

# Cue-based Acquisition and Information Structure Drift in Diachronic Language Development

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## 1. Introduction

Within a model of language acquisition and change which recognizes the importance of cues and so-called ‘micro-cues’ in the input (e.g. Lightfoot 1999, 2006, Westergaard 2006, 2007), this paper argues that patterns of information structure may be a factor causing word order change. The examples discussed are taken from mixed grammars which allow two subject or object positions, in both historical and present-day data, mainly from English and the Scandinavian languages. In these systems children are exposed to the cue for a particular word order, e.g. OV or verb-second (V2), in only some of the relevant contexts in the primary linguistic data (PLD).

The following examples provide evidence of such mixed word order systems from the history of English. In (1) and (2) we see that Old English (OE) allowed both OV and VO, while (3) and (4) illustrate that also V2 and non-V2 word orders are attested during the same time period.

- (1) We ne magan **eow neadian** (OE)  
*we NEG can you constrain*  
‘We cannot constrain you. . .’ (Pintzuk, 2005: 129)
- (2) Se wolde **gelytlian þone lyfigendan hælend**  
*he would diminish the living saviour*  
‘He would diminish the living saviour . . .’ (Pintzuk 2005: 117)
- (3) Him **geaf þa se cync** twa hund gildenra pænenga.  
*him gave then the king two hundred golden pennies*  
‘Then, the king gave him two hundred pence in gold.’

- (4) Hiora untrymnesse **he sceal** ðrowian on his heortan.  
*their weakness he shall atone in his heart*  
‘He shall atone in his heart for their weakness.’  
(from Haeberli 2002: 88-90)

The choice of word order in such mixed systems is often at least partly dependent on information structure, in such a way that one of the subject or objects positions is preferred for discourse given elements (typically pronouns) and the other for informationally new or focused elements (typically heavier elements such as full DPs or clauses).

It is often claimed that subjects tend to be given information and objects more often new. Investigating samples of natural spoken language from Norwegian and English child-directed speech, this paper shows that this is indeed the case in the input to children. While e.g. approximately 90% of all subjects are pronouns, the situation is reversed for objects, which are expressed by pronouns only about 20-35% of the time. This means that in systems allowing two subject positions, the one preferred for discourse given (often pronominal) subjects should be naturally more frequent in the spoken language. Conversely, the position for informationally given objects should be relatively infrequent.

The paper argues that in combination with various syntactic micro-cues, these patterns of information structure may over time cause a natural increase of one of the word orders in language use, i.e. in the E-language which constitutes the input to children in the acquisition process.<sup>1</sup> This leads to a corresponding drop in the frequency of the other word order, which then becomes vulnerable to change. While other factors (e.g. dialect contact) may reverse such changes, the paper shows that in the examples at hand, the direction of the historical change indeed corresponds to the prediction of this information structure drift.

## 2. Theoretical Background

The theoretical background for this study is an extended version of Lightfoot’s (1999, 2006) cue-based approach to language acquisition and change. According to Lightfoot’s model, children scan the PLD for designated cues, which are abstract pieces of structure in the children’s I-

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<sup>1</sup> See Chomsky (1986) or Lightfoot (2006) for a discussion of the distinction between E-language and I-language, ‘externalized’ vs. ‘internalized’ language.

language. Examples of such cues are provided in (5) and (6) for an OV and a V2 grammar respectively.

(5) Cue for an OV grammar:  $_{VP}[DP V]$

(6) Cue for a V2 grammar:  $_{CP}[XP V]$ .

The cue-based model further argues that cues must be relatively robustly expressed in the PLD for children to acquire them. Structures with a low input frequency, on the other hand, may be ignored by children in the acquisition process and may as a consequence disappear from the I-language grammar of the next generation. This means that word order variation in the input to children must be considered to be part of the E-language only, and frequencies of the “irrelevant” word orders may vary over time.

Recent work on language acquisition (e.g. Westergaard 2006, 2007) has shown that young children easily learn constructions that have a very low frequency in the input, even exceptions to major, general rules. That is, children seem to be sensitive to relatively minor categories that distinguish between different word orders at a very early stage. For example, children acquiring English have no problem with word order variation that is dependent on different classes of verbs (auxiliaries vs. lexical verbs) in the acquisition of verb movement, illustrated in example (7) in section 3 (see e.g. Roeper forthcoming). Nor do children acquiring certain Norwegian dialects experience any problem distinguishing subcategories of *wh*-elements in the acquisition of word order in *wh*-questions, long *wh*-elements requiring V2, while short ones allow either V2 or non-V2 (see e.g. Westergaard 2007). In response to these findings, Westergaard (submitted/a) has developed a model of ‘micro-cues’ in acquisition, which argues that the cues that children search for are much smaller entities than was previously assumed. That is, children do not only pay attention to major categories such as Noun and Verb, but easily distinguish between linguistically relevant classes of categories, such as auxiliaries vs. lexical verbs, long vs. short *wh*-words (representing strong and clitic-like elements respectively, see Cardinaletti and Starke 1999), or different clause types (see Westergaard 2006). In this model of micro-cues, therefore, word order variation that is dependent on such linguistically relevant subcategories is considered to be part of the I-language. Nevertheless, micro-cues that are extremely infrequent in typical child-directed speech may be vulnerable to change.

