The production of SE- and SELF-anaphors in Dutch child language

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1. Introduction

Dutch, like many languages, has two types of anaphoric elements; so-called Simple Expression or SE-anaphors and complex anaphors, called SELF-anaphors. These two types of anaphors differ from each other in syntactic distribution, semantics and function. The SE-anaphor *zich* has a much more limited syntactic distribution than the SELF-anaphor *zichzelf*. Concretely, while *zichzelf* can appear freely in the object position of transitive verbs, *zich* can only do so with a limited class of verbs, often called "inherently reflexive" verbs (Everaert 1986). A verb such as *wassen* 'wash' belongs to this latter class, whereas *haten* 'hate' does not. Consequently, *wassen* 'wash' can appear with both *zich* and *zichzelf* (1), whereas *haten* 'hate' only with *zichzelf* (2).[1]

(1) a.   Jan   waste   zich.
          John washed SE
     b.   Jan   waste   zichzelf.
          John washed SELF
          'John washed himself.'

(2) a.   *Jan   haatte zich.
           John hated SE
     b.   Jan   haatte zichzelf
          John hated SELF
          'John hated himself.'

The fact that verbs such as *wassen* 'wash' allow both SE- and SELF-anaphors does not mean that the use of the two anaphors is fully optional for this class of verbs. In general, *zich* is the unmarked option (3a), while *zichzelf* is used in contrastive situations (3b).

(3) a.   De tovenaar stapt uit   bed en de heks kleedt *zich* aan
          the wizard   gets out-of bed and the witch dresses SE   prt
          'The wizard gets out of bed and the which is dressing herself.'
     b.   De vrouw kleedt het kind aan en daarna kleedt zij *zichzelf* aan
          the woman dresses the child prt and then   dresses she SELF   prt.
          'The woman is dressing the child and then she is dressing herself.'

Summarizing, the distribution of *zich* and *zichzelf* is regulated by both syntactic and pragmatic principles. This has important consequences for language acquisition, since adultlike performance on *zich* and *zichzelf* requires knowledge as well as intergration of knowledge belonging to different modules of our language faculty.

In this paper we will present experimental results on Dutch children's production of SE- and SELF-anaphors. We will argue that the results support early knowledge of both the syntax and the

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[1] The class of inherently reflexive verbs can be split up between those that are exclusively inherently reflexive and those that are optionally inherently reflexive. The former class includes verbs such as *vergissen* 'to be mistaken' and *herinneren* 'remember', which do not have a transitive counterpart and cannot be combined with a SELF-anaphor. The latter class of verbs, which can also be normal transitive verbs and allow SELF-anaphors, includes common verbs such as *wassen* 'wash', *scheren* 'shave', *verdedigen* 'defend', *aankleden* 'dress', *uitkleden* 'undress' and many other verbs. It is not easy to semantically characterize the class of (optionally) inherently reflexive verbs. See König and Siemund (1999) and Kemmer (1993) for some proposals.

pragmatics of *zich* and *zichzelf*. At the same time it will be shown that the use of some of this knowledge is problematic, leading to less adultlike performance on the SE-anaphor *zich* than on the SELF –anaphor *zichzelf*. This finding is in line with earlier experimental results on the interpretation of *zich* and *zichzelf*, and also with spontaneous production data.

2. SE- and SELF-anaphors: linguistic background

The analysis of SE-and SELF-anaphors that we adopt is based on Reuland (2001), which contains a further elaboration of the alternative binding theory developed by Reinhart and Reuland (1993).

Reuland (2001) argues that referential dependencies can be established in different components of our language system. In general lines, he distinguishes referential dependencies formed in narrow syntax from dependencies formed outside narrow syntax. Dependencies formed outside narrow syntax include bound-variable and coreference relations between pronouns and their binders or antecedents. In the local domain, extra-syntactic dependencies are blocked by dependencies created in narrow syntax. This type of dependency involves A-Chain formation between two elements that are in a feature checking relation. However, A-Chain formation only results from checking operations between SE-anaphors and their local subjects. This operation proceeds in the following way. Reuland proposes that the formal features of *zich* (third person, accusative case), move to INFL where they end up in a checking configuration with the subject in [Spec, IP].

