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ORIGINAL PAPER

# Clausal order and the acquisition of Dutch deverbal compounds

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**Abstract** The purpose of this study was to explore how Dutch-speaking children acquire deverbal compounds, particularly in ordering verbs and nouns. English-speaking children form compounds like *bottle breaker* around 5–6 years of age and make noun-verb reversal errors at younger ages. These errors have been attributed to clausal ordering. Dutch allows more variations in clausal ordering, so Dutch-speaking children might acquire deverbal compounds differently from English-speaking children. In Study 1, we examined the input to a Dutch-speaking child between 4;8 and 5;2 and her compound acquisition. She heard a variety of clausal orderings, mostly with verbs before objects, and her deverbal compounds were already well acquired. In Study 2, we tested 24 Dutch-speaking preschool children's production and comprehension of novel compounds. They produced many of the same forms as have been reported for English-speaking children, making reversal errors at around the same age. In Study 3, we compared a subset of the Dutch-speaking children with age-matched English monolingual children. We found a slight advantage for the Dutch-speaking children on production but no difference on comprehension. We argue that children's ordering errors with OV-*er* compounds are not due to clausal word order but to ordering of other complex word forms.

**Keywords** Compounds · Lexical innovation · Acquisition · Dutch

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## 1 Introduction

Children sometimes coin novel terms to refer either to known concepts, such as *nose beard* to refer to a mustache (Becker 1994), or to novel concepts, such as *apple juice chair* to refer to the chair close to the apple juice (Downing 1977; see also Clark 1981). The novel terms usually rely on word formation structures allowed in children's native language(s). For example, English-speaking children often coin novel compounds while French-speaking children are more likely to use derivations in creating novel words (Clark 1981, 1993, 1998). One apparent contradiction to children's general reliance on existing word formation structures is preschool English-speaking children's attempts at novel deverbal compounds such as *rug sweeper* to refer to an instrument that sweeps rugs. When these compounds are elicited from preschool children, children often reverse the verb and the noun to form ungrammatical compounds such as *a sweep-rug* or *a sweeper-rug* or *a sweeping-rug* (e.g., Clark et al. 1986). These reversal errors are usually attributed to children's reliance on canonical clausal ordering, the most frequent exposure they will have had with verbs and objects (e.g., Clark et al. 1986; Clark and Barron 1988). If this explanation were true, it would suggest that children generalize across morphological and syntactical order. As will be elaborated below, this explanation for children's reversal errors has come into question in recent years.

The purpose of the present paper is to explore how Dutch-speaking children acquire deverbal compounds containing a verb and a noun, like *haardroger* 'hair dryer', with the object preceding the verb. While compounding is used frequently in Dutch, there is little data on children's acquisition of Dutch compounds (see Clark 1993). Of particular interest for the purposes of this study is the order in which they produce verbs and nouns. Dutch allows more variable clausal ordering across canonical sentence types than English does, including exposure to clausal OV orderings (see Koster 1975). The greater variety of clausal orderings could lead to less reliable knowledge among Dutch-speaking children relative to English-speaking as to how to interpret a noun preceding a verb within a compound. Alternatively, Dutch-speaking children may find deverbal compounds easier than English-speaking children, having had the advantage of exposure to clausal OV orderings. In either case, Dutch-speaking children should acquire deverbal compounds differently from English-speaking children.

In the following section, we will present the background to this debate as well as an overview of the most important relevant literature. Sections 3–5 present Studies 1–3, in which we used various empirical techniques to explore how Dutch-speaking children acquire deverbal compounds, particularly in ordering verbs and nouns. Section 6 offers a general discussion of the results obtained from these studies, and Sect. 7 concludes this paper.

## 2 Background

The main purpose of this study is to examine cross-linguistic differences in the acquisition of deverbal compounds and understand why there are such differences.

It starts from the hypothesis, spelled out in Sect. 2.4, that the acquisition of deverbal compounds is influenced by clausal order. Since Dutch allows more variations in clausal ordering, Dutch-speaking children might acquire deverbal compounds differently from English-speaking children. Before discussing deverbal compounds in Dutch, we will review what is known about children's acquisition of such compounds in general. Next, we turn to Dutch-speaking children's acquisition of various types of compounding, and we end Sect. 2 with a brief summary and the main question of this article.

## 2.1 Acquisition of deverbal compounds

A number of factors are thought to influence children's acquisition of compounds, including frequency and/or productivity, morphological complexity, and deviation from typical clausal ordering. Dutch, English, Swedish, and Mandarin Chinese are sometimes referred to as compounding languages, because compounds are both highly frequent and highly productive. Children learning these languages can produce novel Noun-Noun compounds quite early, by 2 years of age (Clark 1993; Clark et al. 1985; Mellenius 1997; Nicoladis and Yin 2002). In contrast, in languages like French and Hebrew, where Noun-Noun compounding is infrequent and not very productive, children tend to acquire compounds later, after 2 years of age (Clark 1998; Clark and Berman 1987).

The most productive deverbal compounds in English are in the form Object + Verb + *-er* (e.g., *bookkeeper*) and Verb + *-ing* + Noun (e.g., *chewing gum*; cf. Quirk et al. 1985), with the latter being more productive than the former. Object + Verb + *-er* (hereafter, OV-*er*) compounds are said to preserve an older, no longer active, phrasal ordering in English (Baker 1998). There are other, less productive and less frequent, kinds of deverbal compound in English, such as Verb + Object compounds like *scarecrow* and *pickpocket* and Verb + Noun compounds like *dump truck*, *playhouse*, and *jump rope* (Marchand 1960). In English, deverbal compounds are used in speech to children less frequently than Noun-Noun root compounds (Nicoladis and Yin 2002). The lower rate of frequency may play a role in children's later acquisition of deverbal compounds relative to Noun-Noun root compounds (see the review in Clark 1993).

Children's acquisition may also be influenced by morphological simplicity. Clark and Berman (1987) have shown that the morphologically more complex Hebrew compounds are acquired later than morphologically simpler ones. They asked Hebrew-speaking children to produce novel compounds. It is not clear how important morphological simplicity is for children, though, as even simple compounds can be acquired fairly late. For example, French deverbal compounds consisting of a bare verb and a bare noun (e.g., *tournevis* 'turn screw', meaning a screwdriver) are acquired around 4–5 years of age (Nicoladis 2003a, 2007).

Canonical clausal ordering has been thought to influence children's acquisition of deverbal compounds. There are at least two reasons to suppose that clausal ordering is related to compound acquisition: (1) English-speaking children acquire deverbal compounds late (around 5–6 years), and (2) English-speaking children make errors in the direction of canonical clausal ordering when asked to form novel compounds.

Specifically, for deverbal compounds, Clark et al. (1986) note that children's production responses seemed to fall into the following stages:

Stage 1: Verb-Noun e.g., *break man* (meaning: a man who breaks bottles);
Stage 2: Verb-Object e.g., *break bottle*, *breaking bottle*, *breaker bottle* (meaning: something or someone who breaks bottles);
Stage 3: Object-Verb-*er* e.g., *bottle breaker* (meaning: something or someone who breaks bottles).