This model of language acquisition has consequences for how one views language change. It is no longer necessary to argue that gradualism in historical data is simply an E-language phenomenon (as in e.g. Light-

foot 2006) and that real language change constitutes ‘catastrophes’, i.e. I-language differences between two generations of speakers. In this extended version of the cue-based model, gradualism can be seen as the result of ‘many small catastrophes’, reflecting the loss of several I-language micro-cues in succession.

In the next section we consider some word order variation in present-day languages and argue that information structure plays a certain role in the choice of one over the other. Section 4 provides similar data from historical languages.

### 3. Word Order Variation and Information Structure

Although it has been common within generative syntactic theory to assume that grammars may only consist of major, global parameters to be learnable grammars, it is not difficult to find languages which allow a considerable amount of word order variation. English, for example, has V-to-I movement only for a certain class of verbs (auxiliaries *have/be* plus main verb *be*), which may thus (like modals) appear in front of an adverbial such as *never*, as illustrated in (7a, b). English also displays a kind of V2 word order (subject-auxiliary inversion) in questions, but not in declaratives, as shown in (8a, b). That is, there are minor syntactic restrictions on these word order parameters, distinguishing between e.g. verb classes, clause types or other linguistic sub-categories.

- (7) a. Peter **has never** tried this wine. /Peter **is never** late.  
 b. Peter **never drinks** this wine. /\*Peter **drinks never** this wine.
- (8) a. When **will Peter** drink this wine?  
 b. On weekends **Peter will** drink this wine. /\*On weekends **will Peter** drink this wine.

Furthermore, two word orders are also possible in constructions such as particle shift or sentences with double objects, as we see in (9) and (10).

- (9) She looked **up the word**. /She looked **the word/it up**.
- (10) I gave **Peter a glass of wine**. /I gave **a glass of wine to Peter**.

In such mixed grammars, patterns of information structure tend to govern the choice of the two word orders, according to Bresnan and Nikitina (2003) and Bresnan et al (2007). They show that in double object

constructions, the order IO-DO (DP-DP) is preferred when the indirect object is short and informationally given (often a pronoun) and the direct object is correspondingly long and informationally new, as in (11), while the other word order (DP-PP) is chosen when the informational status of the two objects is the other way around, shown in example (12). In fact, 94% of all datives in a corpus investigated by Bresnan et al (2007) are predicted by a variety of pragmatic factors: discourse accessibility, length, definiteness, animacy, etc.

- (11) He gave **DP[her]** **DP[the wine he had bought yesterday]**.  
 (12) He gave **DP[the wine]** **PP[to all the students present]**.

Furthermore, they claim that semantic constraints cannot account for the word order preferences displayed by speakers. A common explanation for the DP-PP construction is that it must express some directionality, which should account for the ungrammaticality of the second sentence in (13). However, by providing an authentic example such as (14), Bresnan and Nikitina (2003) show that this construction may be perfectly grammatical given the right pragmatic context.

- (13) The movie gave **DP[me]** **DP[the creeps]**. /\*The movie gave **the creeps to me**.  
 (14) Stories like these must give **DP [the creeps]** **PP[to people whose idea of heaven is a world without religion...]**

Word order variation is also found in other present-day languages, e.g. Norwegian, where many dialects have optional V2 in *wh*-questions, discussed in e.g. Westergaard (2003, 2005b) and argued to be a stage in a diachronic development towards non-V2 (see also Vangsnes 2005). Thus, in sentences such as (15), both V2 and non-V2 are possible, and when the sentences are uttered in isolation, speakers are generally unable to identify any difference in meaning between the two.

- (15) Kor **bor du?** /Kor **du bor?**  
*where live you/ where you live*  
 'Where do you live?'