(4) a. Jan waste zich.
        'John washed himself.'
    b. [Jan [$_{INFL}$ [F$_{zich}$ F$_{waste}$]] [$_{VP}$ waste   zich]]
        John   washed SE

Zich checks the D-feature and the phi-features number and person of the subject. However, checking the subject's person feature will lead to the elimination of the person feature on *zich*. Since the person feature of *zich* is interpretable, its elimination leads to loss of information (Chomsky 1995). To prevent this from happening, Reuland proposes that the subject *Jan* "recovers" the checked and deleted person feature of *zich*. This recovery operation has an important side effect: it creates a referential dependency – an A-Chain – between *zich* and the local subject. Importantly, third person pronouns, such as *hem* 'him'or *haar* 'her' cannot be involved in A-Chain formation. Reuland argues that this is because they are specified for number, number being a feature that cannot be recovered after checking and deletion of this feature has taken place (see Reuland 2001 for a discussion).[2]

The creation of a chain between the object (*zich*) and the subject has an important effect on the argument structure of the verb. The two members of a chain count as one syntactic object. If the verb assigns two thematic roles, one role would remain unassigned. This explains why (5) is ungrammatical.

(5) *Jan haatte zich.
      Jan hated SE

Transitive *haten* 'hate' requires two arguments. Since *Jan* and *zich* form one syntactic object, one theta-role remains unassigned. The fact that (4a) is grammatical shows that some verbs aparently allow the reduction of one theta-role, but most do not.

The difference between the two types of verbs is accounted for by Reinhart & Reuland's (1993) alternative binding theory. This theory consists of two principles, A and B, but only Principle B, displayed in (6), is relevant to our discussion.

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[2] Reuland (2001) argues that pronouns such as *hem* 'him' and *haar* 'her' can be identified with local antecedents through variable binding or coreference. However, an economy rule blocks this possibility in favour of feature checking. This explains why (i) is ungrammatical with a reflexive reading.
(i) *Jan$_i$ waste hem$_i$.
     John washed him
Importantly, in languages that do not have pronominal elements underspecified for number (SE-anaphors), such as Frisian and Afrikaans, (i) is grammatical; if SE-anaphors are absent, feature checking/A-Chain formation is not an option, hence referential dependencies created outside narrow syntax, such as variable binding, become the most economic option.

(6) *Binding Theory*
    Principle B: A reflexive semantic predicate is reflexive-marked.

This principle captures a cross-linguistic observation according to which verbs only allow a reflexive interpretation if this interpretation is somehow marked, either syntactically, morphologically or semantically. If we assume that reflexivisation involves the change of a two-place predicate (transitive verb / relation) into a one-place predicate (intransitive verb / property), by identification of the object role with the subject role, Principle B can be interpreted as an interface filter on **arity reduction** in the syntax or at the interface, as proposed by Reuland (2001). In formal terms, Principle B states: $\lambda x \lambda y$ $(xRy) \rightarrow *\lambda x (xRx)$. However, arity reduction is allowed if the verb in question is reflexive-marked in the lexicon. In Dutch, reflexive-marking depends on lexical-semantic properties of the verb, and is therefore lexically restricted. This explains why (5) is ungrammatical, whereas (4a) is grammatical. Chain formation leads to the reduction of an argument of the verb. *Haten* 'hate' is a two-place predicate $(\lambda x \lambda y (xHy))$. In order to be compatible with a single argument configuration, *haten* 'hate' should be reduced to a one-place predicate $(\lambda x (xHx))$. However, since *haten* does not have the required lexical-semantic properties to qualify as an inherently reflexive verb, arity reduction will lead to a Principle B violation. *Wassen* 'wash', on the other hand, does have the apropriate lexical-semantic properties to qualify as an inherently reflexive verb, hence its existence as a one-place predicate is legitimate. Consequently, chain formation is possible, rendering (4a) grammatical.
    As shown by (2b), repeated as (7), non-inherently reflexive verbs such as *haten* can get a reflexive interpretation by using SELF-anaphors.

