can manipulate the thematic information of these elements. It has been suggested that the syntactic machine cannot change the lexical-semantic information of the elements it operates on. For instance, Siloni (2002) argues that the syntax

[11] Note that the fact that what is to become a reflexive verb in syntax leaves the lexicon with the same number of θ-roles as the basic entry, does not at all in contradict the conclusion that reflexive verbs (derived from a two place entry) are syntactically intransitive (section 2.1). Although they keep the same number of roles as the basic entry, they do not map the internal role onto the object position and are thus syntactically intransitive.

cannot change the θ-grid of a predicate, that is, elimination, modification and addition of a θ-role are illicit after syntactic insertion. Such manipulation of θ-grids is only possible in the lexicon. This is stated in the Lexicon Interface guideline in (29).

(29) The Lexicon Interface Guideline
The syntactic component cannot manipulate θ-grids: Elimination, modification and addition of a θ-role are illicit in the syntax.

Dimitriadis (2004) suggests deriving a similar insight from the basic properties of the semantic representation. While lexical operations apply to θ-roles, operations in the syntax apply to syntactic structure, which is already associated with event semantic representations (lambda formulas). Operations eliminating an argument from the semantic representation or manipulating its content are logically illicit. Hence, such operations cannot apply in the syntax.

In sections 4.2 and 6.2, we will show that there are reasons to believe that the syntactic component is indeed constrained along the lines of (29). Returning to bundling, we argue that the operation can apply in the syntax, without violating the guideline in (29). First, bundling does not modify the internal composition of θ-roles, but just cluster the roles together. Next, the operation does not need to access the verb's grid, which should not be accessible to syntactic operations. In the syntax, bundling does not apply to the verb's grid, but to unassigned θ-roles, which, as commonly assumed, are retained on the verbal projection. The requirement that bundling always applies to an external θ-role (24) is captured if syntactic bundling takes place upon the merger of an external θ-role. As will be shown shortly, the fact that bundling in the syntax does not apply to the verb's grid, but to unassigned roles, is what enables reflexivization of ECM predicates in syntax languages.

Assuming gradual building of structure along minimalist lines (Chomsky 1995), we define syntactic reflexivization as follows. The choice of morphology (*se*) reduces accusative Case (or another Case as will be discussed in sections 4.2 and 6.3). We assume the clitic originates on V and then moves with the verb to I, but nothing hinges on that. An internal θ-role is not mapped onto its canonical position owing to lack of Case. The unassigned role is retained on the verbal projection, until an external θ-role is merged. Upon the merger of an external θ-role, the unassigned role is bundled with the external role, resulting in the assignment of the two roles to the same syntactic argument.[12] Syntactic bundling, then, turns an external role, upon its merger, into a bundle of roles. For the operation to take place, an unassigned θ-role is required. This is obvious as a role that has already been assigned will not be available for bundling. The way reflexivization applies in syntax, then, is summarized in (30).

(30) *Reflexivization in syntax*
a. Case: Case is reduced by the appropriate morphology (such as the clitic *se*)
b. Bundling: Operation (24) applies to unassigned θ-roles, upon merger of the external θ-role.

[12] If the internal role is merged in the canonical object position despite the lack of Case, it ends up associated with nominative Case. The external role, in that case, cannot be merged, and ought to undergo closure at the level of interpretation (saturation), which is what happens in passives, for instance (see sections 4.1, 6.3). Note that indices (the merging instructions) are vacuous if the role is not merged.

Let us illustrate syntactic reflexivization with the French reflexive in (31a). The derivation includes a two-place verb *laver* 'wash' with Agent and Theme roles, the clitic *se*, and the DP *Jean*. The selection of *se* reduces the verb's ability to check accusative Case (30a). The Theme role is not mapped onto the object position; rather it is retained on the verbal projection. Thus, at the VP level (abstracting away from the VP-internal subject hypothesis for the sake of presentation) the verb still has two unassigned roles (31b). Upon merger of *Jean*, namely, upon the assignment of the Agent role, the Theme role is bundled with Agent, as schematized in (31c). The interpretation given in (31d) is equivalent to that obtained by lexical reflexivization (27b).

(31) a. Jean se lave.
Jean SE washes
'Jean washes.'

b. VP: [se lave$_{\theta i\text{-Agent},\ \theta k\text{-Theme}}$]]

c. IP: [Jean$_{<\theta i,\ \theta k>}$ [ se lave$_j$ [$_{VP}$ t$_j$]]]

d. $\exists$e [wash(e) & Agent(e, Jean) & Theme(e, Jean)]

What enforces bundling to apply in (31) is the θ-criterion requirement that thematic information carried by the verb be assigned. Since the status of the θ-criterion has been debated, it is important to stress that we believe this requirement of the criterion to be indispensable. The original θ-Criterion also includes a questionable biuniqueness condition requiring that each argument receive only one θ-role and that each θ-role be assigned to only one argument. The latter part of the biuniqueness condition is obvious: an assigned θ-role is not available for the verb to reassign. The former part is empirically problematic and was primarily meant to rule out movement to θ-positions (Chomsky 1981). As movement to θ-positions can be excluded on different grounds (Chomsky 1995, Bošković 1994 among others), the biuniqueness condition should be discarded. The θ-criterion, then, requires that θ-roles be assigned. Had an arity operation not applied in (31), the derivation would be filtered out by the θ-criterion.

Since syntactic bundling is enabled when a θ-role is retained on the verbal projection, the question arises whether there is a maximal domain where the role must be discharged. As we will show shortly, the domain is precisely the domain where A-movement is applicable. This is not surprising as in both cases we are dealing with thematic dependencies. We will define the domain by means of the EPP. Further, as will become clear below, there are good reasons to believe that the EPP is a requirement of the cycle. That is, C cannot merge with a Specless IP (see Chomsky 2001). Hence, the projection of Spec,IP, or in other terms, the projection of a full IP, is necessary to complete a cycle. Intermediate Spec,IPs are optional. (32) states the EPP as a constraint imposed by the cycle, and (33) reformulates the θ-Criterion.[13]

[13] We use the traditional lable IP for TP. A Specless IP is a defective (EPP-deficient) TP and a full IP is a regular TP in Chomsky's (2001) terms,

(32) EPP
Merging the outmost SpecIP of the cycle is obligatory.

(33) θ-Criterion
Every θ-role must be assigned in the smallest full IP.

Consider now the derivational options opened by this view of the EPP and the θ-Criterion for the ECM reflexive in (34a). The external θ-role of the embedded verb *laver* 'wash' is not assigned. The question arises, what is the categorial projection of the embedded clause? We assume it is an IP, as shown in (34b) since it is able to accommodate the sentential negation *ne pas* (35).

(34) a. Jean se voit [laver Marie].
Jean SE sees wash Marie
'Jean sees himself wash Marie.'

b. Embedded IP: $[_{IP}$ [laver $_{<\theta i>}$ Marie$_{\theta g}$]]

c. Next VP: $[_{VP}$ se voit $_{<\theta k>}$ $[_{IP}$ [laver $_{<\theta i>}$ Marie$_{\theta g}$]]$_{\theta f}$]

d. Top IP: $[_{IP}$ Jean$_{\theta k+\theta i}$ $[_{VP}$ se voit $[_{IP}$ [laver Marie$_{\theta g}$]]$_{\theta f}$]]

(35) Jean s'entend ne pas dire ce qu'il voulait dire.
Jean SE hears NEG say what he wanted to+say
'Jean hears himself not say what he wanted to.'

Let us now follow the derivation of (34a).Through the derivation (34b-d), we mark θ- role assignment by labeling constituents with the role assigned to them; unassigned roles appear in angle brackets. In the embedded clause (34b), the Theme role of *laver* is assigned to *Marie* (θg), but its Agent role is not assigned (θi); hence, it stays on the verb and can be carried along. C cannot be projected at this stage as IP is Specless. The derivation proceeds as in (34c) to the next VP. The higher verb is associated with *se*; hence, it has no accusative Case to check. This is what enables the derivation to continue. Had we proceeded instead just with the verb *voit* (without the clitic *se*), the derivation would crash on grounds of Case (no DP to check accusative). The matrix verb assigns its Theme role to the IP clause (marked as θf in (34c)). Its external role θk still waits to be assigned at the next external merger. At that stage, in (34d), two θ-roles need assignment: the unassigned Agent role (θi) of *laver,* which has been retained, and θk of *voit*. Upon merger of θk, θi bundles with it, so that both end up associated with the same argument.

In Reinhart and Siloni (2004), we assumed covert complex predicate formation in order to account for the possibility of reflexivization in ECM examples such as (34-35). The present view allows us to do away with that. The final syntactic representation (34d) is directly interpretable as in (36), which appears to capture correctly the truth conditions of the sentence.[14]

[14] As noted by an *LI* reviewer, to explain the *restructuring* phenomenon, it may nonetheless be necessary to assume complex predicate formation, as in Rizzi 1978 (but see Cinque 2002,

(36) $\exists e_1 \exists e_2$ [see($e_1$) & wash($e_2$) & Agent($e_1$, Jean) & Theme($e_1$, $e_2$) & Agent($e_2$, Jean) & Theme($e_2$, Marie)]

Importantly, the present account does not overgenerate. If *se* is associated with the ECM verb as in (34), then (34d) is the only possible derivation. If *se* is associated with the embedded verb (37), then the only meaning is (37a), derived by bundling the internal θ-role of *laver* with its external θ-role, upon merger of *Marie*

(37) Jean voit Marie se laver.

a. Jean sees Marie wash herself.

b. *Jean sees Marie wash himself.

c. Jean voit [Marie$_i$ se laver $t_i$ ]

d. *Jean sees himself wash Mary.