In Westergaard (2003), a sample of spontaneous adult speech of the dialect was investigated, and it was shown that the choice of the two word orders was not random. V2 was typically chosen when the subject was a full DP and the verb *be*, while non-V2 was preferred with pronominal

subjects and any other verb than *be*, as illustrated by the two sentences in (16). The analysis of this was that V2 was used with informationally new or focused subjects and non-V2 with discourse given subjects. Thus, one could say that there are two subject positions in *wh*-questions in Norwegian dialects, one below and one above the finite verb.<sup>2</sup>

- (16) Kor **er restauranten**? /Ka **vi skal** spise?  
*where is restaurant.DEF / what we shall eat*  
 ‘Where is the restaurant? /What are we going to eat?’

The two subject positions are also visible in other constructions in the language where there is variable word order. In V2 constructions with negation, i.e. main clause questions and non-subject-initial declaratives, the subject may appear either above or below negation, as illustrated in (17) and (18).

- (17) Kan **ikke Peter** gjøre dette? /Kan **Peter ikke** gjøre dette?  
*can not Peter do this*  
 ‘Can’t Peter do this?’
- (18) Dette kan **ikke Peter** gjøre. /Dette kan **Peter ikke** gjøre.  
*this can not Peter do*  
 ‘This Peter can’t do.’

In Westergaard & Vangsnes (2005), it was argued that informationally given subjects precede, while informationally new or focused subjects follow negation and sentence adverbs within the IP domain. This is supported by the fact that pronominal subjects, which are in a sense inherently given information, tend to appear in the higher position, as shown in (19). In fact, a pronoun is ungrammatical in the low position unless it is stressed, as illustrated in (20). This pattern has been referred to a ‘subject shift’ (Westergaard forthcoming).

- (19) Dette kan **du ikke** gjøre.  
*this can you not do*  
 ‘This you can’t do.’
- (20) \*?Dette kan **ikke du** gjøre. /Dette kan **ikke DU** gjøre.  
*this can not you do*  
 ‘This you can’t do.’ /This YOU can’t do.’

<sup>2</sup> For a syntactic analysis of these constructions, see e.g. Westergaard (2005b).

Finally, two subject positions are also found in embedded clauses, again before and after certain sentence adverbs or negation, as in (21) and (22). According to Nilsen (2003), the two positions are distinguished by information structure, the higher one being used for given information and the lower one for new or focused information. Therefore, weak pronouns are virtually impossible in the low position. However, to me (as a native speaker of the language) the low position seems generally odd, and this is corroborated by findings reported in Garbacz (2004). He has studied the word order of embedded clauses in two Norwegian corpora, the Big Brother (spoken) corpus and the Oslo corpus of written Norwegian, and he finds that the word order Neg-S is extremely rare, as low as 7.3% (14/191) of all *that*-clauses in the spoken corpus and as little as 2.0% (239/12,049) in the written corpus.<sup>3</sup>

(21) Vi vet at **studentene ikke** ville drikke denne vinen.  
*we know that student.DEF/PL not would drink this wine*  
 ‘We know that the students wouldn’t drink this wine.’

(22) Vi vet at **ikke studentene** ville drikke denne vinen.  
*we know that not student.DEF/PL would drink this wine*  
 ‘We know that the students wouldn’t drink this wine.’

We then move to a construction where two object positions are visible, so-called object shift in the Scandinavian languages. In sentences containing a single transitive verb (no auxiliary) and negation, pronominal objects must ‘shift’ and appear preceding negation, while full DPs and strong (stressed) pronouns follow. This is illustrated in examples (23) and (24).

(23) Peter så **ikke boka**.  
*Peter saw not book.DEF*  
 ‘Peter didn’t see the book.’

(24) Peter så **den ikke**. /Peter så **ikke DEN**.  
*Peter saw it not /Peter saw not that*  
 ‘Peter didn’t see it. /Peter didn’t see that.’

Finally in this section, I would like to point out an example of word order variation in present-day Russian, a language with much freer word

<sup>3</sup> The figures from the written corpus have been arrived at by adding up the numbers presented in Garbacz’s Tables 2, 3 and 4 (representing press, prose and fictional texts respectively).

order than both English and the Scandinavian languages. Russian allows both OV and VO, as shown in (25) and (26), a variation that was found historically in many languages, e.g. Old/Middle English (see e.g. Pintzuk 2005), Middle High German (e.g. Hinterhölzl 2004) and Middle Norwegian (Sundquist 2002). In Russian the variation is dependent on discourse factors, pronominal objects virtually always appearing in OV constructions (see e.g. Diakonova 2003).

(25) Ivan **potseloval tsarevnu**.

*Ivan kissed princess.ACC*

‘Ivan kissed the princess.’

(26) Ivan **tsarevnu potseloval**.