Further evidence for this progression can be seen in children's errors in understanding novel deverbal compounds, as when they interpret the object as if it is the subject (so they might think a *bottle breaker* is 'a bottle that breaks something'). We refer to these errors as Subject-Verb (SV) errors because children interpret the object of the verb as the subject (although, note that these errors are also possible if children interpret both constituents of compounds as contributing equally to the meaning; see Nicoladis 2003b; Parault et al. 2005). Murphy and Nicoladis (in preparation) showed that 3- to 4-year-old English-speaking children picked randomly between the two possible meanings when asked to interpret the meaning of novel OV-*er* compound. Only when they were about 4 or 5 years old did children show greater than random choice of the target referent for novel deverbal compounds.

There has been some debate as to whether children necessarily pass through stage 2 (i.e., whether they produce ungrammatical compounds like *break bottle*), as no such forms appeared in the spontaneous conversations of a child recorded longitudinally between the ages of 2 and 5 years (Becker 1994). However, stage 2 errors do appear consistently in experimental elicitation paradigms (Clark et al., 1986; Nicoladis 2003a), as well as in diary data (Nicoladis 2005). These results suggest that stage 2 forms do consistently appear but are low in frequency.

The interpretation of stage 2 forms as evidence that children rely on canonical clausal ordering to form (ungrammatical) deverbal compounds has also been questioned. For example, in French, deverbal (VO) compounds follow canonical clausal ordering (SVO), yet children learn these compounds just as late as English-speaking children (Nicoladis 2003a; see also Nicoladis 2007). This finding sheds some doubt on the argument that English-speaking children learn deverbal compounds late because the compounds reverse canonical clausal ordering. Furthermore, French-speaking children make the same kinds of SV error that English-speaking children do in the comprehension of novel deverbal compounds, even though the French compounds follow clausal ordering and the English ones do not. Yet another reason to doubt children's use of clause structure in acquiring compounds comes from a longitudinal case study of novel complex words (Nicoladis 2005). In this study, the child created complex words like *hanger light* and *hanging light* that had similar meanings (i.e., both meant 'a light that was hanging in a window'). Because -*er* occurs less often than -*ing* and -*er* occurs in complex word forms like *roller skate*, which the child could not distinguish in meaning from *rolling skate*, the child might have initially interpreted -*er* as meaning something similar to -*ing* (although -*ing* itself was rarely misused). A final reason to doubt a clausal explanation comes from evidence that British English-speaking children produce more ungrammatical

VO forms than Canadian English-speaking children (Nicoladis and Murphy 2002). The authors attribute the difference to the fact that British English has more Verb-Noun forms (like *answerphone* to mean an answering machine or *hold-all* to mean a tote bag) than Canadian English. While Verb + Noun forms are fairly low in frequency overall in both British and American English (Nicoladis and Murphy 2002), they are higher in frequency in British English.

These findings point to the possibility that children's acquisition of compounds is influenced by other lexical forms in their input. If this explanation holds true, then children's errors in ordering novel deverbal compounds (Clark et al. 1986) may have nothing to do with clausal ordering. That is, children hear many examples of complex constructions in English (e.g., *rolling pin*, *roller skate*, *playhouse*, *fire-fighter*, etc.). They may initially fail to distinguish the meaning of *-er* from that of *-ing* and conclude that the order of complex lexical items tends to be Verb-first. If children's approach to ordering elements within complex lexical items is probabilistic, then SV errors in comprehension can be explained by their calculating the probability of meaning on the basis of other complex lexical items that they know.

### 2.2 Deverbal compounds and canonical clausal ordering in Dutch

In Dutch, deverbal nominal compounds generally come in two forms, depending on the semantic relation between the composing terms (see Haeseryn et al. 1997, 671ff; see also Booij 2002): OV-*er* compounds and Verb-Noun compounds. The *-er* suffix is used to denote the agent/instrument of an action in the productive construction OV-*er*. For example, *haardroger* 'hair dryer' refers to the instrument for drying hair. Almost invariably, in this construction the nominal term assumes the status of direct object with respect to the verbal stem (but see the occasional exception, like *kustvaarder* 'coast sailer', with *varen* 'to sail' being intransitive in Dutch). Note, however, that outside this complex construction the *-er* suffix itself is ambiguous between denoting the subject (*speler* 'player') or, more marginally, the object of an action (*martelaar*, from *martelen* 'to torture': martyr, i.e., 'someone who was tortured'). Note also that this suffix comes in three different allomorphs in Dutch, viz., *-er* itself, *-aar*, and *-der*: *-er* is the default, *-aar* occurs when the final syllable of the stem ends in a liquid or nasal preceded by a schwa (as in *martelaar*), and *-der* occurs when the stem ends in *r* and is not preceded by schwa (as in *kustvaarder*) (see also Booij and Van Santen 1998; p. 193).

Another common deverbal compound in Dutch is the Verb-Noun construction (Booij 2002). It is mainly used to describe a type of object, like OV-*er*, but the specifics of the relation between the nominal and verbal referent may vary. Thus, an *antwoordapparaat* 'answer machine' is a machine that does the answering, while *slaapkamer* 'sleep room', referring to a bedroom, exemplifies a less straightforward meaning expressing an activity (with an implied generic subject) as related to location. This type can even incorporate an object noun in the first, verbal term of the compound, yielding a ternary structure as in *aardappelschilmes* 'potato peel knife'. A passive construal is relevant to the interpretation of Verb-Noun compounds like *rookworst* 'smoke sausage', describing the result of an action.

The problem of Dutch constituent order and sentence structure is a tricky one, given its marked variability along a number of parameters like clause type, mood, and information structure, and the wide range of possible variation (covering as many as five different types). The decision to take this or that pattern as *basic* is highly dependent upon the theoretical position of the linguist involved (see Wijnen and Verrips 1998; Zwart 1997; see also Kayne 1992), although many linguists regards SOV as the basic position (e.g., Koster 1975), despite the fact that it is only overtly manifested in embedded clauses. In this study, we rely on surface phrasal ordering, as Clark et al. (1986) argued that it is the frequency with which children experience a particular phrasal ordering that influences their compounds.

There is some evidence to suggest that the frequency of different clausal orderings may change over developmental time. In Dutch-speaking children's early language production (combinations of a [pro]nominal and a verb), the infinitival verb is usually in final position, in accordance with SOV. Evidence for this observation is seen in child-addressed speech, where mothers also display a preference for SOV (Klein 1974). When children are older, the finite or finite-like verb in a three-word sentence may be fronted and in fact ends up in a left-peripheral (first or second) position fairly frequently. In these early sentences, both SV and VS (or inversion) orders are attested, with inversion initially ranging higher in frequency, but it is unclear when exactly the first nonsubject (e.g., direct object) constituents in first position start to appear, yielding possible OV structures. In a third stage, then, the finite verb occurs in first or second position and accompanying nonfinite participles or infinitives, as part of a complex predicate, are put at the end, as in adult speech:

(1) (a) SOV: *Basje oke botram eten.* 'Basje too sandwich eat'
(Basje wants to eat a sandwich too.)
(b) left-peripheral position of verb: *kijken dat!* 'look that' (Show it!)
(both from Basje, 2;3, in Klein 1974)

All in all, at an adult proficiency level, Dutch boasts no less than five word order types that may be encountered with some regularity in ordinary discourse. In fact, Dutch-speaking children can be expected to master all five of them from an early age on, even if such (productive) mastery is at first restricted to certain construction 'islands' for the less frequently occurring types. To the extent that the acquisition of OV-*er* compounds is related to clausal ordering, Dutch-speaking children might perform differently from English-speaking children, either showing a disadvantage (because they cannot as reliably interpret nouns preceding verbs) or an advantage (because they know that objects *can* precede verbs).