Obtaining the interpretation in (37b) would violate (33) as the internal role of *laver* would not be assigned in the domain of the first full IP. The impossible interpretation in (37d) is also blocked. This derivation would require merger of Marie in object position as the Theme, followed by movement to the embedded Spec,IP, as shown in (37c), and bundling of the external role of *laver* with the external role of *voit*, upon merger of Jean. This derivation too, violates (33), as the external role of *laver* is not assigned in the domain of the first full IP.

Moreover, the account predicts that an unassigned θ-role can be retained as long as a full IP is not projected. This prediction is borne out. As can be seen in (38), the role of *stupide* (θk) can remain unassigned up to the highest predicate.

(38) Jean se voit paraître stupide$_{\theta k}$ (bien qu'il sache qu'il est intelligent).
Jean SE sees to+appear stupid (though he knows that he is intelligent)
'Jean sees himself appearing to be stupid (although he knows he is intelligent)'

This is possible because merger of Spec,IP does not occur on the way. Not accidentally, this is very reminiscent of the traditional Specified Subject Condition imposed on A-movement. Both A-movement and syntactic reflexivization form thematic dependencies. Both are limited to the same domain. However, A-movement involves merger followed by movement, while syntactic reflexivization involves (local or nonlocal) bundling.

Finally, the present proposal straightforwardly accounts for the notorious incompatibility of reflexivization with passive (Kayne 1975, Rizzi 1986) and raising predicates (Burzio 1986), as illustrated in Italian (39a) and French (40a) respectively. Note first that the reflexive interpretation is possible when an anaphor in situ is used (39b, 40b); second that the

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for a monoclausal analysis of restructuring configurations). At any rate, the restructuring phenomenon is clearly different in nature and properties from reflexivization, and is therefore not relevant for our concerns here.

predicates, of course, allow pronominal clitics (39c, 40c); and third that the clitic in (39a, 40a) reduces dative Case, which it can normally do, as discussed in the next section.

(39) a. *Gianni si è stato affidato.
Gianni SI is been entrusted

b. Gianni è stato affidato a se stesso.
Gianni is been entrusted to himself

c. Gianni gli è stato affidato.
Gianni to+him$_{cl}$ is been entrusted

(40) a. *Jean se semble intelligent.
Jean SE seems intelligent

b. Jean ne semble intelligent qu'à lui-même.
Jean not seems intelligent but to himself

c. Jean leur semble intelligent
Jean to+them seems intelligent

This incompatibility has often been mentioned as a prevailing argument in favor of an unaccusative derivation for reflexive verbs (Grimshaw 1990, Pesetsky 1995, Sportiche 1998). The unaccusative reasoning goes as follows. The reflexive clitic *se* absorbs the external θ-role (in the lexicon or in the syntax). Hence, the incompatibility is to be expected, as the relevant predicates do not have an external θ-role available for absorption. Under our account the incompatibility simply follows from (30b). There is no merger of an external θ-role, upon which the unassigned role of *affidato* 'entrusted' and *semble* 'seem' can be discharged. Hence, the operation cannot take place.[15]

*4.2. Parameter setting*

The operation of reflexivization can apply in the lexicon or in the syntax in accordance with the lex-syn parameter (21) repeated in (41). A cluster of distinctions will be shown to follow from the different setting of the parameter. In our sample of languages, we found the settings listed in (42):

[15] Further, as pointed out by an *LI* reviewer, the possibility of reflexivizing the causative verb in (i) is also expected. Just as the Agent role of *affidato* 'entrusted' in (39a), the Agent role of *embrasser* 'kiss' in (i) is not merged as an external argument (but rather saturated, see section 4.1 and 6.3). As *embrasser* is embedded, its internal role is retained and bundled with the external role of the causative *fera* upon merger of the latter.

(i) Jean se fera embrasser (par Marie).
Jean SE will+make kiss (by Marie)

(41) The Lex-Syn Parameter
UG allows thematic arity operations to apply in the lexicon or in syntax.

(42) Lexicon setting: Hebrew, Dutch, English, Russian, Hungarian.
Syntax setting: Romance, German, Serbo-Croatian, Czech, Greek.

As is clear from the definition of the lex-syn parameter, all things being equal, we predict it to be relevant for arity operations other than reflexivization, too. Indeed, the prediction is borne out. The parameter turns out to be responsible for crosslinguistic variation exhibited by reciprocals (Siloni 2001), and middles (Marelj 2004). Moreover, it seems that languages are consistent regarding the setting of the parameter. In our sample of languages, the value of the parameter is identical for reflexives, reciprocals and middles. This, of course, facilitates parameter setting during acquisition, since evidence from various sources (operations) converges to set the choice. Section 6 summarizes evidence to that effect.

We expect gaps in the distribution of arity operations when characteristics of the operation are incompatible with the nature of the component. If a guideline of the type in (29) is on the right track, then operations involving manipulation of the verbal grid cannot apply in syntax. We argue in section 6 that this is exactly why unaccusative and subject-Experiencer verbs, for instance, are derived crosslinguistically in the lexicon.

We now turn to the cluster of distinctions that follows from the setting of the lex-syn parameter. We freely alternate between the languages in our sample when illustrating the distinctions. We have already noted one diagnostics for the parameter setting, namely, the split with regard to the existence of ECM reflexives. Lexicon languages do not allow ECM reflexives ((12-13) above, or (43) below). Syntax languages allow them ((34-35) above or (44) below).

(43) *Okosnak gondol-kod-t-unk. (Hungarian)
clever-dat think-*Refl*-Past-1pl+indef.obj.agr.
(Intended meaning: 'We thought ourselves clever')

(44) Peter se smatra [$_{AP}$ pametnim] (Serbo-Croatian)
Peter se considers intelligent-inst.
'Peter considers himself intelligent'

This puzzling linguistic variation becomes obvious in light of the lex-syn parameter. Reflexivization of ECM predicates involves θ-roles of two distinct predicates. In the lexicon, there is no relation whatsoever between these predicates. Only syntax puts them together. Hence, a lexical operation of reflexivization definitely cannot form ECM reflexives. The syntactic operation, in contrast, can bundle two θ-roles in the domain of the cycle. ECM reflexives are thus possible outputs. Notice that a grammar without an active lexicon would have a hard time deriving this distinction in a natural fashion.

A second diagnostics is that a lexical setting allows reflexive nominalizations while a syntactic setting seems to disallow it. We find reflexive nominals showing reflexive morphology in Hebrew (45a) or Hungarian (45b). We do not find anything of the sort in Romance languages.

(45) a. hitraxcut ('self-washing')

b. mos-akod-ás (wash-*refl*-nom 'self-washing')

It may be argued that the explanation for this fact is just morphological, namely that *se* is incompatible with nominal morphology. While this is indeed correct, French nonetheless allows unaccusative and subject-Experiencer nominalizations without *se* (46) although their verbal counterpart appears with *se* (47). So the question remains why we cannot find the same with reflexive entries.

(46) a. le rétrécissement du pantalon au lavage.
the shrinking of the pants in+the washing

b. l'intérêt de Marie pour ce livre
the interest of Marie for this book

(47) a. Le pantalon s'est rétréci au lavage.
The pants shrank in+the washing

b. Marie s'intéresse à ce livre.
Marie SE interest to this book
'Marie is interested in this book'

We assume reflexive nominalizations are derived in the lexicon from the corresponding verbs, along lines proposed by Siloni (1997). The above data, then, immediately follow from the lex-syn parameter. When reflexivization applies in the lexicon (as in Hebrew or Hungarian), it can feed the nominalization operation. When it applies in syntax (in Romance), there is no reflexive input in the lexicon to nominalize. Under our analysis, (46) is expected, because unaccusative and subject-Experiencer formation is a lexical operation even in Romance languages, as discussed in more detail in section 6.2.

Similarly, while Agent nominals in English allow a reflexive interpretation, their French equivalents do not have this interpretation. A *habilleur* must be someone who dresses other people and a *maquilleur* alike.

(48) a. She dresses slowly because she is an elegant dresser.

b. Jean est un excellent habilleur/ maquilleur
Jean is an excellent dresser/ make-up-er (of others only)

Again, this is so, because in English reflexive verbs are derived in the lexicon, and can give rise to nominalizations. In French they are formed in syntax, and hence there is no reflexive input to nominalize. Thus, the split attested in our sample of languages with regard to reflexive nominalizations follows straightforwardly from the lex-syn parameter. Note that the above data provide support to the assumption that reflexive nominals are derived from reflexive verbs.[16]

[16] When the paper was in press, we learned that reflexive nominalization can occur in syntax

A third diagnostics is that in syntax languages reflexivization is a productive operation: any transitive verb whose external argument can be interpreted as bearing a [+m] feature (mental state relevant) can reflexivize as illustrated below in French. That is, any transitive verb whose external argument is an Agent (49a), an Experiencer (49b), or even a Cause [+c] (which is unspecified with regard to the feature /m but compatible with a [+c +m] interpretation) (49c) can reflexivize.[17]

(49) a. Jean se dessine.
Jean SE draws
'Jean draws himself'

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languages under certain circumstances. According to Hron (2005), Czech allows reflexive nominals (i), although its reflexive verbs, clearly, have properties of syntactic reflexives.

(i) mit$^{j}$i: se (Czech)
washing SE
'self-washing'

Showing that these nominals cannot be argued to be formed in the syntax by nominalization of the corresponding verb, Hron proposes that they are derived by reflexivization of the corresponding transitive nouns. He further shows that Reflexivization of nominals in Czech is a syntactic operation as the reflexivization of verbs. If so, then the question arises, why is the same impossible in French, for example? As mentioned, the clitic *se* in French is a verbal clitic and can never be attached to nouns, unlike its Czech equivalent as is clear from (i). The role of the clitic in syntax languages is to reduce Case. Suppose that in order for refleixvization to apply to a transitive noun in syntax, a (genitive) Case reducer must be present. If so, then owing to the absence of an appropriate Case reducer, syntactic reflexivization of a transitive noun is blocked in French.