*Ivan princess.ACC kissed*

‘It was the princess that Ivan kissed.’ (from Diakonova, 2003: 11)

In this section we have seen that word order variation is relatively common in present-day systems, which display several constructions that reveal the existence of two subject or object position. The choice of the two word orders seems to be at least partly dependent on information structure, in such a way that discourse given elements, typically pronouns, appear higher in the structure than informationally new or focused elements. This corresponds to the well-known pragmatic principles of end focus and end weight (see e.g. Firbas 1992). Word order variation such as this seems to be even more frequent in historical languages, some examples of which are considered in the next section.

#### 4. Diachronic Word Order Variation

Several scholars have argued that word order variation typically seen in historical data may be dependent on information structure. One example of this is Hróarsdóttir (2004) on the choice of VO vs. OV in Icelandic, a variation which lasted up to the beginning of the 19th century. She shows that in Old Icelandic, the order OV was chosen if the object was given information (often a pronoun), while VO was used if the object was heavy and/or conveyed new information (often a full DP). Examples are provided in (27)-(28).

(27) að hann hafi **hana drepið**

*that he had her killed*

‘that he had killed her’

(Old Icelandic)

(from Hróarsdóttir 2004: 141)

- (28) hvört hann vilji ei **kaupa þræla**  
*whether he wanted not buy slaves*  
 ‘whether he didn’t want to buy slaves’  
 (from Hróarsdóttir 2004: 145)

Mixed VO/OV also existed for an extended period of time in the history of English, as described in numerous publications (e.g. Pintzuk 1991, 2005, Roberts 1997, etc.). Various syntactic factors have been argued to play a role in the choice of word order at the different stages of Old and Middle English (OE/ME), e.g. whether the object was negated or contained some kind of quantification. The development from OV to VO has often been argued to be due to the loss of inflectional case morphology (e.g. Roberts 1997). Nevertheless, throughout the period when the mixed grammar existed, there were certain preferences that must also have been subject to information structure: Pronominal objects virtually always appeared in OV constructions, while heavy DPs were strongly preferred in VO structures. This is illustrated in examples (29)-(30):

- (29) We ne magan **eow neadian** (OE)  
*we NEG can you constrain*  
 ‘We cannot constrain you. . .’ (from Pintzuk, 2005: 129)
- (30) Se wolde **gelytlian þone lyfigendan hælend**  
*he would diminish the living saviour*  
 ‘He would diminish the living saviour . . .’  
 (from Pintzuk 2005: 117)

A similar situation existed in Middle Norwegian, according to Sundquist (2002). That is, the word orders OV and VO were both possible, and the choice depended to a large extent on the type of object, generally pronominal vs. full DP, but also subcategories of pronouns (personal, reflexive etc.) and DPs (definite/indefinite, quantified etc.). During an extended period of the variation, pronouns were clearly preferred in preverbal position, while DPs were much more common in postverbal position. A couple of examples are provided in (31) and (32):

- (31) ok þui ualðe sem han heuir **oss fengit** (MNw)  
*and this power which he has us given*  
 ‘...and with this power which he has given us.’

- (32) at hann hafðe **suaret þænna sama vithnisburð** aðr  
*that he had sworn that same testimony before*  
 ‘that he had sworn that same testimony before’  
 (from Sundquist 2002: 101-2)

Returning to the history of English, we will consider some constructions where the subject may appear in two different positions. It is well known that there is variation between V2 and non-V2 word orders in declaratives throughout the OE and ME periods. It has also been recognized by many scholars that V2 was preferred with DP subjects, while non-V2 mainly appeared with pronouns (e.g. van Kemenade 1987, Pintzuk 1991, Kroch & Taylor 1997). This is illustrated in (33) and (34).

- (33) Him **geaf** þa **se cync** twa hund gildenra pænenga. (OE)  
*him gave then the king two hundred golden pennies*  
 ‘Then, the king gave him two hundred pence in gold.’
- (34) Hiora untrymnesse **he sceal** ðrowian on his heortan.  
*their weakness he shall atone in his heart*  
 ‘He shall atone in his heart for their weakness.’  
 (from Haeberli 2002: 88-90)

A common analysis of this pattern argues that pronominal subjects are clitics attached to a position in front of the moved verb, so that even examples such as (33) are considered to display V2 word order (i.e. the verb in the C position). However, both Bech (2001) and Westergaard (2005a) argue that the choice of V2 vs. non-V2 in OE/ME was dependent on information structure: The word order XSV (non-V2) was preferred if the subject was informationally given (often a pronoun) and XVS (V2) if the subject was focused or new information (often a full DP). Note that this is very similar to the subject preferences with the two word orders in *wh*-questions in present-day Norwegian dialects, as discussed in section 3 (cf. example (16)).