## 2.3 Acquisition of compounds in Dutch

On the acquisition of Dutch compounds, very little research has been done. Elbers and van Loon-Vervoorn (2000; pp. 212–216) summarize the results of studies on the acquisition of compounding in Dutch and note that children's earliest novel

compounds usually consist of two nouns, as in *bootauto* ('boat car') for a type of amphibious vehicle. They also remark that reversal errors in such Noun-Noun compounds are common around the age of 3 years. An example would be the use of *boontjebabietjes* ('bean babies') for 'baby beans', i.e., small beans.

The earliest reported compound including both a verb and a noun produced by a Dutch-speaking child is at the age of 4;3: *vrouwenmaker* 'woman maker', referring to a person who can turn boys into women (Clark 1993; p. 152). This compound appeared in the correct order, unlike another deverbal compound reported for a Dutch-speaking child of 4;6, which was produced in the verb-noun order: *stap-voeten* 'step-feet', referring to an object to slow down skates (Clark 1993; p. 152). While there are few reported deverbal compounds by young Dutch-speaking children overall, the latter example suggests that the correct ordering of verbs and nouns within deverbal compounds might pose a problem for children late into their preschool years, just as with English-speaking children (Clark et al. 1986).

### 2.4 Hypothesis

We want to find out if clausal ordering, which shows more variation in Dutch, affects the acquisition of deverbal compounds in that language. To this end, we describe the developmental sequence of compounding in Dutch and, in Study 3, compare English- and Dutch-speaking children's production and comprehension of novel compounds. Rather than ruling out this hypothesis, which we will not be able to do on the basis of the Dutch data alone, we propose a complementary explanation for (reversal and interpretation) errors made by children. Taking into account findings from English (where children sometimes think that *-er* means *-ing* in V-*ing*N compounds), English dialects (e.g., differences in the rates of these forms between British and Canadian English), and French (where children never seem to make reversals), we conclude in Sect. 6 that other complex nominals in the lexicon of a language also influence children's ordering within deverbal compounds.

## 3 Study 1

Because children's production of deverbal compounds has been linked to frequent clausal orderings, our first study focused on the orderings heard by a single Dutch-speaking child, as well as on her use and understanding of novel compounds. We looked at three pieces of data relevant to her acquisition of deverbal compounds: (1) the kinds of clausal ordering she heard and produced, (2) the kinds of novel compound she produced in an elicitation ask and understood in a comprehension task, and (3) the kinds of novel compound she produced spontaneously. The child was 4;8 when we started this study, an age at which English-speaking children are still making many verb-noun reversal errors when attempting novel deverbal compounds (Clark et al. 1986).

### 3.1 Method

To see which kinds of clausal ordering were commonly heard by a native Dutch-speaking girl between ages 4;8 and 5;2, we looked at transcripts of spontaneous conversations in the child's home, one at 4;8 and the other at 5;2. This child was temporarily living in Edmonton, Alberta, Canada at the time of both observations and had picked up enough English by the second observation to form some simple sentences. She remained much more proficient in Dutch even at the end of this observation period. At 4;8 and 5;2, we checked for the occurrence of possible word order types and calculated their relative frequencies in the input language as well as in the child's own production. With respect to the compounds at issue, we ran the same elicitation and the same comprehension test twice, one at the beginning of this period and one towards the end. The child's parents were also asked to keep a diary during these 6 months, in which any instance of the relevant compound type was recorded, as well as any effort to produce complex concepts that might be expressed by an OV-*er* compound but were not.

To compile a corpus, we videotaped the child for 1 h in her home at the start of the observation period (age 4;8), and again for 1 h at the end (age 5;2). In order to create as natural a conversation environment as possible, the parents did the taping and there were no outside observers present. The tapes were transcribed by a native speaker of Dutch, and all finite-verb clauses were listed and classified according to verb placement. This was done both for the input language and for the child's own production.

At the start of the observation period, we administered two tests. One was an elicitation task, in which the child was asked to look at drawings of machines with arms and hands, performing individual actions on distinct objects (see example in Fig. 1). Each drawing was preceded by the following instruction: "Dit is een machine die [Object] [Verb] (e.g., dit is een machine die appels eet'). Hoe zouden we dat kunnen noemen?" 'This is a machine that [Verb] a(n) [Object] (e.g., this is a machine that eats apples). What could we call this?' The experimenter then waited for the child to respond. The order of the relative clause in the Dutch instructions is SOV, unlike in English. Following three trials in which the experimenter gave a response in the form OV-*er*, the child was asked to name the pictures herself. Every response of the child was recorded, i.e., from a compound to a complete sentence and any level of description in between. We used nine pictures which were presented in a random order. The targets were: *appeleter* 'apple eater', *boekenverbrander* 'book burner', *flessensmijter* 'bottle thrower', *knoppenduwer* 'button pusher', *kattenkrabber* 'cat scratcher', *eierbreker* 'egg breaker', *bloemenstreler* 'flower petter', *voetenkietelaar* 'foot tickler', and *muizenknuffelaar* 'mouse hugger'. Note that, in the last two cases, the allomorph -*aar* is used. With the exception of *appeleter*, these compounds are not as morphologically simple as their English equivalents, since they involve an interfix, -*en*, which is typically, but not always, identical to the plural suffix for the first compound noun (except for *eier*, which needs another suffix for the plural *eieren*).

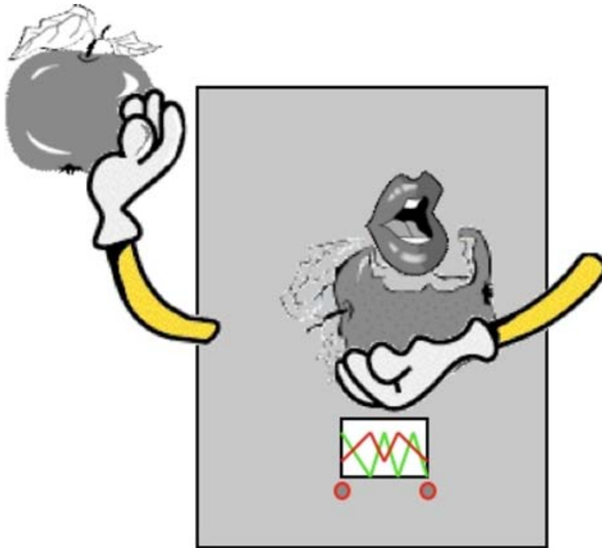

**Fig. 1** Example of production item

For the comprehension task, the child was confronted with eight sheets of paper presented in random order. On each sheet of paper, four drawings were separated by lines and distributed across the corners, and the child was asked to indicate which of these drawings corresponded to the novel OV-*er* compound proffered by the experimenter in Dutch (e.g., "Waar is de konijnetrekker?" 'Where is the rabbit puller?'; see Fig. 2 for an example). The target answer was in each quadrant for two of the eight pictures. The distracters systematically depicted other referent types: next to the correct drawing for every OV-*er* compound (e.g., a hand pulling a rabbit for 'rabbit puller'), there were also: (1) a picture of the object referent alone (e.g., 'rabbit' in Fig. 2), (2) a picture construing a V-*er* relation (e.g., a 'puller' [of a boat], but not the rabbit), and (3) a picture of an SV distracter, that is, the object referent performing the verb (e.g., a 'rabbit pulling something', like a cart). The following eight items made up the comprehension task: *badwasser* 'bathtub washer', *baby-weger* 'baby weigher', *dozendrager* 'box carrier', *centjesvanger* 'coin catcher', *verfmorser* 'paint spiller', *konijnentrekker* 'rabbit puller', *schoenendraaier* 'shoe turner', and *tafelsnijder* 'table cutter'.