[17] Greek (Papangeli 2004) and Serbo-Croatian (Marelj 2004) are of the Syntax type but they seem to be more limited with regard to Experiencer reflexivizations. In French or Italian, in contrast, even Experiencer verbs such as *plaire* ('please') and *déplaire* (displease) (i), which have unaccusative syntax (Belletti and Rizzi 1988, Pesetsky 1995, Reinhart 2002) allow reflexivization (Arad 1998, Landau 2001).

(i) Jean se plaît/déplaît sur cette photo.
Jean SE pleases/displeases on this picture
'Jean pleases/displeases himself on this picture'

This is the only case not captured by (30b). We believe this can be captured by a more precise analysis of such verbs. Note, incidentally, that the existence of these reflexives is completely unconceivable under an unaccusative approach to reflexives, which associates *se* with the external θ-role.

Finally, it may be important to note that object Experiencer verbs such as *fâcher* ('anger'), *intéresser* ('interest') etc., whose external role is a cause, give rise to reflexives, e.g., *se fâcher* ('make oneself angry'), as expected. This is somewhat masked by the more dominant reading these *se* verbs have, namely, that of a subject Experiencer verb, e.g., *se fâcher* ('get angry').

b. Jean s'aime.
Jean SE loves
'Jean loves himself'

c. Jean se cache.
Jean SE hides

In lexicon languages reflexivization is limited. The set of lexical reflexives is approximately the same across languages. It is a subset of the set of Agent-Theme verbs. (50a-b) are impossible reflexives in Russian or any other lexicon language we have examined ((50b) has others meanings, which are irrelevant here).

(50)a *Ona ljubits'a
she loves(refl)

b. *Ona risu'ets'a.
she draws(refl)

Regarding the definition of set, it has often been noted that activities that people tend to perform on themselves give rise to reflexive verbs. While this is true, it is only a tendency, not a definition. In addition to grooming concepts, other concepts can also give rise to reflexive verbs in lexicon languages. Consider *equip* and *arm*. They do not seem to constitute a more typically reflexive activity than *feed*. Still, the former, but not the latter, form reflexive verbs in Hebrew. It is thus not yet clear what is the precise definition of the subset of Agent-Theme verbs that allow reflexivization in the lexicon.

Finally, reflexivization involving a dative argument (henceforth, dative reflexivization) is possible when the parameter is set onto syntax (e.g., in French), but seems to be impossible when the setting is lexicon. *Se* can clearly reduce accusative or dative Case. It is a general Case reducer, not selective regarding the Case. In section 6.3 we discuss cases where it reduces nominative Case.[18]

(51)a. Jean s'est acheté une voiture.
Jean SE is bought a car
'Jean bought a car to himself'

b. Jean s'est envoyé une lettre.
Jean SE is sent a letter
'Jean sent himself a letter'

(52) *dan hištale'ax mixtav.
Dan sent(refl) letter

[18] The issue of dative reflexivization seems to be more intricate. According to Papangeli (2004), Greek forms reflexives in the syntax, but does not allow dative reflexivization. Papangli's account is morphological: While the reflexive morphology in French (the clitic) is associated with the head I and is therefore a general Case reducer, in Greek it is a verbal affix limited to reduce accusative.

The fact that dative reflexivization is impossible in lexicon languages immediately follows if indeed lexical reflexivization can only target Agent-Theme verbs. A Theme role is never realized as a dative argument. Note that if it turns out that there are lexicon languages that allow dative reflexivization, the definition of the set of reflexive verbs would, of course, have to take this into consideration.

Crucially, whether the reduced argument is accusative or dative, syntactic reflexivizatoin must take place upon merge of the external argument, even when the verb is a three place predicate, exactly as predicted by (30b). Thus, while it is possible for an anaphor in situ to be bound by an internal coargument as illustrated for French in (53a), the reflexivization operation cannot involve two internal coarguments, as in (53b).[19]

(53)a. ?Sur cette photo Jean n'a montré les enfants$_i$ qu'à eux-mêmes$_i$.
On this picture Jean not has shown the boys but to themselves

b. *Jean s$_i$'est montré l'enfant$_i$.
Jean SE is shown the boy

In sum, a cluster of distinctions follows from the setting of the lex-syn parameter. The distinctions, not surprisingly, are reminiscent of the criteria suggested by Wasow (1977) for deciding between a lexical analysis of a phenomenon and a transformational one. Further, the distinctions provide the triggers for parameter setting at the acquisition stage. The setting onto syntax will be triggered by encountering reflexive ECM predicates, reflexives that do not belong to the universal lexical set, such as *se dessiner* ('draw'(refl)) or *s'aimer* ('love'(refl)), as well as reflexivizations involving datives, all of which characterize syntactic languages. By contrast, the existence of reflexive nominalizations is typical of languages forming reflexives in the lexicon and could set the right parameter value. As will become clear in section 6.1 additional triggers for the lexical setting are supplied by reciprocal verbs. We now turn to discuss the case of German and Dutch.

## 5. Dutch and German

Everaert (1986) observes that the distribution of the element *zich* in local environments is limited in Dutch, unlike the distribution of the complex anaphor *zichzelf*. While it is possible in (54a), it is disallowed in (54b-c), for example. Notwithstanding *zich* can appear in environments where it is nonlocally bound, and in particular in ECM configurations (55).

(54) a. Max wast zich.
Max washes ZICH
'Max washes himself'

b.?? Max haat zich.

[19] The slight marginality of (53a) is due to the fact that French does not commonly use anaphors (or pronouns) in argument position (often, stress on the anaphor improves the example). The important point here is that (53b) is completely unconceivable.

Max hates ZICH

c.?? Max hoorde zich.
Max heard ZICH

(55) Max hoorde [zich zingen ].
Max heard ZICH sing
'Max heard himself sing'

To account for that, Reinhart and Reuland (1993) propose that *zich* is possible in local environments (54a) only when the predicate is reflexive (what they call intrinsically reflexive). In our terms, then, *zich* can appear in local environments (54a) only when lexical reflexivization has taken place. Hence, it is possible with a closed set of predicates (54a). The predicates in (54b-c) do not belong to the set.

But if reflexivization is impossible with the verb 'hear' in (54c), why is *zich* allowed in (55)? In cases such as (55), argue Reinhart and Reuland, *zich* occurs as a simplex long distance anaphor syntactically bound by a nonlocal (a noncoargument) antecedent; hence coindexation is allowed in concert with their condition B. That is, *zich* can appear in (55), because it is the subject of the ECM complement, not a θ-argument of the matrix verb. Hence, it is syntactically bound not by a coargument, but by an argument of a distinct predicate, the embedding predicate *hoorde*. It is important to note that although (55) superficially seems to be analogous to its Romance paraphrase (56), under our approach, (55) is an instance of syntactic binding, while (56) is the output of the operation of syntactic reflexivization, as extensively discussed in the previous section.

(56) Jean s'est entendu chanter.
Jean SE is heard sing
'Jean heard himself sing'

Dutch then uses the same element (*zich*) in two sorts of contexts: when lexical reflexivization takes place (for more on its use there see section 7) and in the context of nonlocal syntactic binding.[20] (54b-c) are impossible because the predicates are not of the set that allows lexical reflexivization. Still, a speaker can try and salvage the constructions by analyzing *zich* there as a simplex anaphor syntactically bound. But simplex anaphors reject local binding (condition B), and the constructions are thus not grammatical. Interestingly, the violations in (54b-c) are relatively mild. This is indeed due to the fact that speakers try to apply a simplex (long distance) anaphor analysis to the constructions. As observed by Reinhart and Reuland (1993), violations triggered by the insertion of a simplex (long distance) anaphor in a local environment are milder than those arising by the insertion of a pronoun in the same environment. According to Reinhart and Reuland, this is expected, as the binding of a pronoun in local contexts violates the chain condition in addition to condition B, while the local binding of a simplex anaphor, like zich, violates condition B

[20] As noted by an *LI* reviewer, the two uses of *zich* are not unrelated. It has been observed that crosslinguistically there is a diachronic pattern of development from an anaphor to a marker of intransitivity (under our analysis, a Case reducer marking arity operations) (see Kemmer 1993).

only, which they view as a weak condition (see cited reference for discussion of the chain condition).

The comparison of German to Dutch is surprising. As noted by Everaert (1986), despite the apparent similarity, German, in addition to allowing *sich* in nonlocal environments (57), allows it productively in local environments ((58) vs. (54)).

(57) Max hörte sich singen.
Max heard SICH sing

(58) a. Max wäscht sich.
Max washes SICH

b. Max hasst sich.
Max hates SICH

c. Max hörte sich.
Max heard SICH

If it were lexical reflixivization as in Dutch, productivity would be unexpected. One could then suggest that *sich* in (58) is simply an anaphor syntactically bound in a local environment. Analyzing *sich* this way would be incongruous with the observation that locally bound anaphors tend to be complex elements of the *himself* type (Pica 1987, Reinhart and Reuland 1993) and not simplex elements such as *sich* or *zich* We will shortly supply evidence against the analysis of *sich* in local contexts as an anaphor syntactically bound.