Finally, we will consider a further example from the history of English, the two subject positions found in embedded clauses, discussed in van Kemenade & Los (2006). In OE, the subject may appear either above and below certain adverbs, most notably *þa/þonne* ‘then’, which van Kemenade & Los consider to be focus particles. As in the present-day examples from Norwegian discussed in section 3 (cf. (21) and (22)), the higher subject position is preferred when the subject is informationally given (often a pronoun), as illustrated in (35), which incidentally also contains a pronominal object preceding *þa/þonne*. The lower subject position is typi-

cally chosen when the subject is discourse new or focused (normally a full DP), as illustrated in (36).

- (35) He ne mihte swaþeah æfre libban, þeah ðe **he hine þa** ut alyside  
*he not-could nevertheless ever live though that they him then released*  
 'Nevertheless, he could not live forever, though they then released him'
- (36) Gif him **þonne God** ryhtlice & stræclice deman wile.  
*if him then God justly and strictly judge will*  
 'if God will then justly and strictly judge him'  
 (from van Kemenade & Los 2006: )

The development of these historical mixed grammars is well known in most cases. Both English, Icelandic and Norwegian generally lose OV word order and develop into relatively strict VO languages. This means that it is the low object position that survives in all these cases, the one that is closely linked to heavy or new/focused elements. With respect to mixed V2/non-V2 in the history of English, V2 word order was generally lost in declaratives during the ME period, which means that it is the higher subject position which survives. This is also the case in present-day Norwegian dialects, according to the analysis of the variation found in the synchronic data (see e.g. Westergaard 2005b, submitted/a). Finally, in embedded clauses, van Kemenade and Los (2006) show that, to the extent that the context for the two subject position exists in ME (the frequency of *þa/þonne* drops considerably from OE), it is the higher one that is preferred, for both pronouns and full DPs. This means that the subject position that survives in all these cases is the one that is preferred for informationally given subjects in the mixed grammar.

To sum up, we have discussed three cases where the low object position survives (loss of OV in English, Norwegian and Icelandic), and three cases where the high subject position survives (loss of V2 in declaratives in the history of English and in *wh*-questions in present-day Norwegian dialects as well as the low subject position in embedded clauses from OE to ME). It may of course be the case that these developments are simply coincidental, since examples of the opposite change also exist in historical data, e.g. the development from a mixed VO/OV system into a pure OV grammar in the history of German (see e.g. Hinterhölzl 2004, forthcoming). It may also be the case that these developments are due to different external effects, as explored in e.g. Hróarsdóttir (2004) and Sundquist (2002).

However, the changes discussed in this section take place at different times and seem to be unrelated developments. Thus, an obvious question

to ask is whether these developments could be due to particular word order preferences in children’s acquisition process. In the next section we therefore explore some child language data from present-day grammars which display similar word order variation, more specifically on the acquisition of the present-day word order variation discussed in section 3.

## 5. Child Language Data

The acquisition data discussed in this section are mainly from Norwegian, more specifically from a corpus of child language collected in Tromsø.<sup>4</sup> The corpus contains spontaneous data from three children between the ages of approximately 1;9 to 3, as shown in Table 1.

Table 1: Norwegian corpus of child language, Tromsø dialect.

Name of Child	Age	Files	Child Utterances
Ina	1;8.20-3;3.18	Ina.01-27	20,071
Ann	1;8.20-3;0.1	Ann.01-21	13,129
Ole	1;9.10-2;11.23	Ole.01-22	13,485
Total			46,685

Recall from section 3 that the dialect allows both V2 and non-V2 in *wh*-questions, with clear preference patterns for subject and verb types with the two word orders in the adult grammar, argued to reflect patterns of information structure. An investigation of the child data reveals that the children produce both word orders from early on, with the same preferences for subject and verb types as in the adult data, V2 with *be* and full DP subjects and non-V2 with pronominal subjects and all other verbs than *be*. Examples from the children’s production are provided in (37) and (38). Thus, it is argued in Westergaard (2003) that the children have an early sensitivity to information structure and distinguish between informationally given and new subjects in the two types of *wh*-questions from early on. Given very different frequencies of the two word orders produced by individual speakers in the adult data (Westergaard submitted/a), there is no adult standard to compare the children’s data to, and it is therefore impossible to state whether the children display a delay with respect to the production of one of the two word orders.

<sup>4</sup> Apart from 10 files that have been collected and transcribed by the author, the corpus has been collected by Merete Anderssen.