(7) Jan   haatte zichzelf.
     John hated SELF

The question is: why does the use of SELF-anaphors not lead to a Principle B violation? Reuland (2001) accounts for this in the following way. The Dutch SELF-anaphor *zichzelf* is composed of two elements, *zich*, which occupies the D-position, and the nominal element *–zelf*.

(8) [$_{DP}$ zich [$_{NP}$ zelf]]

Zich checks the features of the subject *Jan* in the same way as in (4), creating a chain between *zich* and the subject. This would normally require arity reduction, hence to a violation of Principle B. However, this is avoided by *–zelf*. The nominal part *-zelf* incorporates into the verb and receives the theta-role assigned to the object, making arity reduction unnecessary. But saving the arity of a predicate does not provide the predicate with a reflexive meaning (on the contrary; it remains a two place predicate). The reflexive interpretation is the result of the semantic properties of *–zelf*. *Zelf*, which is nominal in nature, has the capacity to "stand for" the referent of the subject (or more precisely, the referent of the chain *Jan—zich*) by representing it through a "guise". With a guise we mean a representation of an entity which shares properties with, but is not necessarily identical to this entity (Heim 1982; Jackendoff 1992). In formal terms this means that the predicate in (7) has the form "x H f(x)", with the referent of f(x) quite close to, but not identified with the referent of x (see also Postma 1997; Lidz 1997).[3] The capacity of *–zelf* to establish a semi-identity with the (subject) antecedent allows, on the one hand the predicate to have a reflexive meaning, and on the other hand prevents a Principle B violation from occurring at the Conceptual-Intentional interface (C-I interface), the level at which binding relations are interpreted.[4]
    The capacity of *–zelf* to be associated with the subject antecedent through a guise explains particular semantic properties of SELF-anaphors, such as their ability to refer to statues, pictures and other reprentations of the referent, as in (8a). SE-anaphors, on the other hand, do not have this ability (8b) (Rooryck and vanden Wyngaerd 1997; Jackendoff 1992; Reuland 2001).

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[3] Many languages use body-part reflexives for this purpose.

[4] If *–zelf* involved complete identity with the local subject, the resulting predicate would be represented as $\lambda x (x \text{ haatte } x)$, which would amount to a Principle B violation.

(8) Context: Ringo Starr visiting a wax museum passing by a wax statue (=guise) of himself.
   a. Plotseling begon Ringo *zichzelf* uit te kleden.   [zichzelf = statue; zichzelf = Ringo]
       'All of a sudden, Ringo started undressing SELF.'
   b. Plotseling begon Ringo *zich* uit te kleden   [*zich = statue; zich = Ringo]
       'All of a sudden, Ringo started undressing SE.'

Importantly, according to Zuckerman, Avrutin and Vasić (2002), the ability of SELF-anaphors to be stressed, hence to be used in contrastive contexts, is dependent on their ability to introduce guises, i.e., to refer semi-independently from their antecedents.

   Note finally that SELF-anaphors can also be combined with verbs that can be reflexive-marked in the lexicon, such as *wassen* 'wash' (see note 1). This is not surprising, since arity reduction and reflexive-marking is an option for *wassen*, not a requirement. If arity is preserved, SELF-marking serves to assign a reflexive interpretation to the predicate. However, SELF-marking is the marked option for this kind of verbs, and is used in, for instance, contrastive contexts (3b).

3. Predictions for acquisition

   We have shown that *zich* and *zichzelf* differ with respect to their syntax, semantics and pragmatics. As far as their syntax is concerned, we have argued that both *zich* and *zichzelf* involve a feature checking operation. *Zichzelf* differs from *zich* in that –*zelf* establishes an semi-identity relation with the subject outside narrow syntax, at the C-I interface. With respect to their pragmatics, *zich* differs from *zichzelf* in that only *zichzelf* can be used in contrastive contexts.