So why is the German *sich* productive in local environments unlike its Dutch counterpart, which can occur with a limited set of verbs? Given the lex-syn parameter, the explanation is straightforward. While in Dutch the parameter is set onto lexicon and therefore the set of verbs is limited, in German it is set onto syntax and hence the phenomenon is productive. *Sich* in local environments is then the result of the operation of syntactic reflexivization, just like in Romance languages. Additional evidence to that effect comes from the fact that Dative reflexivization is productive in German but not in Dutch.[21]

(59)a. Johannes hat sich einen Wagen gekauft.
Johannes has SICH a car bought
'Johannes bought a car to himself'

b. *Peter gaf zich een cadeau / een vrije dag.
Peter gave ZICH a present / a day off

Thus, from the fact that (55) and (57) are acceptable in Dutch and German respectively, it is impossible to draw the conclusion that they set the value of the lex-syn parameter onto syntax, as the languages use *zich* not only in cases of reflexivization but also as a long distance anaphor. The distribution of *zich/sich* in local environments, however, leads us to conclude that in Dutch the setting is lexicon while is German it is syntax.

[21] It is not clear that the relevant distinction regarding nominalizations can be found in Dutch and German.

Examples involving three place predicates provide strong evidence that *sich* in local contexts is the outcome of the operation of reflexivization in syntax and not a syntactically bound anaphor. Recall first that the reflexivization operation allows bundling only upon merge of the external argument (30b). In light of that, consider the difference in grammaticality between (60a) and (60b). If *sich* where an anaphor syntactically bound in local environments (similarly to *sich selbst)*, there would be no reason for why (60b) is perfect, whereas (60a) is not. But if *sich* in local environments is the result of an operation of reflexivization in syntax, (60a) cannot be generated as it requires the application of the reflexivization operation to two internal arguments.[22]

(60)a. ??Ich habe ihm sich gezeigt.
I have him-DAT SICH-ACC shown

b. Ich habe ihm sich selbst gezeigt.
I have him-DAT himself-ACC shown

The impossibility of (60a) parallels the ungrammaticality of (53b) repeated here in (61). Both are excluded as the reflexivization operation can apply only upon merge of the external argument.

(61) * Jean $s_i$'est montré l'enfant$_i$.
Jean SE is shown the boy
('Jean showed the boy$_i$ to himself$_i$')

The sentence in (60a) nonetheless gives rise to a milder violation in comparison with (61). In both French (Romance) and German the reflxivization operation cannot bundle two internal arguments. However, in German, but not in French, an alternative analysis is possible for such sentences, which yields a relatively mild violation. Namely, *sich* can be analyzed by the speaker as a simplex (long distance) anaphor, which in examples of the kind in (60a) would be locally bound; hence, their unacceptability. The violation is expected to be relatively mild, unlike a parallel violation with a pronoun. As already mentioned above, that is so because a pronoun in this environment would violate the chain condition in addition to the binding condition B, while a long distance anaphor violates binding only.

## 6. Arity operations and the lex-syn parameter

As already mentioned above, all things being equal, we predict the lex-syn parameter to be

[22] Parallel data are mentioned by Grewendorf (1983). Unlike Grewendorf, the speakers we have consulted also rule out the order accusative dative (i). However, this order seems to be independently impossible also with a complex anaphor (*sich selbst*) (ii). Hence, it is irrelevant with regard to the issue at hand.

(i) *****Ich habe ihn sich gezeigt.
I have him-ACC SICH-DAT shown
(ii) *Ich habe ihn sichselbst gezeigt.
I have him-ACC himself-DAT shown

relevant for other arity operations as well. There are arity operations that seem to apply in the lexicon only. As we will see shortly, this is predicted by the lexicon interface guideline (29), since these operations involve a change of thematic information, which the guideline prohibits.

Below we survey the various arity operations. As mentioned, in our sample of languages, we find reflexives, reciprocals, unaccustaives, subject-Experiencers, middles, instances of passives, and impersonals (e.g. in Italian) with the same morphology. We believe this morphological form is typical of outputs of arity operations reducing the syntactic valence of the verb. The operations involved in deriving these structures (alongside reflexivization) are reciprocation, decausativization, and saturation. Their details are discussed in depth in Reinhart (2000, 2002), Siloni (2001), Marelj (2004) and Papangeli (2004). Here we limit ourselves to a brief survey, focusing on the question of the lexicon-syntax parametrization of these operations. Importantly, when the operation applies in the lexicon it reduces accusative Case, when it applies in the syntax, an appropriate morphological element is required to reduce Case.

### *6.1 Reciprocalization*

Siloni (2001) reveals a cluster of distinctions that splits reciprocal verbs across languages into two types ((62) vs. (63)). According to Siloni, the reciprocalization operation is reminiscent of the reflexivization operation. It prevents mapping of a role of the complement domain; the role gets associated with the external θ-role, but forms a reciprocal meaning. The exact formulation of the operation is not directly relevant here.[23] For our purposes it is important that the operation is subject to the lex-syn parameter, and that languages show the same parameter setting for reciprocals as for reflexives. In Hebrew, Russian, and Hungarian reciprocals are formed in the lexicon, while in Romance languages, German and Serbo-Croatian they are formed in the syntax. (62) and (63) illustrate lexical and syntactic reciprocals in Hungarian and Italian respectively. In lexicon languages, like Hungarian, reciprocals constitute a closed set of verbs, disallow ECM predicates (62b) and can give rise to reciprocal nominalizations (62c), unlike in languages forming reciprocals in the syntax, such as Italian.

(62) a. János és Mari csókol-óz-t-ak.
János and Mari kiss-*rec*-past-3pl
'János and Mari kissed '

b. *János és Mari okos-nak talál-koz-t-ak
János and Mari smart-dat find-*rec*-past-3pl
(Intended meaning: János and Mary consider each other smart)

c. csókol-óz-ás; ölelk-ez-és
kiss-*rec-nominal.affix* hugg-*rec-nominal.affix*

[23] See Dimitriades (2005), Siloni (2005) for discussion of the formulation of the reciprocalization operation.

'mutual-kissing' 'mutual-hugging'

d. János csókol-óz-ott Mari-val.
János kiss-*rec*-past Mari-with

(63)a. Gioanni e Maria si sono abbracciati
Giovanni and Maria SI are hugged

b. Giovanni e Maria si sono visti danzare.
Giovanni and Maria SI are seen dance
'Giovanni and Maria saw each other dance'

c. *Giovanni si è abbracciato con Maria.
Giovanni SI is hugged with Maria

Siloni (2001) further shows that additional distinctions, particular to reciprocals, match the observed split. To give one example, lexical, but not syntactic, reciprocals allow the so-called discontinuous reciprocal construction, where reciprocity holds between the subject set and the set denoted by a PP argument ((62d) vs. (63c)), and not between the members of the subject set as in (62a) or (63a-b).[24]

*6.2 Decausativization: unaccusative and subject-experiencer verbs.*

Reinhart (2002) argues that transitive verbs whose external role is a Cause [+c] can undergo an arity operation that eliminates their external argument altogether. The [+c] role is unspecified with regard to the feature 'mental state' [m], and can thus be realized by animate as well as inanimate arguments as illustrated in (64a) and (65a). We label the operation *decausativization* as it reduces the Cause role altogether. (In previous versions, the same operation was labeled *expletivization*.) Unlike the operation of saturation, which forms passive, for example, decausativization leaves no residue of the role in either the syntactic structure or in the interpretation, as will be shown shortly.
When decausativization applies to a lexical entry whose internal argument is a Theme [-c -m], it derives an unaccusative verb, whose subject is an internal argument. When it applies to a lexical entry whose internal argument is an Experiencer [-c +m], it derives a subject-Experiencer verb, whose subject is an external argument (see Reinhart (2002) for the details of the derivation). French examples are given in (64) and (65) respectively.

(64) a. Le vent / Jean a cassé la branche.

[24] In syntax languages there can be instances of lexicalized reciprocals (showing the behavior of lexical reciprocals, e.g., the discontinuous construction). These are predicates that belong to the set of reciprocals typical of lexicon languages, such as *se battre* 'quarrel' in French, or *se săruta* 'kiss' in Romanian. As expected by the Lex-syn parameter, instances of syntactic reciprocals are not found when the setting is lexicon. That is so because when the phenomenon is syntactic it is productive.

the wind / Jean has broken the branch

b. La branche s'est cassé.
the branch SE is broken
'The branch broke'

(65) a. Le bruit / Jean a fâché Pierre.
the noise / Jean has angered Pierre

b. Pierre s'est fâché.
Pierre SE is angered
'Pierre is angry'

As already mentioned in section 4.1, a reliable test to detect the semantic presence of a nonprojected external role, which can be interpreted as an Agent[25] relies on the Instrument generalization: In order to be realized syntactically, an instrument requires the presence of either an explicit Agent or an implicit argument interpretable as an Agent. As can be seen in (66) (just like in (22b), section 4.1), decausativization indeed eliminates the external role altogether. An instrument can be added neither to unaccusatives (66a) nor to subject-Experiencer verbs (66b) (unlike passivization, for instance, where the external argument is implicit (semantically accessible) even if it is not realized phonetically, as discussed in 4.1 and in the subsequent subsection).

(66) a. *La branche s'est cassé avec une hache.
the branch SE is broken with an axe

b. Pierre s'est fâché (avec cette musique)
Pierre SE is angered with this music (impossible as an Instrument)

Decausativization, then, can be defined as in (67a). The eliminated role plays no part in the interpretation of the derived entry. Still, within the framework of event semantics, the standard entailments between the transitive and the unaccusative derivations are maintained.

(67) a. Decausativization: Reduction of an external [+c] role
$V_{acc}$ ($\theta_{1[+c]}$, $\theta_2$) → V ($\theta_2$)

b. The wind broke the vase.
∃e [break (e) & Cause (e, the wind) & Theme (e, the vase)]

c. The vase broke.
∃e [break (e) & Theme (e, the vase)]

(67b), based on the transitive entry, entails ((67c), which is derived from the decausativized unaccusative entry. This is so, because the event semantics representation is a conjunction, which

[25] That is, in addition to [+c +m], also [+c], which is unspecified for /m and hence does not exclude a [+c+m] interpretation.

entails all subconjunctions.