This whole procedure was repeated towards the end of the observation period, and the results were compared.

A diary study was also conducted during the observation period. The parents were asked to note striking examples of both canonical and "ungrammatical" compounds produced by the child, in particular those which displayed an incorrect ordering of the composing elements. They were asked to pay special attention to OV-*er* compounds, and to note *any* other strategies the child had at her disposal to solve any problems of expressing the concepts that would fit such compounds.

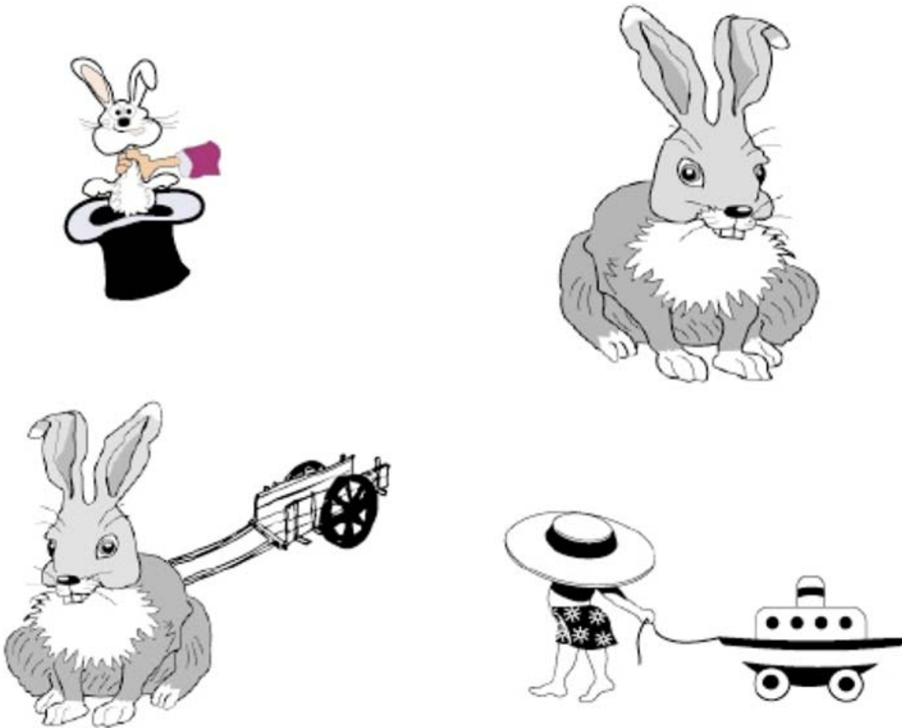

**Fig. 2** Example of comprehension item

## 3.2 Results

### *3.2.1 Clausal order*

The child produced the following orders, at times 1 and/or 2:

SVO: *Ja, ik hoor de poes nie.* 'yes, I hear the cat not' (I can't hear the cat.)
SOV: *As ik op de schommel zit?* 'when I on the swing sit' (When I'm sitting on the swing?)
VSO: *wil je een foto van mij trekken?* 'want you a picture of me take' (do you want to take a picture of me?)
OVS: *Wat denk jij?* 'what think you' (What do you think?)
OSV: (*En then weet je) wat ik gedaan heb,* '(and then [English] know you) what I done have?' (And then do you know what I've done?)

Note that OSV order only occurs in dependent interrogatives and nominal relatives.

The overall distribution of word order is summarized in Table 1. There are a few changes between time 1 and time 2. The high percentage of VSO clauses at time 1 is mainly due to interrogatives and other types of inversion, often with imperatives. At time 2, the rate of VSO dropped, which indicates lower frequencies for

**Table 1** Rate of different clausal orderings

| | Time 1 (4;8) | | Time 2 (5;2) | |
|---|---|---|---|---|
| | Input ($N = 410$) | Child ($N = 156$) | Input ($N = 262$) | Child ($N = 268$) |
| VSO | 48.8% | 34.6% | 40.8% | 25.4% |
| SVO | 33.2% | 47.4% | 39.3% | 54.5% |
| SOV | 14.1% | 9.6% | 12.2% | 8.6% |
| OVS | 3.9% | 7.7% | 6.9% | 8.2% |
| OSV | 0.0% | 0.6% | 0.8% | 3.4% |

Percentages in each column may not add up to 100% because of rounding errors

interrogative and imperative sentence types. At time 2, OSV, a marginal and very intricate pattern requiring highly developed grammatical skills, is higher than at time 1 for both the child and her parents. Different types of conversation appear to have been held at time 2, involving more coordinated efforts of description than before, and certainly more balanced exchanges (in terms of turn allocation, as indicated by the number of clauses).

In spite of the differences in ordering clauses with regard to subjects and verbs, there was a remarkable consistency in ordering the verb and object. Both the child and the adults at time 1 and time 2 produced verbs before objects about 80% of the time (VSO + SVO) and objects before verbs only about 20% of the time. While placing verbs before objects is clearly more frequent in this child's Dutch, the child knew that it was possible to put objects before verbs as early as 4;8.

Finally, given the theoretical significance of other compounding patterns in the Dutch lexicon as possible sources for (errors in) word formation, we also looked at complex, child-produced nominals that were not of the OV-*er* type (which did not occur in the corpus), both at time 1 and at time 2. The only attested example of the VN pattern is the form *zwembad* ('swim bath', for swimming pool), where the noun is in fact not an object but more like a location and which in any case comes close to the English V-*ing*N pattern for instrument nouns, as in *chopping knife* 'a knife for chopping' (or *swimming pool*, for that matter). Other complex nouns are invariably of the NN type: *paardenbloem* ('horse flower', dandelion), *babyshampoo*, *badkamer* ('bathroom'), *handdoek* ('hand cloth', towel), *tandenborstel* ('tooth-brush'), *dennebomen* ('pine trees', twice), and *appelboom* ('apple tree'). It is less likely that the latter type should have a significant influence on ordering patterns in the deverbal compounds examined here, if only because they all express a meaning, 'a kind of…', that is not related to the semantics of deverbal compounds.

### *3.2.2 Elicitation and comprehension of novel compounds*

Next, we present the results of the two compound elicitation tasks. At time 1, 4/9 novel compounds produced by the child were in the correct OV-*er* order. At time 1, when the child did not produce the target form, she responded with two compounds in the form N-'machine' (e.g., *knoppenmachine* 'button machine'), one in the form OV (i.e., *kattenkriebel* 'cat tickle'), and one in the form VO-*er* (i.e., *kietelvoeter* 'tickle footer'). In the final form produced at time 1, it was difficult to hear whether

there was actually a suffix following the verb stem, and if so, then in any case a phonologically reduced one rather than the expected *-aar* (i.e., *muizenkriebel(er)* 'mouse tickle(r)'). The only ordering mistake made in this task is *kietelvoeter* ('tickle footer'). At time 2, 9/9 novel compounds were in the target order. Thus, for the majority of the items presented, the child used structures corresponding to well-formed Dutch compounds.