   The different types of knowledge that need to be integrated in order to use *zich* and *zichzelf* correctly, might give rise to problems in their acquisition. According to Avrutin (1999, 2003) children have very early command of syntactic principles of their language, but have problems with the *use* of syntax to structure information. This often leads them to rely on extra-syntactic strategies to structure information.[5] If this view is correct, it predicts that children show more difficulties with *zich* than with *zichzelf*. The reason is that *zich* involves a purely syntactic way of establishing referential dependency. The anaphoric properties of *zichzelf*, on the other hand, rely basically on an extra-syntactic association of the guise introduced by –*zelf* with the local subject.[6]

   Also, children may have problems with pragmatic principles, as argued by many authors (Chien and Wexler 1990; Kraemer 2000). If this is true they are predicted to show problems with the correct context of use of *zich* and *zichzelf*, using *zichzelf* in non-contrastive contexts and vice versa. In the next section, we present an elicited production experiment that tested the different predictions with respect to the acquisition of *zich* and *zichzelf* by Dutch-speaking children.

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[5] Children's preferences for extra-syntactic encoding of referential dependencies also account for five-year-olds' high acceptance rate of the reflexive interpretation of (ia).
(i) a. La niña la ve   bailar.   (60% rejections of reflexive interpretation)
         the girl her sees dance
         'The girl sees her dancing.'
     b. La niña la   señala.   (90% rejection of reflexive interpretation)
         the girl her points-at
         'The girl is pointing at her.'
In adult Spanish, the reflexive interpretation of (ia) is blocked by the more economical construction involving feature checking and chain formation between the SE-anaphor *se* and the main clause subject *la niña* 'the girl.' Children's difficulties with this operation makes operations outside narrow syntax, such as bound-variable relations between pronouns and local antecedents, equally economical. This does not work for (ib), since variable binding between *la* 'her' and la *niña* 'the girl', being co-arguments of the same predicate, would require arity reduction, hence a Principle B violation (Ruigendijk, Baauw, Zuckerman, Vasić, de Lange and Avrutin, to appear)

[6] With extra-syntactic we mean outside narrow syntax. This domain includes the level at which binding relations are interpreted (the C-I interface) and discourse/information structure. Possibly, these two levels can be considered one and the same.

4. The experiment

19 Dutch-speaking children were tested, ranging from 5;4 to 6;7, with a mean age of 5;11. In addition 13 Dutch-speaking adults were tested, ranging from 36 to 70 years old, with a mean age of 54;6.

The subjects were tested with a Story Elicitation Task. The aim of the task was to elicit short stories on the basis of three-picture-sequences. One experimenter, who was sitting opposite to the child and could not see which picture sequence was being described, had to guess which picture the child was describing. Another experimenter sat next to the child, and acted as the child's helper. The kind of help that was allowed consisted in a general description of the action depicted when the child misinterpreted the picture (e.g., "I think the story is about dressing"). The child was allowed to pick up an arbitrary picture sequence from the pile, and put the picture aside after telling the story. The stories were recorded with a DAT recorder, and transcribed afterwards.

The experiment consisted of two conditions of seven items each, eliciting either *zich* or *zichzelf*. Since two items of both conditions gave rise to many visual errors in both children and adults, we decided to exclude them from the analysis, limiting ourselves to five items per condition. The items differed from each other in the verb that was used. The following verbs were used: *wassen* 'wash', *aankleden* 'dress', *afdrogen* 'dry', *schminken* 'make up' and *insmeren* 'put oil on'. All these verbs allow both *zich* and *zichzelf*, i.e., they are optionally inherently reflexive verbs. The test items were intermingled with 20 filler items.[7] The total number of items was 34, divided over two test versions of 17 items each. Each child received one version, which was administered to her in one session of 20 minutes. Before the actual test started, some practice items were administered. The adult controls were tested in a similar way, with the exception that the verb representing the action was written underneath the last picture of the three-picture-sequence, in order to avoid visual errors, and no second experimenter, acting as a helper was present. Moreover, the adults received the complete test (34 items), in one session.

In (9) an example is given of a *zich*-item and a *zichzelf*-item.

(9) a. ZICH-Condition

Model response:
1. Een heks en een tovenaar lagen in bed te slapen.
    'A wich and a wizard were sleeping in bed.'
2. Toen stapte de tovenaar uit bed.
    'Then the wizard got out of bed.'
3. En daarna kleedde de heks *zich* aan.
    'And then the wich dressed SE.'