- (37) kor **er Ann sin dukke** hen? (Ann, age 1;11.0)  
*where is Ann POSS doll LOC*  
 ‘Where is Ann’s doll?’
- (38) ka **du skal** finne? (Ina, age 2;0.5)  
*what you shall find*  
 ‘What do you want to find?’

Even in the children’s early production of non-subject-initial declaratives, subject and verb combinations such as the ones illustrated for *wh*-questions in (37) and (38) seem to be preferred, even though there is no input for a distinction between given and new subjects in this construction, the adult language requiring V2 only. The children’s early non-subject-initial declaratives occur predominantly with *be* and full DP subjects, as in (39), while their occasional non-target-consistent (non-V2) constructions appear with other verbs than *be* and pronominal subjects or the child’s own name, as illustrated in (40) (see Westergaard 2004). Thus, the patterns found in declaratives in early child language turn out to be very similar to what is found in the historical English data (cf. examples (33) and (34) above).

- (39) her **er sekken.** (Ann, age 1;10.2)  
*here be.PRES backpack.DEF*  
 ‘Here is the backpack.’
- (40) der **Ann har** et. (Ann, age 2;1.28)  
*there Ann have.PRES one*  
 ‘There Ann has one.’  
 Target form: Der har Ann et.

We now move on to a construction where a certain delay is attested, viz. so-called subject shift. This was illustrated in examples (19) and (20) in section 3, and involves movement of a pronominal (or informationally light DP) subject to a position above negation in questions and non-subject-initial declaratives. In Westergaard (forthcoming) it is shown that all three children in the corpus at an early stage produce a predominance of examples such as (41), where the subject has failed to undergo movement. Between the ages of 2;6 and 3, this construction seems to fall into place and the children generally produce target-consistent word order, as illustrated in (42).

- (41) har            **ikkje han** fota her? (Ina, age 2;5.25)  
*have.PRES not he feet here*  
 ‘Doesn’t he have feet here?’  
 Target form: Har han ikkje fota her?
- (42) nei, nå må **han ikke** røre. (Ina, age 2;9.18)  
*no now must he not touch*  
 ‘No, now he must’t touch (it).’

Likewise, the children show an early preference for the low subject position also in embedded clauses, as illustrated in (43), cf. examples (21) and (22) in section 3. Recall that although this position is grammatical in the adult grammar, it is extremely dispreferred, appearing only 7.3% in a corpus of spoken Norwegian. Given that embedded clauses are generally late acquisitions and thus very infrequent in early child language, the present corpus, which contains data only until about the age of three, cannot say anything about when this word order becomes target-like.<sup>5</sup>

- (43) ...ho si at **ikkje det er** min kjæreste. (Ina, age 3;3.18)  
*...she says that not it is my sweetheart*  
 ‘She says that it isn’t my sweetheart.’  
 Target form: Ho sir at det ikkje er min kjæreste.

We then move on to constructions that provide evidence of two object positions, first and foremost object shift in Norwegian, where a pronominal object moves to a position above negation, cf. examples (23) and (24) in section 3. Again, a certain delay is attested, children displaying a preference for the low position at an early stage, as illustrated in (44). Occasional target-consistent forms are produced, see (45), but the construction is in general extremely infrequent both in child-directed speech and in the child data. At the end of data collection (age 3), the proportion of non-target forms is still higher than the target-consistent production, indicating that the object shift construction is more delayed than subject shift. It should be noted that a similar delay is attested in other languages, e.g. for object shift in Swedish (Josefsson 1996), and for object scrambling in Dutch and German (Schaeffer 2000, Barbier 2000).

<sup>5</sup> See also Westergaard & Bentzen (forthcoming) for a discussion of children’s word order in embedded clauses.

- (44) eg finn <**ikkje han**> [>] . (Ina, age 2;5.25)  
*I find not him*  
 ‘I can’t find him.’  
 Target form: Eg finn han ikkje.
- (45) ho har **den ikkje** på sæ . (Ina, age 2;11.26)  
*she has it not on REFL*  
 ‘She doesn’t have it on.’

Finally, it should be noted that in Russian, where both VO and OV word orders are permitted by the adult grammar, cf. examples (25) and (26) in section 3, Diakonova (2003), who studied the word order produced by one Russian child Varvara from the CHILDES database (MacWhinney 2000), finds that both word orders are produced from early on. However, there are occasional examples of VO with pronominal objects at an early stage, again indicating a certain delay of movement and an early preference for the low position.<sup>6</sup>

To sum up this section, it has been shown that children have an early sensitivity to patterns of information structure, producing both word orders in a more or less target-consistent way in Norwegian *wh*-questions (V2 vs. non-V2). The findings from Russian child data (VO vs. OV) provide further evidence for this. To the extent that children produce non-target-consistent word order at all, they have an early preference for the lower position of two available ones, be it a subject or an object position. This has been argued in Westergaard (forthcoming) to be due to a general principle of economy of movement in the acquisition process, and not a problem with information structure.