Since decausativization eliminates a θ-role of the source predicate (the input), the lexicon interface guideline (29) predicts that the operation ought to be illicit in the syntax. Indeed, no crosslinguistic variation of the type attested by reflexives and reciprocals can be detected with regard to the outputs of the operation, namely, unaccusatives and subject-Experiencers. We believe they are formed in the lexicon even in Romance, German and Serbo-Croatian, which form reflexives and reciprocals in the syntax. French nominalizations provide evidence pointing to this direction.

As already mentioned in section 4.2, there are no reflexive nominalizations in French, but there are unaccusative and subject-Experiencer nominalizations in the language (examples (46) repeated in (68)). This is exactly the expected state of affairs, if decausativization applies in the lexicon while reflexivization in syntax. Recall that nominals are morphologically incompatible with *se*. Hence, the nominalizations lack *se* unlike their verbal counterparts.

(68) a. le rétrécissement du pantalon au lavage.
the shrinking of the pants in+the washing

b. l'intérêt de Marie pour ce livre
the interest of Marie for this book

Likewise, the operation of causativization discussed by Reinhart (2002) can apply only in the lexicon, if a guideline of the type in (29) is correct. This operation derives, for instance, the transitive *walk* (*Max walked the child*) from the corresponding intransitive entry (*The child walked*). It adds an Agent role to the θ-grid of the input entry, namely it modifies the θ-grid of the base verb. Hence, (29) allows it to apply only in the lexicon. Another form of causative formation available across languages typically embeds a given verb under a causative predicate (in French, for example, *Jean a fait marcher l'enfant* 'Jean made the child walk'). This operation, by contrast, applies only in the syntax, and it ought to involve two predicates.

*6.3 Saturation: passives, impersonals and middles*

Following Chierchia (1989/2004), we assume passivization involves an arity operation labeled saturation, which saturates the external θ-role by existential closure. That is, the θ-role is assigned to a variable bound by an existential operator. (69b) is the semantic representation of passives, illustrated here for the French (69a).

(69) a. La chambre a été nettoyée.
the room was cleaned

b. ∃e ∃x [clean (e) & Agent (e, x) & Theme (e, the room)]

c. Le chambre a été nettoyée avec un aspirateur.
the room was cleaned with a vacuum cleaner

The role targeted by saturation is thus present at the level of interpretation. Indeed, it licenses the

addition of an Instrument (69c).

Chierchia (1995) proposes that there are two types of saturation: the standard one examined above, and Arb(itrary) saturation, which we label Arbitrarization. Both passive saturation and arbitrarization bind a variable by existential closure. However, unlike regular saturation, arbitrarization creates a different sort of variable, $x_{Arb,}$ whose range is restricted to a group of humans. Existential closure applies in the same way to bind this variable. In Chierchia's analysis, Arb saturation is operative in the formation of impersonals, illustrated in (70a) for Italian, where the unrealized external θ-role receives an arbitrary interpretation ('people in general'). The semantic representation of (70a) is given in (70b). The Agent is present at the semantic level, and indeed an Instrument is licensed (70c). The same is found also with intransitive verbs, as in (70d).

(70)a. Qui, si mangia spesso gli spaghetti.
here SI eat-3SG often the spaghettis
'Here people/one often eat(s) spaghettis'

b. $\exists e\, \exists x_{Arb}$ [eat (e) & Agent (e,$x_{Arb}$) & Theme (e, spaghettis)]

c. Qui, si mangia spesso gli spaghetti con i bastoncini.
here SI eat-3SG often the spaghettis with the little sticks
'Here people/one often eat(s) spaghettis with chop sticks'

d. Qui, si balla spesso.
here, SI dance-3SG often
'Here people/one dance(s) often'

The question arises as to what the function of the clitic *si* is in such structures. Chierchia assumes that *si* has a semantic impact and is interpreted, itself, as an operation that both saturates and arbitrarizes an argument[26]. However, as we saw, the same clitic appears in several other structures that do not involve arbitrarization (reflexives and reciprocals). Hence, we assume that the thematic operation of arbitrarization is independent of the morphological marking, inasmuch as the function of *si* is to handle problems created when an argument is not realized syntactically but rather undergoes an arity operation. Cinque (1988, 1995) argues that the clitic *si* is, in fact, ambiguous between a [+arg(umental)] and [-arg(gumental)] occurrence. Abstracting away from the details of his analysis, in impersonal constructions, it always absorbs nominative Case and is [+arg] in certain cases, and [-arg] in others. Unlike what we have argued with regard to *si,* for Cinque, the clitic can be [+arg]. For the present discussion, suffice it to note that assuming two types of *si* (and in particular, a [+arg] *si*) is not necessary once Chierchia's arbitrarization is assumed: In (70) the θ-requirement is satisfied, because the external argument is realized semantically, just as in passive

[26] Chierchia's definition of arbitrarization in impersonals is given in (i).
(i) The clitic *si* is interpreted as an operation that takes a property and does two things to it:
1. It closes existentially the argument corresponding to the subject and
2. It restricts the range of such an argument to groups of humans (perhaps drawn from a contextually specified set).

saturation.[27] This leaves us only with the problem of Case, and thus enforces our central hypothesis regarding the function of elements like *si*.

We have argued in the course of the paper that this clitic is never an argument, but rather a general Case reducer that marks reduction of syntactic valence. So far, we have discussed only instances of accusative and dative reduction by *si* (see section 4.2). However, as is standardly assumed, impersonals of this sort are an instance of nominative Case reduction. As note by Cinque (1988, 1995) among others, evidence that it is nominative which is reduced here is that with transitive verbs, accusative is still assigned, as witnessed by the accusative clitic *li* in (71).

(71) Qui, li si mangia spesso
here them-acc SI eat-3SG often
'Here, people/one eat(s) them often'

For convenience, then, we may refer to the type of impersonals under consideration as Nominative Impersonals.

We may conclude that the clitic indeed has one and the same function in all structures examined here - that of a general Case reducer, which can reduce any Case. The selection of the clitic into the numeration frees the derivation from the need to check that Case, and, thus, enables one of the arguments not to be realized syntactically. If a thematic arity operation can apply in the syntax and handle the unrealized θ-role, the derivation will go through. Case reduction (by *si*) imposes the application of an arity operation, but does not require a specific arity operation. Let us further illustrate this independency. Consider (72). It has precisely the same interpretation as (70a) given in (70b). But while in (70a) there is no agreement between the verb and the plural DP, in (72) there is.

(72)a. Qui, si mangiano spesso gli spaghetti
here SI eat-3PL often the spaghettis

b. Qui, gli spaghetti$_1$ si mangiano spesso t$_1$
here the spaghettis SI eat-3PL often
'Here, spaghettis are often eaten'

Under Cinque's analysis this difference followed from his distinction between [+arg] and [-arg] *si.* Challenging his analysis, Dobrovie-Sorin (1998) argues for the traditional view (e.g., Belletti 1982) that (70) is indeed the impresonal construction (with nominative *si*), while (72) is in fact a passive derivation with an accusative *si*. We may, then, label derivations like (72) Impersonal Passives.

Building on this distinction, Papangelli (2004) shows that the availability of both derivations (70) and (72) is directly predicted within the framework presented here.[28] In both (70) and (72), the arity operation that applies is arbitrarization of the external role. Hence, the

[27] For counter-arguments to Cinque's distinction between two types of *si*, see Dobrovie-Sorin (1998), and Marelj (2004, chapter 6.2.4).

[28] Judgments vary regarding nominative impersonals with transitive verbs (e.g., (70a), (71)); not all speakers equally accept them (see Chierchia 1995, Cinque 1995, Marelj 2004).

semantic representation is identical (70b). But while in (70a) *si* reduces nominative, in (72) it reduces accusative - a free option for *si*. In (70a), the DP checks the remaining accusative Case. But in (72), in which accusative is gone and nominative is intact, the syntactic derivation proceeds as in passives: the internal argument functions as the subject: It checks nominative Case, and triggers verbal agreement. In (72a) it stays in situ and does the checking 'long distance'. In (72b), in contrast, it moves to SpecIP, where it also checks the EPP. So, the next question is how the EPP is taken care of in (72a). The same question arises regarding nominative impersonals (70), and we turn to it directly.

We have seen, then, that in both impersonal passives (73a) and nominative impersonals (73b) arbitrarization applies, but while in the former *si* reduces accusative Case and the internal argument checks nominative, in the latter, it is the other way around: *si* reduces nominative Case and the internal argument checks accusative. The constructions, then, pose neither a Case problem nor a θ-problem, but we are still left with the question of the EPP, since no external argument is mapped onto syntactic structure. Following proposals by Cinque (1988), Franks (1995), and Papangelli (2004), we assume that the EPP in both constructions is satisfied by an expletive *pro*.

(73)a. Qui, $pro_{\text{Expl}}$ si mangiano spesso gli spaghetti
here SI eat-3PL often the spaghettis

b. Qui, $pro_{\text{Expl}}$ si mangia spesso gli spaghetti.
here SI eat-3SG often the spaghettis

In Romance non-pro-drop languages (e.g. French), sentences like (73) are impossible, since *pro* cannot occupy SpecIP. Being a pro-drop language is a necessary, but not a sufficient condition for the availability of nominative impersonals. Under our analysis, nominative impersonals are possible only in syntax languages (where arity operations apply in the syntax). This is so because nominative Case cannot be reduced in the lexicon, since it is not a Case feature of the verb.[29] Russian (Franks 1995) and Hebrew do not allow nominative impersonals, although they are both pro-drop languages. This is so because, as we saw, they set the Lex-syn parameter onto the lexicon, and hence cannot allow nominative reduction.