On the comprehension task she scored 5/8 at both time 1 and time 2. She gave incorrect answers for exactly the same items at both times. For 'box carrier', the subject pointed out the drawing of a box, for 'paint spiller' that of spilled paint (without an overt agent involved), and for 'rabbit puller' that of a rabbit pulling a cart (with the object noun in an active role). There was no evidence that the child was systematically interpreting novel OV-*er* compounds as subject/agent-verb constructions.

#### *3.2.3 Novel compounds from diary*

The diary study did not reveal any major error types in the formation of Dutch compounds including any kind of verb form between ages 4;8 and 5;2. The first OV-*er* form spontaneously produced during the observation period (4;8.2) is *kindjeskapper* ('hairdresser for little [diminutive] children'), which immediately displays the right order and impeccable overall morphology (even though the word is newly coined). Other OV-*er* compounds that were correctly produced later on (*schoorsteenveger* 'chimney sweep(er)'; *sleutelhanger* key ring, literally 'key hanger'; *miereneter* 'ant eater'; *pitamaker* 'pita maker'; *haardroger* 'hair dryer') show the same tendencies. The OV-*er* type of compound may not have been produced very frequently, but it is clear that the child had no significant difficulties when using these forms.

Some general compounding errors do point to formal, i.e., ordering, difficulties. Binoculars were called *kijker voor van ver* ('watcher/looker for from far', 5;2.22), a paraphrase that suggests uncertainty as to the syntactic/semantic function of the first term *ver(re)*- 'far' in the correct form *verrekijker* 'far watcher/looker'. Clearly, having an adjective appear in the same position as more canonical object nouns in an OV-*er* compound can be confusing. On the other hand, the child also generalizes the OV structure to strictly nominal (N-N) compounds whose structure can be interpreted on analogy with OV-*er* forms: *boekjeketting* ('book chain', 4;10.27), for instance, is a new form created to refer to a chain that holds a small book. In this case, the book acts as a type of object vis-à-vis the head noun *ketting*, even though the latter term is not a verb.

### 3.3 Discussion of Study 1

This 5-year-old child produced and heard a variety of clausal orders, including the order required for well-formed compounds, and had little trouble producing or comprehending novel compounds in the correct order. One elicited compound at 4;8 appeared in the order Verb-Object, corresponding to the more frequent ordering of these elements at the clausal level, but even at 4;8 this child generally used objects

before verbs in her novel compounds. By 5;2, the child's elicited compounds were all in the correct order.

One possible interpretation of these results is that deverbal compounds are less difficult for Dutch-speaking children to acquire than they are for English-speaking children, as the latter do not acquire deverbal compounds until around 5 or 6 years (Clark et al. 1986). If this interpretation were correct, the variety of clausal orders that Dutch-speaking children hear might contribute to this early acquisition of deverbal compounds. However, since English-speaking children acquire deverbal compounds around 5–6 years of age and this child turned five over the course of the present study, the child's age still fell within the range of age of acquisition for English-speaking children. To see how Dutch-speaking children produce and comprehend deverbal compounds over a broader age range, we conducted Study 2.

## 4 Study 2

The purpose of this study was to see how Dutch-speaking children's acquisition of deverbal compounds changed between 3 and 6 years of age. We asked children to produce and indicate their comprehension of novel deverbal compounds, as in Study 1.

Most, although not all, of the children who participated in this study spoke English as well as Dutch. Because not all the children spoke English well enough to participate in a compound elicitation task, we decided not to test their English compound formation.

On the basis of the current literature on bilinguals' acquisition of compounds, we think it unlikely that the children's English affected their production of Dutch deverbal compounds. That is, the research to date indicates that compound formation in one language of a bilingual can affect that in the other language, but only if the same type of formation pattern exists, from the children's perspective. For example, Nicoladis (2003a) tested French-English bilinguals' production of deverbal compounds. VO compounds are grammatical in French but ungrammatical in adult English (although produced by English-speaking preschoolers; e.g., Clark et al. 1986). The bilingual children produced more VO compounds in English than monolingual English-speaking children. There was no difference between monolinguals and bilinguals in the rate of VO compounds produced in French. Because the same OV-*er* compounds exist in both Dutch and English, we would expect that Dutch-English bilingual children produce similar rates of OV-*er* compounds as same-age Dutch monolingual children.

### 4.1 Method

Twenty-four Dutch-speaking children between the ages of 2 and 6 years participated in this study. For the purposes of presentation and analysis, we divided the children into three age groups of eight children each, whose average age and proficiency scores are summarized in Table 2.

**Table 2** Average (standard deviation) age and proficiency scores of participants

| | Age (months) | Proficiency | Number of children with high Dutch proficiency |
|---|---|---|---|
| I ($N = 8$) | 38.8 (8.6) | 2.1 (1.1) | 5 |
| II ($N = 8$) | 64.0 (4.6) | 2.6 (1.2) | 3 |
| III ($N = 8$) | 81.1 (5.8) | 2.5 (1.3) | 3 |

High Dutch Proficiency refers to parents' reporting that the children spoke mainly Dutch (i.e., a four proficiency rating) or much better Dutch than English (i.e., a three proficiency rating)

The children lived in various parts of Alberta, Canada, a province where the majority language is English. Most also spoke English. We asked the parents to tell us which language, Dutch or English, the child spoke better on a 4-point scale, with 1 corresponding to knowing mainly Dutch and little English and 4 corresponding to knowing mainly English and little Dutch. In all age groups, the parents reported scores from 1 to 4. A similar scale was used by Gutiérrez-Clellen and Kreiter (2003) with Spanish-English bilinguals and found to be a valid and reliable indicator of the children's home language proficiency. As a group, the children spoke Dutch quite well according to this measure, with the younger children (in group I) tending to be more Dutch-dominant and the older children (in groups II and III) more English-dominant.

The children were given two tasks: a production task and a comprehension task. These were very similar to the tasks given in Study 1, except that some of the items were changed for dialectal reasons. For the production task, we showed children pictures of machines acting on objects and asked them to tell us what the machine could be called (see Fig. 1 above for an example). The children were given three warm-up trials where the machines were explicitly named (i.e., *slaknipper* 'salad cutter', *koffiedrinker* 'coffee drinker', and *truckduwer* 'truck pusher'), and then ten test trials (the targets were: *bloemenaaier* 'flower petter', *flessengooier* 'bottle thrower', *boekenverbrander* 'book burner', *poezenaaier* 'cat petter', *appeleter* 'apple eater', *vlindervanger* 'butterfly catcher', *bananeneter* 'banana eater', *voetenkietelaar* 'foot tickler', *eierbreker* 'egg breaker', and *knopjesdrukker* 'button pusher').

For the comprehension task, children were given ten displays of four pictures. They were asked to show us which picture corresponded to the meaning of a novel compound (as in *konijnentrekker* 'rabbit puller' in Fig. 2). In addition to the target picture, each display contained the same types of distracter as in Study 1. Again, we were particularly interested in the SV distracters (e.g., a rabbit pulling something), because children might select those if they did not understand that the first noun is the object of the verb in the compound. The same items were used as in Study 1, except that we replaced *tafelsnijder* 'table cutter' with *tafelknipper* 'table clipper', *schoenendraaier* 'shoe turner' with *appeldraaier* 'apple turner', and *centjesvanger* 'coin catcher' with *geldvanger* 'money catcher'. We eliminated *badwasser* 'bath-tub washer' and added *huizenschudder* 'house shaker', *kadogever* 'gift giver', and *stoelenschudder* 'chair shaker'. The changes were made because we thought these

forms would be more familiar in the Netherlandic dialect of Dutch which the children spoke (as opposed to the Flemish Dutch spoken by the child in Study 1). In sum, the following ten items made up the comprehension task were: *appeldraaier* 'apple turner', *huizenschudder* 'house shaker', *babyweger* 'baby weigher', *dozendrager* 'box carrier', *geldvanger* 'money catcher', *verfmorser* 'paint spiller', *konijnentrekker* 'rabbit puller', *kadogever* 'gift giver', and *stoelenschudder* 'chair shaker', and *tafelknipper* 'table clipper'. The target answer and the SV distractor were distributed approximately equally often in each of the four quadrants.