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[7] The filler items belonged to a study that tested children's use of definite and indefinite articles and pronouns.
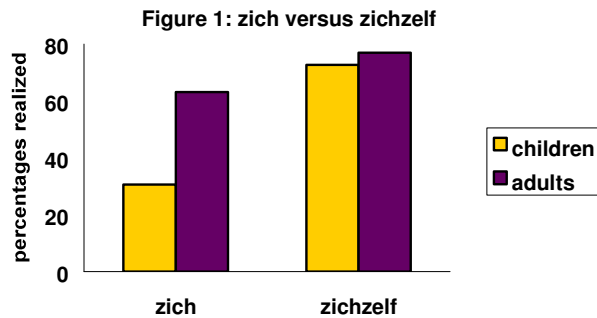
b. ZICHZELF-condition
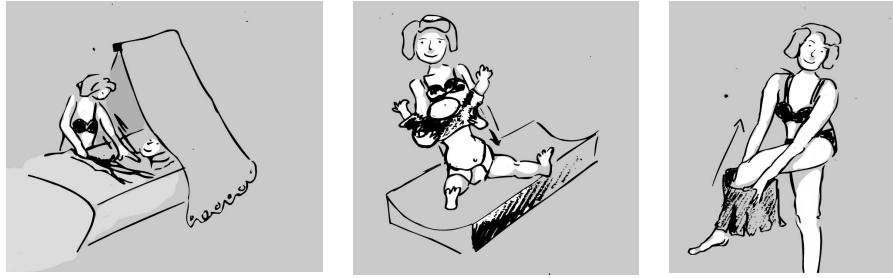
Model response:
1. Een vrouw maakte haar kindje wakker.
   'A woman woke up her child.'
2. Toen kleedde ze het kind aan.
   'Then she dressed the child.
3. En daarna kleedde ze *zichzelf* aan.
   'And then she dressed SELF.'

All responses were noted down, and coded afterwards as either target-like or non-target-like. In the case of spontaneous corrections, the corrected response was counted.

5. Results

In Figure 1 the results of the experiment are presented.

Figure 1: zich versus zichzelf

A MANOVA showed significant main effects for group and condition (children vs. adults F=14.019, p<0.01; *zich* vs. *zichzelf* F (1,30)= 6.956, p<0.05), but no significant interaction (F(1,30)=1.341, p=0.256). A post-hoc t-test shows that children performed differently on the *zich* condition than adults (t=-3.633, p<0.001), but not on the *zichzelf* condition (t=-1.343, p=0.189).

6. Discussion

The results showed that Dutch children used *zich* only 30.6% of the time in contexts that require it, whereas the adults used it 63.1% of the time in the same context. This indicates that children are able to establish referential dependencies in syntax, but that they preferably avoid such operation, using other means to describe the situation. These other means include omissions of *zich*, constructions involving body parts (e.g., "the boy washed his belly"), the use of pronouns and occasionally forms with *–zelf* (*zichzelf* and *hemzelf/haarzelf*). The more extra-syntactic nature of *zichzelf*, on the other hand, led to almost adult-like performance; children used SELF-anaphors 72.7% of the time in contexts that require it. Adults used *zichzelf* 76.9% of the time in this context. This result supports Avrutin's (1999, 2003) claim that children have very early knowledge of the principles of syntax, but as a result of their more limited processing capacity, they show difficulties with the *use* of syntax to structure information. The anaphoric properties of *zich* are the result of processes that take place in narrow syntax: feature

checking and A-Chain formation. Therefore they are predicted to give rise to difficulties. *Zichzelf*, on the other hand, is identified with its local antecedent through processes that lay outside narrow syntax, and are therefore predicted to be relatively unproblematic.

Importantly, our experimental results are in line with spontaneous production data from Dutch; until the age of four, Dutch children hardly ever use *zich*. SELF-anaphors, on the other hand, develop earlier (van Kampen, personal communication).[8] The results are also in line with Coopmans and Avrutin's (1999) study on the interpretation of *zich* and *zichzelf* in four-to-six year old children. They found that children, who were tested with a Truth Value Judgment Task, accepted the identification of *zich* with the non-c-commanding antecedent *de princess/de beer* 'the princess/the bear' 70% of the time in sentences such as (10).