In order to express the impersonal meaning, Hebrew has recourse to a different construction that uses the so-called Arb(itrary) *pro,* whose features are third person plural. Recall first that whether an arity operation applied or not in Hebrew is witnessed by the verbal morphology. Hebrew impersonal constructions, as expected, do not use this morphology, but rather keep their regular verbal morphology (74a). This is so because the subject is not saturated, but realized by

[29] Even within the relevant set of syntax languages, there are some pro-drop languages that do not have nominative impersonals, as pointed out by Dobrovie-Sorin (1998) for Romanian, and Papangeli (2004) for Greek. The precise conditions restricting further their availability are still a subject of scrutiny. Papangeli (2004) proposes a morphological condition (see also note 18). While in Romance the Case reducer is a clitic (*se*/*si*) associated with I, in Greek it is a verbal affix. Papangeli argues that the domain of Case absorption for the verbal affix is only the accusative Case. Hence, although Greek is both syntax and pro-drop language, it cannot have nominative impersonals. This still leaves Romanian unexplained; but see Papangeli (2004, chapter 1.4), for some speculations. Previous approaches to this problem are surveyed in detail in Marelj (2004, chapter 6.2.4.)

Arb *pro*, as shown by the third person plural agreement. Arb *pro* receives the Experiencer θ-role of the verb.

(74) a. $pro_{Arb}$ son'im šam muzika.
hate-3PL there music
'People hate music there'
b. Lì $pro_{Arb}$ odiano gli stranieri.
there hate-3PL foreigners
'There people hate foreigners'

This option is utilized in Italian too, alongside the impersonal *si*-constructions, as noted by Cinque (1988). In (74b), there is neither arbitrarization nor nominative reduction (no *si*), and the external θ-role is assigned to the Arb *pro*. Hebrew and Italian are both pro-drop languages and have thus both an Arb (plural) *pro* and an expletive *pro.* Since Italian is a syntax language it can realize both the arbitrarization option and the Arb *pro* option for deriving impersonals. Hebrew, in contrast, as a lexicon language can only use the Arb *pro* option.

Turning now to middles, they have posed, for years, serious problems. While their semantics appears the same across languages, there is massive variation in their syntactic properties, and in the choice of verbs allowing middle formation. A debate has evolved regarding whether middle formation takes place in the lexicon (e.g. Fagan (1992)) or in the syntax (e.g. Hoekstra and Roberts (1993)). Along lines proposed by Zubizarreta (1987) and Cinque (1988), Marelj (2004) argues that this debate could get resolved by the Lex-syn parameter: In certain languages, middles are formed in the syntax, and in others - in the lexicon.

Marelj shows, first, that the semantic properties of middles, and their uniformity across languages are explained if the same operation of arbitrarization of the external argument that applies in the derivation of nominative impersonals (and impersonal passives) is involved also in the derivation of middles. As is well known, middles are predicates that express some generalization with regard to some property of their subject.[30] The French example (75a), for example, states that it is a property of new ovens that they can be cleaned easily. The Agent cannot be realized, but is available at the semantic level, and hence licenses an Instrument (75b). Further, just like in impersonals, the Agent has an arbitrary interpretation. Thus, (75a) states that for people in general cleaning new ovens is an easy task.

(75)a. Les nouveaux fours se nettoient facilement.
the new ovens SE clean easily
'New ovens clean easily'
b. Les nouveaux fours se nettoient facilement avec un chiffon humide.
the new ovens SE clean easily with a rag wet
'New ovens clean easily with a wet rag'
c. Gen e, $x_{Arb}$ [cleaning(e) & Agent (e, $x_{Arb}$) & Theme (e, new ovens)] [easy (e, $x_{Arb}$)]

[30] The term middle is sometimes used in a more general fashion to refer to any predicate that is neither active nor passive, and whose subject is an internal argument (for example, unaccusatives) (Doron 2003, Glinert 1989). We think this usage that has developed out of traditional terminology does not help distinguish between the different types of predicates.

Marelij argues that in this respect, the semantics of middles is similar to that of impersonals, but middles are associated also with genericity. To derive this, the closure of the $x_{Arb}$ is not existential, as in impersonals, but it is bound by the generic operator *Gen*, whose semantics, discussed in detail by Marelj, explains also the role of the modification (adv, negation, etc) in middles. The semantic representation of (75a) is, then, (75c), which states, very roughly, that it is generally the case that for any event of cleaning whose Agent is any arbitrary person ($x_{Arb}$) and whose Theme is new ovens, the event is easy for that $x_{Arb}$.[31]

As for the syntactic derivation of middles in French and other syntax languages, we have already everything we need at our disposal. Since the external argument is saturated (by Gen), and, thus, is not realized syntactically, one Case must be reduced. The clitic reduces here the accusative Case. This then leads to a syntactic derivation similar to the derivation of passives: The Theme is base generated as an internal argument and moves to the subject position. Though the question whether middle formation involves movement has been widely debated, Marelj shows that the arguments against movement hold only for lexicon languages. In syntax languages there is clear evidence for movement.

Unlike the case of nominative impersonals, the Case reduced in middles is accusative, so there is no principled reason why middle formation cannot apply also in the lexicon. Marelj argues that indeed arbitrarization is available in the lexicon, but its specifics are slightly different than when it applies in the syntax. As is the case with other lexicon operations we examined, the operation manipulates directly a θ-role. It applies to a causal type role (Agent or Cause: a cluster containing the feature +c in Reinhart's (2002) terms), and transforms it to an Arb role (a cluster whose features are unspecified [ ]). This role is obligatorily saturated by the Gen operator. Though we cannot discuss the details here, this explains the difference in the choice of verbs allowing middles in lexicon and syntax language. (E.g. lexicon language like English disallow middles like **Cruel enemies hate easily*, but syntax languages allow them: *Les ennemis cruels se détestent facilement*.) It also entails that in lexicon languages the derivation of middles does not involve movement, and their subject merges externally, as argued, e.g. for Dutch and English by Ackema and Schoorlemmer (1995).

As in the case of reflexives and reciprocals, the different parameter setting is witnessed also in ECM contexts. ECM middles are possible in the syntax setting, as in French (76a), but not in the lexicon setting of say English (76b).

(76)a. Des sujets de ce type se considèrent facilement très intéressants.
Subjects of the type se consider easily very interesting

b. *Subjects of the type consider easily very interesting.

Finally, Marelj shows that precisely the same group of languages (in our sample) that set the parameter onto lexicon for reflexives and reciprocals produce middles in the lexicon. Languages forming reflexives and reciprocals in syntax also form their middles syntactically. Thus, while Dutch middles are formed in the lexicon, German middles are formed in the

[31] It has been noted in the literature that middles also have an episodic (eventive) interpretation. This interpretaion is obtained by the existential closure utilzed in nominative inpersonals and impersonal passives, and its derivation is indistinguishable from that of impersonal passives like (72b).

syntax. We are not aware of any exception to this generalization. This enables us to conclude that the lex-syn parameter is set in a given language once for all the relevant operations.

In conclusion, the lex-syn parameter straightforwardly explains the considerable crosslinguistic variation attested by reflexives, reciprocals and middles, and correctly predicts that lexicon languages will not have nominative impersonals. We have not explored its relevance with regard to passives and impersonal passives. The lexicon interface guideline, in turn, rightly predicts that operations that modify the θ-grid of the predicate, such as decausativization, apply crosslinguistically only in the lexicon.

## 7. The Accusative Case parameter

Though the lex-syn parameter explains a substantial range of language variations in the area of arity operations, the crosslinguistic variation with regard to auxiliary selection is not reducible to this parameter. In certain languages, the formation of reflexives and unaccusatives does not affect auxiliary selection, while in others it triggers the selection of *be.* As we shall see, this variation is found in languages set for either values of the lex-syn parameter, so it must be determined independently. In this section we will argue that auxiliary selection is determined by Case considerations, and the relevant parameter regards whether in a given language the verb has structural accusative or not.

### *7.1. The problem of auxiliary selection.*

The crosslinguistic variation with auxiliary selection is most notable if we compare French and Italian on the one hand, with Spanish on the other. As we saw, reflexivization operates in these languages in the same way using the *se*/*si* clitic, and they are equally set on the syntax value of the lex-syn parameter. Still, in Italian and French the application of reflexivization (77a-b) and decausativization, which forms unaccusatives (77c-d) triggers a change in the auxiliary from *have* to *be*, but in Spanish it does not (78). Romanian and Greek (79) pattern with Spanish in showing no effect on the auxiliary.[32] English, too, uses *have* in reflexive and unaccusative sentences.

(77) a. Roberto si è lavato. (Italian)
b. Roberto s'est lavé. (French)
Roberto SE is washed

c. La porta si è chiusa. (Italian)
d. La porte s'est fermée (French)
The door SE is closed
'The door closed'

[32] The crucial thing here is whether auxiliary selection is affected or not by the relevant arity operations. Thus, in Romanian, for instance, in case the required auxiliary (for a specific tense) is *have,* it will remain *have* with the output, in case it is *be* it will remain *be*. Notice that we do not supply an exhaustive reply to the question of auxiliary selection, but rather to the question when the application of an arity operation affects auxiliary selection.

(78)a. Roberto se ha lavado. (Spanish)
Roberto SE has washed

b. La puerta se ha cerrado. (Spanish)
The door SE has closed

(79)a. Maria s-a lovit. (Romanian)
Maria SE-has hurt
'Maria has hurt herself'

b. O Nikos exi plithi (Greek)
the Nikos has washed
'Nikos has washed.'

c. Uşa s-a deschis. (Romanian)
door-the SE-has opened (‘The door opened)

d. I porta exi klisi. (Greek)
the door has closed
'The door has closed.'