In the historical data discussed in section 4, the mixed grammars developed into systems where the high subject position and the low object position survived. This means that the preference in early child language for the low object position could be a factor for the diachronic development from OV to VO word order. This is especially the case since the delay with respect to object positions seems to be more persistent than the delay in subject positions (object shift vs. subject shift in the Norwegian data). However, the children also have an early preference for the low subject positions, which means that this acquisitional preference would have nothing to say about the historical development of subjects, where it is typically the high position that survives.

A natural next step is therefore to consider children’s E-language input and investigate whether typical frequencies of the two word orders in

<sup>6</sup> Unfortunately, Diakonova does not provide any examples from the child data of this delay.

the primary linguistic data that children are exposed to could shed some light on the historical development. This is the topic of the next section.

## 6. Frequencies in Child-directed Speech

Recall from section 2 that the theoretical background for this study is an approach to language acquisition and change which is based on the existence of micro-cues in children's I-language, expressed by certain clause types in the input. That is, children easily acquire mixed systems and even exceptions to general rules, if the variation is based on natural classes of linguistic (sub-)categories or if exceptions are relatively frequent in the input (see Westergaard 2007). In the previous section, we have also seen that children relatively easily learn mixed grammars where the variation is dependent on information structure. Nevertheless, even in this model, a very low input frequency of a construction which expresses a particular micro-cue will make it vulnerable to change over time, and the micro-cue may eventually be lost from the language.

It is therefore important to investigate relative frequencies of the two word orders in typical input to children in the acquisition process. Recall that the high position, be it a subject or an object position, tends to be used for discourse given elements, typically pronouns. As mentioned above, this is in line with well-known pragmatic principles such as end focus and end weight. It is also commonly assumed that in language use, subjects tend to be given information, while objects more often express new information. If this is the case, then the higher subject position should be more common than the lower subject position in general language use, and consequently also in the PLD that children are exposed to. Conversely, for the two object positions it is the lower position that should be the more frequent one.

In this section I have therefore investigated some spontaneous speech in a corpus of adult conversations, and also some samples of child-directed speech in both Norwegian and English. As the informational status of an element is often unclear (and very time-consuming to investigate by hand), I have divided subject and object types into general categories, i.e. whether they are realized as pronouns, full DPs or elements such as *it/there/that*. Pronouns are then considered to be typical cases of given information. They are then compared to the number of clauses full DPs, which more often convey new information (although DPs may obviously also be given). Table 2 displays the results of such counts done on a sample from a corpus of spoken Norwegian (the NoTa corpus - Oslo

dialect), more specifically a conversation between two middle-aged adults (age 39 and 52).

Table 2: The realization of subjects and objects in a sample of Norwegian conversational speech (speakers 119 and 120 in the NoTa corpus).

	Pronouns (pers/refl)	<i>det</i> (‘it/that’)	DPs/clauses	Misc/Other	Total
Sub- jects	340/0 (57.8%)	204 (34.7%)	35/0 (6.0%)	9 (1.5%)	588 (100%)
Ob- jects	11/22 (15.4%)	37 (17.3%)	104/38 (66.4%)	2 (0.9%)	214 (100%)

In Table 2, the element *det* ‘it/that’ has been counted separately, as it is not always clear in the transcriptions whether it is an expletive or referential pronoun (in which case it would tend to pattern with discourse given elements) or the demonstrative (in which case it would often pattern with new or focused elements). Disregarding this element, we see that subjects are realized by pronouns as much as ten times more often than as full DPs or clauses (340 vs. 35). Objects, on the other hand, are realized by DPs/clauses 4-5 times more often than as pronouns (142 vs. 33). As a subject, the element *det* tends to be an expletive or a referential pronoun, while as an object it tends to be a demonstrative. Thus, including *det* would give an even more uneven distribution of informationally given and new elements in the two positions. In any case, it seems certain that in conversational Norwegian, subjects are realized very differently from objects, displaying a clear preference for pronouns, which reflects the status of this function as a position for informationally given elements. Objects, on the other hand, are normally realized by full DPs or clauses, indicating that this position normally expresses new or focused information.

But conversations between adults may be very different from child-directed speech. So in order to say something about typical input to children in the acquisition process, one also needs to consider samples of adult data spoken to children. Table 3 provides an overview of the realization of subjects and objects in a sample of child-directed speech from the Norwegian acquisition corpus (the production of the investigator in file Ole.15, age of child 2;7.20). This sample has been hand-counted in the same way as the sample from the adult-adult conversation.