*Procedure* We always presented the production task before the comprehension task, so as not to bias the children's productions with any novel grammatical deverbal compounds. The children were administered these tasks in their homes by a native speaker of Dutch.

*Coding* We classified the children's responses into target forms (e.g., *appeleter* 'apple eater') and nontarget forms. To classify the nontarget forms, we did not attend to whether the children produced a plural or a singular noun (e.g., *eetappels* 'eat apples' or *eetappel* 'eat apple'). The nontarget responses were: Verb-Object (e.g., *eetappel* 'eat apple'), Verb-*er*-Object (e.g., *eterappel* 'eater apple'), Verb-Object-*er* (e.g., *eetappeler* 'eat appler'), Object-Verb (e.g., *appeleet* 'apple eat'), and Verb-*er*-Object-*er* (e.g., *eterappeler* 'eater appler'). There were also a few responses that did not fall into these categories (i.e., nine among the children in age group I, 6 in age group II, and none in III).

## 4.2 Results

Table 3 summarizes the five most frequent forms the children produced by age. They produced more target forms in function of age, with the biggest increase between groups I and II. Note that in group I, the children were almost equally likely to produce the target form as Verb-Object, and more likely to produce some form with the verb before the object than with the object after the verb. For groups II and III, the target form was the most frequent form produced by the children, although they occasionally made errors by putting verbs before objects.

We analyzed the number of lexical forms with verbs before objects and objects before verbs by age group in a 3 (Age group) $\times$ 2 (Order) ANOVA. We first report the results of the subjects analysis. The results of this analysis showed a significant interaction between order and age, $F(2,21) = 4.66, p = .02$, as well as a main effect for order, $F(2,21) = 7.16, p = .01$. The main effect for age was not significant. On an items analysis, there was also an interaction between order and age, $F(2,27) = 7.80$, $p = .002$, as well as a main effect for order, $F(2,21) = 9.49, p = .005$. These statistics mean that the youngest children were more likely to produce verbs before objects and that in age groups II and III, the children produced more objects before verbs.

With regard to the comprehension task (see Fig. 3), we focus on comparing the average rate of choosing the target response and of choosing the SV distracter. The children chose the target response 5.6 times on average (SD = 1.8) and the SV distracter 3.3 times on average (SD = 1.9). Figure 3 summarizes the averages by age group. To compare the children's target response with/against their choice of the SV distracter, we performed an ANOVA by the three age groups (i.e., Choice

**Table 3** Average (standard deviation) percentage of forms produced by age

| | I | II | III | All children |
|---|---|---|---|---|
| Target (e.g., *appeleter*) | 27.5% (21.2%) | 65.0% (16.0%) | 68.6% (27.5%) | 56.4% (28.4%) |
| Verb-Object (e.g., *eetappel*) | 25.0% (23.3%) | 17.5% (13.9%) | 16.3% (20.0%) | 19.6% (19.0%) |
| Verb-*er*-Object (e.g., *eterappel*) | 13.8% (10.6%) | 6.3% (9.2%) | 3.8% (7.4%) | 7.9% (9.8%) |
| Verb-Object-*er* (e.g., *eetappeler*) | 5.0% (7.6%) | 5.0% (9.3%) | 6.3% (10.6%) | 5.4% (8.8%) |
| Object-Verb (e.g., *appeleet*) | 2.5% (4.6%) | 0.0% (0) | 5.0% (10.7%) | 2.5% (6.8%) |
| Total Verb before Object | 43.8% (31.6%) | 28.8% (19.6%) | 26.3% (28.8%) | 32.9% (27.1%) |
| Total Object before Verb | 30.0% (24.5%) | 65.0% (16.0%) | 73.6% (28.8%) | 56.3% (29.7%) |

*Note*: Total percentages do not always equal 100% because some infrequently occurring forms were excluded

[Target versus SV] × Age Group). The result on the subjects analysis showed a significant difference in children's choosing the target response over the SV distracter, $F(1,21) = 10.16$, $p < .01$. There was no main effect for the age group and no interaction between age and choice for the comprehension task. On the items analysis, there was also a main effect for choice, $F(2,27) = 9.48$, $p < .01$, and no other significant effects. These statistics mean that the children were always more likely to choose the target than the SV distracter, regardless of age.

As production of the target form increased with age (see Table 2) and correct comprehension remained fairly stable (see Fig. 3), it is no surprise that there was no correlation between the rate of target production and the rate of correct responses on the comprehension task, $r(22) = .117$, ns. The correlations between age and proficiency in Dutch (relative to English), and the percentage of correct responses on the production and comprehension tasks, are summarized in Table 4. The only significant correlation is a positive one between age and percentage of correct responses on the production task.

## 4.3 Discussion of Study 2

To summarize the results of Study 2, we showed that Dutch-speaking children were more likely to produce novel OV-*er* compounds as they got older, as has been shown for English-speaking children (Clark et al. 1986). The youngest children (3- to 4-year-olds) produced many compounds with verbs before objects. In comprehension, the Dutch-speaking children always chose the target significantly more often than the SV distracter, across all age groups. These results suggest that Dutch-speaking children have difficulty producing novel OV-*er* compounds until around the age of 5–6 years (groups II and III here), as with English-speaking children. In

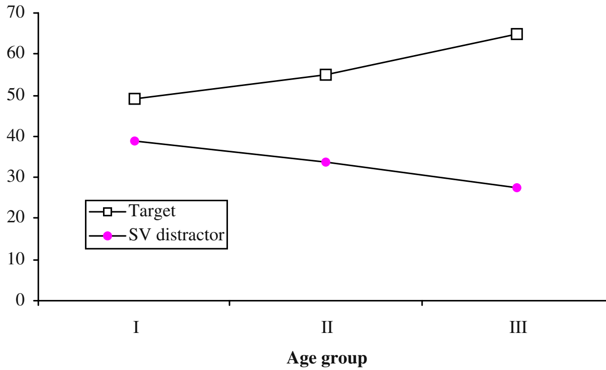


**Fig. 3** Average rate of correct response and SV distracter by age

contrast, their comprehension of novel compounds as OV-*er* (interpreting the noun as the object of the verb, i.e., correctly) is significantly better than as SV (interpreting the noun as the subject of the verb, i.e., incorrectly) from 2 to 6 years of age.

## 5 Study 3

The results of Study 2 suggest that Dutch-speaking children have difficulty producing novel OV-*er* compounds but little difficulty in comprehension. To see if there are any differences with English-speaking children, we conducted Study 3, a direct comparison with English-speaking children. We compared a subset of the Dutch-speaking children with English monolingual children on a similar task. We focused on the age range between 3 and 5 years, because that is where there is the most change in development (i.e., between age groups I and II in Study 2) and we had access to already collected data on a similar task with English-speaking children within this age range (Murphy and Nicoladis 2002).