Dutch and German show yet another pattern. Both use the auxiliary *be* with unaccusatives (80a-b), but they use *have* with reflexives (80c-d).

(80) a. Jan is gearriveerd. (Dutch)
Jan is arrived.

b. Johannes ist angekommen. (German)
Johannes is arrived.

c. Jan heeft zich gewassen. (Dutch)
Jan has ZICH washed

d. Johannes hat sich gewaschen. (German)
Johannes has SICH washed

As we saw, the lex-syn parameter is set differently for Dutch and German. Yet, this difference does not affect auxiliary selection, where they pattern alike. All facts combined, it is obvious that auxiliary selection is not determined by the lex-syn parameter, and there must be another parameter governing this choice. Hopefully, understanding that parameter should also explain why German and Dutch differ from French and Italian regarding where the auxiliary *be* is used.

Two lines are available regarding *be* selection with unaccusatives. It either marks the missing external θ-role, or the missing accusative Case. An interesting θ-based account is offered by Ackema (1995), who assumes that *have* has an external role to assign (via merging with the verb), hence it cannot be used when such a role is lacking. An alternative Case-based direction,

also discussed by Ackema, is that *be* selection correlates with the fact that *have* has full accusative Case to assign (via merging with the verb), hence it cannot be selected with an unaccusative, while *be* has no accusative Case.[33]

As stated, the θ-based accounts hold only for unaccusative entries, where the external role is indeed absent, but they cannot extend to Italian or French, where the *be* auxiliary surfaces also with reflexives, in which, as we saw, the remaining argument is external. More generally, a θ-based analysis is less likely to account for the parametric variations in *be* selection. The thematic structure of reflexives is essentially the same in all languages; likewise that of unaccusatives. Hence, this is not a likely area for finding another parameter. Let us, therefore, further examine the area of Case.

So far we have assumed that the arity operation we discussed reduces the number of realized θ-roles, but also the accusative Case of the verb. If so, then there is not much room for parametric variations in the area of Case as well. But let us consider the option that this Case reduction is not identical in all languages, because the Case system is not identical. We will argue that some languages have a 'stronger' Case system than others. In these languages, there is still an accusative residue left after the operations apply, which needs checking. *Be* selection, found in these languages, is forced by the need to check this Case residue. Pursuing this line requires a closer look at the theory of Case. We present here a summary of work in progress by Reinhart, Reuland and Siloni.

### *7.2. Structural and thematic (inherent) Case.*

A central question in Case theory since the eighties has been the relation between Case and the thematic system. Purely structural Case has been contrasted with inherent Case that has been assumed to be dependent on thematic relations. In descriptive terms, the former are e.g. nominative and accusative in our sample of languages, and the clearest instance of the latter is oblique Case, such as instrumental often found within PPs. Genitive Case has been argued to have structural and inherent manifestations (Siloni 1997). Regarding dative Case, opinions are divided on whether it counts as structural or inherent. However, it is less clear what the precise characterization of the two is. Following Chomsky (1981, 1986), it is largely assumed that inherent Case is determined thematically, while structural Case is determined by syntactic relations, such as government or Spec-head.

There are several known problems with the characterization of inherent Case. In the case of argumental PPs, it is assumed that the DP gets its θ-role from (or via) the P head. Nevertheless, in this area of PPs it is the least clear that the standard relation of the DP and the P head is thematic. Danon (2002) showed that there are several instances, most notably in Hebrew, where the sole function of the preposition is to assign structural Case, and the P cannot have any thematic content. Botwinik-Rotem (2004) extends this observation also to prepositions that could be viewed as θ-assigners. She provides substantial evidence that prepositions that are selected by verbs, which she labels *small Ps,* assign structural Case, and

[33] There is also a family of accounts attempting to explain *be* selection independently of either θ-requirements or Case, in terms of aspect. Arguments against this line can be found in Ackema (1995) and Everaert (1996).

P does not take any direct part in θ-assignment, though it may seem to affect some aspects of the semantic interpretation of the given role.

Regarding accusative, the view that the Case the verb assigns to its object is necessarily a structural Case has also been challenged. Belletti (1988), Belletti and Rizzi (1988), and Siloni (1997) argue that it can be either structural or inherent (within the same language). Torrego (1998) further pursues such a line in accounting for the variation in object marking in Spanish (that we return to directly).

We go a step further and argue that accusative is both structural and thematic (inherent). More broadly this reflects a different perspective on the relations of Case and Theta. It is not that the Cases themselves are divided to structural *(*e.g. accusative) and thematic (e.g. instrumental), but rather all Cases have these two components. Case thus encodes two different relations: that of a θ-argument, and that of a syntactic complement. We conceive of the former as the implementation of the θ-criterion, namely, the assignment of a θ-role to a noun phrase requires some formal checking, which is universally executed through the Case system. We assume that Case checking is a requirement of the checker. But the DP, too, has an uninterpretable feature to be deleted by the checking. We assume this feature is not selective and can be checked against the thematic component, the structural one or both. As far as VP internal arguments are concerned, we assume the verb always checks the thematic Case directly, but the structural and thematic components of Case may be checked independently. The problem just mentioned with regard to PPs, is resolved if the full PP checks the thematic Case of the verb, and the DP complement of P checks structural Case with the preposition. Accusative Case, in contrast, is checked by a DP that is a direct complement of the verb. This means that the verb should be able to check both the thematic and the structural components. But the structural and thematic accusative components can also be checked independently. In ECM structures like *Jean a vu [Marie danser]* ('Jean saw Marie dance'), IP checks the thematic accusative component, and *Marie* checks its structural component.[34]

Let us illustrate the usefulness of this distinction between the thematic and structural components of Case with a long-standing problem regarding the distribution of *zich/sich* in Dutch and German, discussed by Everaert (1986). As we saw in section 5, this anaphoric element has two functions in Dutch and German (as in many other languages not in our present corpus). It occurs both with reflexive verbs and as a long-distance anaphor. The problem here concerns its function as a long-distance anaphor. As such, *zich* in Dutch can be bound into an embedded clause by a matrix argument, as in (81a-b). Still, it cannot occur in the direct object (accusative) position of the embedded clause, as in (81c). This is a problem independent of our major concern here with reflexivization. Though Dutch and German are set differently regarding the lex-syn parameter, the facts of (81) are the same in German.

(81)a. $Jan_i$ hoorde [$zich_i$ zingen]

[34] Whether in fact further projections are needed, such as AgrO, is orthogonal to our discussion. For simplicity we assume here that accusative is checked directly by the verb, though nothing hinges on that. The question regarding dative Case is whether the verb itself carries alongside the thematic Case also the structural dative Case, or a specific preposition-like element (*to*) is needed for that purpose. Languages seem to vary on that. We assume nominative Case also contains a thematic and structural component, both checked by the relevant functional head (I).

Jan$_i$ heard [ZICH$_i$ sing]
'Jan heard himself sing'

b. Jan$_i$ hoorde [jou tegen zich$_i$ argumenteren]
Jan$_i$ heard [you against ZICH$_i$ argue]
'Jan$_i$ heard you argue against him$_i$'

c. *Jan$_i$ hoorde [jou zich$_i$ becritiseren]
Jan$_i$ heard [you ZICH$_i$ criticize]
'Jan$_i$ heard you criticize him$_i$'

This problem was left unsolved in Reinhart and Reuland (1993), since there were no tools available for tackling it in that framework. It does not follow from the movement analysis of simplex anaphors (assumed by Reinhart and Reuland and many others) either. (Nothing known could make this movement to matrix Agr easier out of the PP in (81b) then in (81c).) Nor is it a universal problem with long-distance (simplex) anaphors. The Japanese *zibun*, for instance, has no problem being bound in an accusative position as in (81c).[35] But the present distinction between the thematic and structural components of accusative Case opens the way for an account.

Reinhart and Reuland (1993) noted that *zich*, like all anaphors, is a referentially defective argument (an -R expression). But an open question is what precisely it lacks.[36] One difference between, say, the Japanese *zibun* and the Dutch *zich* is that the first can have a discourse logophoric function, while *zich* cannot, which suggests that *zich* is more deficient than *zibun*. A reasonable assessment of the specific deficiency of *zich* is that, unlike regular noun phrases, it cannot check thematic Case, although it can check structural Case.

With this assumed, the mystery of (81) is resolved. In (81b) *zich* is embedded in a PP. We argued that a DP complement to a small P does not check thematic Case. In such structures, checking is split between the verb, which checks the thematic component of Case with the PP, and P, which checks the structural one with its DP complement. The PP (*tegen zich*) in (81b) is the element checking the thematic Case of the verb. The complement of P only needs to check structural Case, which *zich* can do. With accusative Case, both Case components are checked directly by the verb itself. Still, it need not always be the same element that checks both components. In (81a), where *zich* is the subject of the embedded clause, the latter (IP) is

[35] Everaert's (1986) solution to this problem rests on two assumptions: One is a general requirement he introduces that anaphors, like empty categories, must be properly governed; the other is that a trace of V cannot serve as a proper governor. He argues that in Dutch, because of its SOV properties, there is obligatory verb clustering in structures like (81) and the lower V attaches to the higher one. This leaves only the trace of the verb as a governor for *zich* in (81c), and, thus, this anaphor is not properly governed. In (81b), by contrast, after verb movement, the anaphor is still governed properly by the preposition *tegen*. This is found in Dutch and German, but not in, say Japanese, because Japanese does not have this obligatory verb movement.