(10) a. [De boerin   [naast   de princes]] wast   zich.
          the farmer's-wife next-to the princess washes SE
     b.   De olifant [naast   de beer]] houdt een paraplu   boven zich.
          the elephant next-to the bear   holds an umbrella above SE

Children's performance on similar sentences with *zichzelf* was far from adultlike, but considerably better.[9]

However, our account gives rise to a potential problem. We have argued that not only *zich* but also *zichzelf* involves a feature checking operation, since it contains a *zich*-component. If feature checking/chain formation is problematic, children could be expected to show difficulties with the use of SELF-anaphors. We propose that the reason for children's relatively good performance performance on *zichzelf* is due to the fact that *zich* forms a morphological unity with the *zelf*-part of the SELF-anaphor. This entails that whenever –*zelf* is used, this will facilitate the use of *zich*.[10]

It is important to note that, despite their poor performance on the conditions eliting *zich*, Dutch children correctly differentiate between the conditions designed to elicit *zich* and those that elicit *zichzelf*. When they use *zich*, they never do this in the contrastive contexts, i.e., in the ZICHZELF-condition. *Zichzelf*, on the other hand, is only occasionally used in the ZICH-condition. This shows that children are sensitive to pragmatic distinctions, i.e., they distinguish correctly between contrastive and non-contrastive discourse situations. It also shows that they have a basic understanding of the different morphological properties of *zich* and *zichzelf*. Concretely, they know that *zich* cannot be stressed, and hence cannot be used in contrastive discourse situations. They also know that *zichzelf*, which can be stressed, must be used in contrastive situations. In fact, children's knowledge of the distinction between *zich* and *zichzelf* extents to the semantics of these elements. As shown by Avrutin, Zuckerman and Vlasveld (2003), four- and five-year-old children distinguish SELF-anaphors from SE-anaphors with respect to their capacity to refer through guises, allowing *zichzelf* to refer to statues or other representations in sentences such as (8a), considerably more than *zich* in similar constructions (8b).

Summarizing, the experimental evidence favors a processing account of children's relatively poor performance on *zich* in comparison to *zichzelf*. Children show early knowledge of the syntactic, morphological, semantic and pragmatic properties of *zich* and *zichzelf*, but their inmature processing ability leads them to show difficulties in their atempt to establish referential dependencies in narrow syntax, using the mechanism of feature checking and A-chain formation between the SE-anaphor *zich*

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[8] Stojanović (in press) did not find any instances of *zich* and *zichzelf* in the spontaneous productions of three Dutch children up to 3;10.

[9] The four-year-olds allowed reference of *zichzelf* to the non-c-commanding antecedent 57% of the time. The 5;0-to-6;5-year olds allowed it 28% of the time when *zichzelf* was the complement of a locative preposition (10b) and only 10% of the time when it was the argument of a verb (10a). A recent improved experiment showed an overal improvement of children's performance on *zichzelf*. However, the children still showed a strong contrast between their performance on *zichzelf* in argument position and as complement of a locative peposition (Coopmans, Krul, Planting, Vlasveld and van Zoelen 2003).

[10] Note that the realisation of the SELF-anaphor was not always correct. Sometimes children produced forms such as *hemzelf/haarzelf*, in which -*zelf* is combined with a third person pronoun.

and the local subject. Instead they prefer alternative, extra-syntactic ways to express the reflexive interpretation of the predicate.

7. Conclusion

In this study we presented experimental evidence showing that Dutch children produce both the SE-anaphor *zich* and SELF-anaphor *zichzelf*, and they do so in the correct pragmatic contexts. The results also showed that Dutch children exhibited more difficulties with the production of *zich* than with *zichzelf*. In line with Reuland (2001) we argued that SE-anaphors encode the establishment of a referential dependency in narrow syntax, through A-Chain formation. Children's difficulties with the production of *zich* can be explained as the result of their inmature ability to use syntax to structure information, or more specifically, to establish referential dependencies.

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