### 5.1 Method

The number of participants we could include in this analysis was restricted to the number of children we could match on age within 4 months of age. The final sample included 12 Dutch-speaking children from Study 2, aged between 39 and 71 months of age, $M = 57.9$, SD = 10.1. Twelve age-matched English monolingual children

**Table 4** Correlation coefficients between age and proficiency and percentage correct on production and comprehension tasks

| | Age | Proficiency |
|---|---|---|
| Production task | .592* | .105 |
| Comprehension task | .393 | −.216 |

* $p < .01$

between 42 and 67 months of age, $M = 57.7$, SD = 9.1, were included as a comparison group. Having matched on age, there was no significant difference on age between the two groups, $t < 1$.

*Materials* As with the Dutch production task, the English production task was composed of pictures of machines performing actions on objects. The ten target items were: *apple eater, banana peeler, bell ringer, book burner, coin dropper, cow brusher, foot tickler, kite flyer, mouse hugger*, and *sun juggler*. Note that there is some overlap in the target items for English and Dutch (e.g., *apple eater*) although most of the items were distinct in the two languages.

The English comprehension test was designed exactly like the Dutch comprehension test, with a choice of four pictures: one target picture corresponding to the meaning of a novel OV-er compound (e.g., for a *rabbit puller*, someone pulling a rabbit), one SV distracter (e.g., a rabbit pulling a wagon), a picture of the object alone (e.g., a rabbit), and one of the action carried out with other objects (e.g., someone pulling a cart). The ten test items were: *table cutter*, *rabbit puller*, *paint spiller*, *man holder*, *baby painter*, *house holder*, *coin catcher*, *can crusher, book cooker*, and *ball pusher*. As with the production task, there was some overlap in terms of items in the comprehension task in English and Dutch, although most items were different.

*Procedure* We followed the same procedure with the English-speaking children as with the Dutch-speaking children in Study 2.

*Coding* Where possible, we used the same categories to code the English-speaking children's responses as we did with the Dutch-speaking children's responses in Study 2. One immediate challenge in coding the English-speaking relative to the Dutch-speaking children's responses is that the former gave a wider variety of responses (see also Clark et al. 1986), including names with *-ing* (e.g., *eating machine*), phrases (e.g., *a machine eating apples*), and noun-noun compounds (e.g., *apple machine*).

## 5.2 Results

A summary of the children's responses appears in Table 5. Note that the average rate of target responses was higher among the Dutch-speaking children than among the English-speaking children. Comparing the rate of target responses on an independent samples *t*-test did not yield a significant difference, $t\ (22) = 1.34$, $p = .09$, one-tailed. Part of the reason for this was the distribution of responses in the two groups. All of the Dutch-speaking children in this age range produced two or more target responses. In contrast, six of the 12 English-speaking children produced no target responses; the other six produced five or more. A more valid way of comparing such different distributions is by chi-square on the number of children who produced one or more target response versus the number of children who produced no target responses. This analysis revealed a significant difference between the two language groups, $\chi^2\ (1, N = 24) = 12.00$, $p < .01$.

If *-ing* constructions are excluded, the English-speaking children used an average of 16.7% (SD = 28.1%) verb-before-noun forms and 38.3% (SD = 37.9%) noun-before-verb forms. If the *-ing* constructions are included, the English-speaking

**Table 5** Average (standard deviation) percentage out of total responses of each category of response

| | English-speaking | Dutch-speaking |
|---|---|---|
| Target (e.g., *apple eater* or *appeleter*) | 35.8% (39.4%) | 53.3% (22.3%) |
| Verb-Object (e.g., *eat-apple* or *eetappel*) | 4.2% (7.9%) | 2.5% (1.9%) |
| Verb-*er*-Object (e.g., *eater apple* or *eterappel*) | 1.7% (3.9%) | 10.8% (10.8%) |
| Verb-Object-*er* (e.g., *eat appler* or *eetappeler*) | 10.8% (23.1%) | 5.8% (9.0%) |
| Object-Verb (e.g., *apple-eat* or *appeleet*) | 2.5% (8.7%) | 0.8% (2.9%) |
| Total Verb before Object | 23.3% (27.1%)* | 25.8% (11.6%) |
| Total Object before Verb | 43.3% (38.7%)* | 53.3% (22.3%) |

*Note*: Total percentages do not always equal 100% because some infrequently occurring forms were excluded
* These percentages include deverbal forms with *-ing*

children produced an average of 23.3% (SD = 27.1%) verb-before-noun forms and 43.3% (SD = 38.7%) noun-before-verb-forms. The age-matched Dutch-speaking children produced an average of 25.8% (SD = 11.6%) verb-before-noun forms and an average of 53.3% (SD = 22.3%) noun-before-verb forms. Regardless of whether the *-ing* constructions are included or excluded, the distribution of responses among the English- and the Dutch-speaking children was similar.

To analyze these results, a 2 × 2 Order × Group ANOVA was performed, with Order as a repeated measure. The first analysis compared the Dutch-speaking children's order with the English-speaking children's order, excluding *-ing* constructions. This analysis revealed a significant main effect for Order, $F(1,22) = 8.58$, $p < .01$. The effect for Group did not reach significance, $F(1,22) = 3.01$, $p = .09$. There was no interaction effect, $F < 1$. The second analysis included the *-ing* constructions for the English-speaking children. This analysis also revealed a main effect for Order, $F(1,22) = 7.12, p < .02$, but no main effect for Group or interaction effect, $F < 1$ in both cases. The main effect for Order was due to the fact that both groups of children produced noun-before-verb forms more often than verb-before-noun forms.

On the comprehension task, the average percentage of target responses chosen by the English-speaking children was 55.4% (SD = 18.6%), and by the Dutch-speaking children 53.3% (SD = 15.0%). The SV distracter was chosen on average in 35.1% (SD = 14.4%) of the responses by the English-speaking children and in 38.3% (SD = 15.9%) by the Dutch-speaking children. To analyze the comprehension task, we compared the two groups of children on their choices of the target answer versus the SV distracter on a 2 × 2 Choice × Group ANOVA, with Choice as a repeated measure. This analysis showed a main effect for Choice, $F(1,21) = 7.30, p < .02$, but no main effect for Group and no interaction effect. In other words, both groups were more likely to choose the target response.

### 5.3 Discussion of Study 3

If children's compound ordering is influenced by clausal ordering, then Dutch-speaking children might have acquired OV-*er* compounds differently from English-speaking children. Study 3 compared compounds elicited and comprehended by a small sample of Dutch-speaking children and an age-matched sample of English-speaking children. There were trends for the Dutch-speaking children to produce more target OV-*er* compounds and more noun-before-verb constructions if the analysis excluded the English-speaking children's -*ing* responses. Once the -*ing* constructions were added, the trend toward an ordering difference in production between the two groups disappeared. These results suggest that the Dutch-speaking children may be slightly ahead of the English-speaking children in the production of novel OV-*er* compounds, but primarily because constructions with -*ing* are so common among the English-speaking children.

If the children's comprehension of novel OV-*er* compounds was influenced by clausal ordering, the Dutch-speaking children would have had more experience than English-speaking children with objects preceding verbs. They should therefore have chosen the target response on the comprehension task more often than the age-matched English-speaking children. In fact, both groups were more likely to choose the target answer than the SV distracter, and at equivalent rates. Note that the SV distracter was consistently chosen above chance levels of 25% and so constituted a somewhat plausible interpretation of OV-*er* compounds. This finding could be due to the children's interpretation of the noun as the subject of the verb (see Clark et al. 1986) or simply an interpretation that accorded equal status within the compound to both constituents (see Nicoladis 2003b; Parault et al. 2005).