[36] Reuland (2001) argues that what makes anaphors of this type referentially defective is (possibly universally) the absence of the plural feature. Still, there may be further differences in the degree of defectiveness between anaphors in different languages.

the thematic argument of the matrix verb *horde* ('heard'), and, thus, checks the thematic component of the accusative Case. The subject of IP, *zich*, only needs to check the structural component of this Case, which it can do. But in (81c), *zich* occurs as the direct complement of the lower verb; hence it is the only element that could possibly check both the thematic and the structural accusative components of the verb. Since it cannot check the thematic component, the derivation crashes.

*7.3. The structural accusative parameter*

We have assumed so far that accusative Case has two components to be checked, thematic and structural. But in fact, not in all languages the verb has both these accusative components. As mentioned, we believe the thematic component is the implementation of the θ-criterion; therefore, it must be universal. But the idea that structural Case may be parameterized has been occasionally proposed. Chomsky (1981) argued regarding variations in preposition stranding, that it is parameterized whether P has or not structural Case. Specifically regarding accusative, Danon (2002) argues that structural accusative Case is parametrized. (He did not draw the same distinction we do between the structural and thematic components of Case.) In some languages but not in others the verb can assign structural accusative.

One prediction of the parameter concerns ECM constructions. If a language has no structural Case, it should not allow genuine ECM constructions. This is so because the thematic accusative of the verb is checked with the IP, and there is no structural Case for the subject of the clausal complement. Danon (2002) argues that Hebrew disallows ECM constructions. It only allows small clause complements to ECM verbs, which, according to him, are instances of another Case assigning strategy. Likewise, Greek does not have genuine ECM Constructions. In Hebrew and Greek, thus, V does not assign structural accusative. But there is a distinction between Hebrew and Greek, which leads us to another source of evidence in favor of the structural accusative Case parameter.

Some language specific evidence for the parameter can be found in the area of differential object marking, which is dependent on definiteness or animacy. Independently of the structural accusative parameter, languages may differ in whether definiteness (or animacy) is syntactically coded. The intricate relations of definiteness, specificity, or animacy to Case have been widely observed and analyzed (e.g. Belletti 1988), but Danon (2002) argues that these interface properties are relevant to the computational system only if there is independent evidence that they are syntactically encoded, which is not the case in all languages. He argues that in Hebrew definiteness is a coded syntactic feature and its checking is subsumed under structural Case checking. In other languages another property (specificity, animacy etc.) may be syntactically encoded and therefore require checking. Thus, Spanish and Romanian appear to code animacy/specificity. With this in mind, we can turn to variations in object marking.

In Spanish, an inanimate/nonspecific DP can occur as a direct complement of the verb (82a), but a coded (animate/specifc) DP requires a n object marker (82b) (see Torrego (1998) for more detail). A comparable state of affaires holds in Romanian. In Hebrew definite direct objects are coded and require the marker *et* (83). (Animacy is not coded in Hebrew.)

(82) a. Vimos (*a) una mesa.
We see a table

b. Vimos *(a) Roberto.
We see *A*(to) Roberto.

(83) a. dan Ra'a (*et) yalda
Dan saw (ET) girl ('Dan saw a girl')

b. *dan ra'a *(et) ha-yalda/dina
Dan saw (ET) the girl/Dina

Danon proceeds to argue that the varying object marking in these two languages is explained by the interaction of the syntactic coding with the structural accusative parameter. The coded DP feature requires specific checking by structural Case. In Spanish, Romanian, and Hebrew, the verb does not have structural Case. So the DP feature cannot be checked, and an object marker, a dummy preposition must be introduced to check it.

We should note that this holds only if a language codes definiteness/animacy syntactically, which is independent of the question of structural Case. Standard (uncoded) DPs do not require structural Case checking. It is only the special (language specific) coded feature that requires checking by structural Case. Thus, Greek lacks structural Case, as witnessed by its lack of ECM structures. Still, definites/animates do not require a preposition. This is so, because definiteness/animacy is not coded in Greek, and the uninterpretable feature of any DP can be checked by the thematic component of the accusative.

*7.4. Aux selection and the Acc parameter.*

We suggest that there is a correlation between the structural Case parameter and auxiliary selection. Greek, Spanish, and Romanian lack structural accusative Case, and do not change the auxiliary to *be* with reflexives and unaccusatives. (Hebrew, which also lacks structural Case, hardly ever uses its sole auxiliary, so it is not relevant for the present discussion.) The generalization that suggests itself is that a language opts for *be* selection in the relevant contexts only if its verb assigns structural accusative Case. So the question is what could be behind this generalization.

We assume the accusative Case feature is inserted on the base verb entry in the lexicon (for the precise conditions under which this happens, in terms of θ-cluster composition, see Reinhart 2002). It is then up to the Case parameter to determine what this feature consists of in a given language. In all languages it contains the thematic component (as required by the θ-criterion), but in languages set for the structural accusative Case, it contains, in addition, the structural component. We assumed, additionally, that the accusative feature of the verb is affected by arity operations. This can happen in two ways. If the operation applies in the lexicon, the operation itself reduces the Case. (See the discussion of (25b).) If the operation applies in the syntax, a special Case absorbing morphology is at work, as with the Romance *se*/*si* clitic.

Once we distinguished between the two components of the accusative feature, more attention is needed to this mechanism of Case reduction. The minimum it should capture is the elimination of the thematic Case component. Since the original thematic argument of the verb is not realized syntactically, the thematic component can never be checked. Let us assume that is all it does in the two instances just mentioned.

The Romance *se*/*si* clitic, then, reduces the thematic component of accusative. For Spanish-type languages, this settles the Case problem, since the verb only has thematic accusative. But in French and Italian, which also have the structural component, there is still the structural accusative residue to be checked. Our hypothesis is that the auxiliary *be* is used whenever there is such an accusative residue.[37]

The question why this is so (and what the precise implementation of this hypothesis is) is still open to several construals. It is reasonable to assume that it is not the auxiliary itself that checks the accusative residue, since the same residue is there also in examples not using an auxiliary. So the choice of *be* is just a reflex of some checking procedure. Most likely, the accusative residue is handled in some inflection projection; namely, a checking element is present in that projection, regardless of whether an auxiliary is realized. The presence of this checking element excludes the selection of *have* when an auxiliary is needed. Let us leave these questions open here, and move on to the next auxiliary puzzle.

The fact that Dutch and German use the auxiliary *be* with unaccusatives suggests that, just like French and Italian, they are set for structural accusative Case, namely there is an accusative residue after the arity operation reduces the thematic Case. But the puzzle they pose is why this is so only with unaccusatives. As we saw in detail, reflexivization has precisely the same effect on accusative Case, as the formation of unaccusatives, so we may expect the use of *be*, as in French and Italian.

We already have the answer at our disposal. As we saw in the discussion of (81), Dutch and German *zich/sich* are structural Case checkers. (While they cannot check thematic Case, they can check structural Case.) Unlike the Romance *se/si*, which is a clitic, *zich/sich*, though it is referentially defective, occupies the complement position. Dutch and German, then, have the option of inserting this element in the position where it can check structural Case, just like with standard arguments. In the Dutch (84a), *zich* occurs in the complement position. This is not a θ-position, since the θ-role was bundled with the Agent by the reflexivization operation. But the verb still has its structural Case to check, which *zich* can do.

(84) a. Max $\text{wast}_{\text{ACC-S}}$ zich
Max washes ZICH

[37] In the previous subsection we mentioned that lack of genuine (not small clause) ECM constructions may be a diagnostics for a negative setting of the structural accusative parameter. It should be noted that the relevance of ECM as a diagnostics for the setting of the parameter is not really clear. If Kayne (1981) is right in arguing that genuine ECM constructions (involving Case assignment by the verb to SpecIP of its sentential complement) are disallowed by UG, then obviously they cannot serve as a diagnostics for anything. Kayne (1981) claims that an empty preposition in C is responsible for Case assignment to SpecIP in English ECM constructions. If genuine ECMs do exist, one would, of course, have to explain the behavior of English. It selects *have* with reflexives and unaccusatives, which would suggest that it has a negative setting for the parameter. However, it has ECM constructions. One option would be to investigate the possibility that its auxiliary system is somewhat defective. Although we cannot develop the issue of ECM any further here, let us add that Spanish (Castillo 2001) and Romanian, where V lacks structural accusative and *be* selection is not triggered, indeed do not allow genuine (IP) ECM complements, but only small clauses, and complements to perception and causative verbs. Kayne (1981) claims that the clausal complement of perception verbs and causatives may be reduced.

'Max washes'

b. Max heeft zich gewassen $_{\text{ACC-S}}$.
Max has ZICH washed
'Max has washed'

c. Max heeft Lucie gewassen $_{\text{ACC T+S}}$.
'Max has washed Lucie'

In French and Italian, where the clitic only absorbs the thematic Case, the structural residue requires the insertion of some abstract Case absorber in the Inflection projection, which will then force the auxiliary *be*. But since there is no such residue in Dutch (*zich* takes care of it), no further checking is needed, and the auxiliary remains *have* (84b), just as with standard accusative arguments (84c). The only difference is that in (84c) the verb has both structural and thematic Case, both checked by *Lucie*, while in (84b), the verb has only structural Case, as reflexivization has reduced the thematic part.

With an unaccusative entry, the Case situation is identical. The arity operation that reduces the external θ-role, also reduces the thematic accusative, but since these languages also have structural accusative, the latter remains to be checked. (The unaccusative verb entry for *breken* ('break'), then, is *breken* $_{\text{ACC-S}}$ $\theta_2$.) But here, the remaining argument must be realized internally (and then move to satisfy the EPP). Hence, there is no position where a *zich* type element can be inserted. In this case, Dutch and German have to resort to the same mechanism of inflectional checking, as in French and Italian, and the auxiliary will be *be*.

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