## 6 General discussion

The results of these three studies have shown that the acquisition of deverbal compounds may be challenging for Dutch-speaking children between 3 and 5 years of age, just as it is for English-speaking children. Dutch-speaking children make ordering errors in production and may find SV distracters a plausible interpretation of compounds involving verbs and nouns. We will argue that the results of these studies are not perfectly consistent with the hypothesis that children's errors in deverbal compounds are based on clausal ordering (e.g., Clark et al. 1986).

Our first concern was establishing the kinds of clausal ordering Dutch-speaking children might hear and use. This is important because Clark and her colleagues have argued that the frequency of clausal patterns would influence compound acquisition. In Study 1, we showed that the VO pattern is more frequent in Dutch clauses, both in the input language and in the child's own production, than the OV pattern. However, the child both heard and produced sentences in the OV pattern, suggesting that Dutch-speaking children (unlike English-speaking children) are more than regularly exposed to the same order as in deverbal compounds. If children rely on canonical clausal ordering to form OV-*er* compounds, Dutch-speaking children might acquire their compounds correctly at an earlier age than English-speaking children.

In fact, the Dutch-speaking children in these studies showed a similar acquisition pattern to English-speaking children in production. In Study 1, a 5-year-old Dutch-speaking child had little difficulty in her production and comprehension of novel compounds. However, the results of Study 2 suggest that this child might have been old enough to produce novel Dutch compounds like adults. Study 2 showed that Dutch-speaking children have difficulties in the production of novel compounds until about the age of 5 or 6 years, like English-speaking children. The errors by Dutch-speaking children often involved reversing the verb and the noun and sometimes not producing *-er* (i.e., using bare verbs). Their most frequent errors were Verb-Object forms, like *eetappel*. Recall that Verb-Noun constructions are grammatical in Dutch. Furthermore, the Dutch-speaking children (particularly the younger ones) often chose an interpretation of novel OV-*er* compounds in which the noun was the agent/subject of the action. This has also been found with English-speaking children (Nicoladis and Murphy, in preparation).

In Study 3, we did a direct comparison of Dutch-speaking children with age-matched English-speaking children. The Dutch-speaking children were slightly more likely to produce target forms than the English-speaking children. However, part of the reason for that higher rate was the English-speaking children's use of many constructions with *-ing*, as in *eating machine*. In most cases, these constructions were grammatical, but not the target forms we were looking for. In contrast, in comprehension, the Dutch- and English-speaking children were likely to choose the target most often and the SV distracter the next most often, with no significant difference between groups.

Many of the results of the present studies are consistent with the hypothesis that children's errors with deverbal compounds are due to canonical clausal ordering (e.g., Clark et al. 1986). We found that verb-noun ordering in child-directed Dutch is the most frequent clause order (Study 1), and that the Dutch-speaking children made verb-noun reversal errors in attempting to produce novel OV-*er* compounds and often chose an SV distracter as the referent for novel OV-*er* compounds (Study 2). Also, the Dutch-speaking children were more likely to produce correctly ordered novel OV-*er* compounds than age-matched English-speaking children (Study 3).

However, some of the results are inconsistent with the hypothesis. If the Dutch-speaking children relied on canonical clausal ordering (including objects before verbs) to interpret novel compounds, then they should also have picked the target picture more often than the English-speaking children in the comprehension task. In fact, the Dutch-speaking children did not choose the target interpretation of novel OV-*er* compounds significantly more often than age-matched English-speaking children (Study 3). This result can, at best, be considered weak counterevidence to the hypothesis, since it relies on null results in small-sample groups. Stronger counterevidence comes from the kinds of error made by the English- and Dutch-speaking children. The English-speaking children were quite likely to produce constructions with *-ing* (as has been reported in Murphy and Nicoladis 2006). The most frequent errors among the Dutch-speaking children were Verb-Object constructions; as noted in the introduction, Verb-Noun constructions like *antwoordapparaat* 'answering machine' are grammatical in Dutch (Booij 2002) and might act as a model for the interpretation of novel deverbal compounds (even

though the status of the noun is typically *not* that of Object; cf. also the form *zwembad* ‘swim bath’ noted in Sect. 3.2.1). Thus, both groups of children produced many errors that could be based on grammatical word-formation constructions in their languages (instead of on ordering patterns at the clausal level). Murphy and Nicoladis (2006) argue that preschool English-speaking children are often attempting to produce OV-*er* compounds and that their errors are based on other complex lexical items, such as Verb-*ing* Noun constructions. According to their argument, children make errors because OV-*er* compounds are infrequent. A similar argument could be made about Dutch. Many of the children’s errors could be based on Dutch word-formation constructions available in their input.

There are a number of methodological issues that could have affected the present results, such as the ordering of verbs and nouns in the elicitation questions (i.e., OV in Dutch, VO in English) to children or the pictures used to elicit compounds. These methodological issues can be addressed in future studies. Before closing, we would like to highlight a limitation to the present studies that may affect the generalizability of the results: the children’s bilingualism. Most of the children in Study 2 spoke some English as well as Dutch, a fact that could have affected their acquisition of deverbal compounds (Nicoladis 2002, 2003a). Our proficiency measure showed no relationship with the children’s production and comprehension of deverbal compounds. In fact, age was a fairly good predictor of the children’s performance, as one would expect if their Dutch was improving with age. However, it is possible that our measure of proficiency (parental report) was weak. A stronger measure would be vocabulary size, which has been shown to be related to various aspects of compound acquisition (Nicoladis 2003a). We think it is unlikely, however, that the children’s English had a strong impact on the present results for two reasons. First, the younger children made most of the errors in production and comprehension and they were more proficient in Dutch than in English. The older children, who were more proficient in English than in Dutch, were more likely to produce and choose target forms in Dutch. Thus, the children, as a group, produced more target constructions as they got older, as one would expect with monolingual Dutch-speaking children. Second, current hypotheses about when cross-linguistic influence is seen suggest that the children’s bilingualism may have affected the *rate* of their production of particular forms, but not their comprehension or the fact that they produce a particular form (Müller 1998; Nicoladis 2002; see also Sorace 2005). In other words, bilingual children rarely produce qualitatively different errors compared to their monolingual peers. Thus, it seems unlikely that the children’s bilingualism would have had a strong impact on the present results. Nevertheless, the conclusions drawn here would be strengthened if the same patterns of acquisition were observed in monolingual children, too.

## 7 Conclusion

The present results suggest that Dutch-speaking children’s acquisition of deverbal compounds is a late acquisition, as for English-speaking children. Dutch-speaking children make verb-noun reversals in producing and SV errors in interpreting novel

deverbal compounds. While we cannot rule out the hypothesis that Dutch-speaking children's errors are due to clausal ordering, we have argued that the results are more strongly consistent with the hypothesis that, like English-speaking children, their errors are based on other complex names for things in their input. In Dutch, the most frequent error in production was Verb-Object forms (and Verb-Noun constructions are grammatical in Dutch). In English, the most frequent error in production was Verb-ingNoun forms, a grammatical construction. These results suggest that children are trying to produce novel names for things based on grammatical constructions in their input language (Clark 1993).

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