Table 3: Overview of the realization of subjects and objects in a sample of Norwegian child-directed speech (Investigator in Ole.15).

	Pronouns (pers/refl)	<i>det</i> (‘it/that’)	DPs/clauses	Misc/Other	Total
Sub- jects	272/0 (67.5%)	99 (24.6%)	29/0 (7.2%)	3 (0.7%)	403 (100%)
Ob- jects	26/3 (16.4%)	40 (22.6%)	74/32 (59.9%)	2 (1.1%)	177 (100%)

In Table 3 we see that the patterns for the sample of child-directed speech is very similar to those found in the conversation between adults. Disregarding the element *det* ‘it/that’, subjects are again realized by pronouns about ten times more often than as full DPs (272 vs. 29), while objects are realized by DPs/clauses 3-4 times more often than as pronouns (106 vs. 29). This indicates that it is in fact the case that subjects tend to be given information (often pronouns), while objects tend to be new (often full DPs), also in the input that children are typically exposed to in the acquisition process.

But could this be the case only in Norwegian, or is there also a tendency for this in other languages? To investigate this question, two samples of English child-directed speech were hand-counted in the same way as the Norwegian data. Tables 4 and 5 provide an overview of the production of two adults in the Brown corpus from the CHILDES database (MacWhinney 2000), the mother in file Adam.10 (age of child 2;7.14) and the mother in file Eve.15 (age of child 2;1). For the English data the elements *it* and *there* have been counted together, as they normally pattern with informationally light elements, while *that* has been counted as a separate category.<sup>7</sup>

<sup>7</sup> As was the case with the element *det* ‘it/that’ in Norwegian, the informational status of *that* seems to be different in subject and object position. As an object, *that* often seems to be conveying some kind of focused information, as in e.g. *you don’t use that either*. When *that* is used as a subject, on the other hand, there is normally another element in the sentence that conveys new information, as in e.g. *that’s not shampoo, that’s dressing*. For this reason, *that* has been disregarded in the calculations.

Table 4: Overview of the realization of subjects and objects in a sample of English child-directed speech (Mother in file Adam.10).

	Pronouns (pers/refl)	<i>it/there</i>	<i>that</i>	DPs/ clauses	Misc/ Other	Total
Sub- jects	193/0 (65.4%)	16/2 (6.1%)	46 (15.6%)	35 (11.9%)	3 (1.0%)	295 (100%)
Ob- jects	7/1 (6.2%)	14/0 (10.8%)	10 (7.7%)	96 (73.8%)	2 (1.5%)	130 (100%)

Table 5: Overview of the realization of subjects and objects in a sample of English child-directed speech (Mother in file Eve.15).

	Pronouns (pers/refl)	<i>it/there</i>	<i>that</i>	DPs/ clauses	Misc/ Other	Total
Sub- jects	397 (68.4%)	66/10 (13.1%)	55 (9.5%)	44 (7.6%)	8 (1.4%)	580 (100%)
Ob- jects	44/0 (16.6%)	63 (23.8%)	7 (2.6%)	134 (50.6%)	17 (6.4%)	265 (100%)

Counting all pronouns and the elements *it/there* together, and disregarding *that*, we see from Table 4 that subjects are realized by pronouns or *it/there* about six times more often than as full DPs (193+18=211 vs. 35). In the sample displayed in Table 5 the differences are even more striking, as subjects are realized by pronouns almost 11 times as often as full DPs (397+76=473 vs. 44). Objects, on the other hand, are realized by DPs/clauses four times more often than as pronouns (96 vs. 22) in Table 4, while in Table 5 the difference is not quite so great, only about 20% more (44+63=107/134). Including the element *that* in the count would presumably give even clearer results of the difference between the informational status of subjects and objects (see previous footnote). Thus, the patterns found for Norwegian can also be said to hold for English child-directed speech: There is a clear preference for putting discourse given information in subject position and discourse new or focused information in object position. In fact, this is not simply a tendency, but a very robust pattern in both languages.

For mixed word orders where the choice is to some extent dependent on information structure, as in the present-day systems discussed in section 3 and the historical data in section 4, this means that word orders that are linked to informationally given (typically pronominal) subjects should be naturally frequent in the E-language. Word orders linked to new or focused (full DP) subjects should be correspondingly infrequent. For

mixed grammars involving two object positions, the situation should be the other way around: The word order preferred with discourse given objects should be infrequent in the natural spoken language, while the word order typically chosen for informationally new objects should be considerably more frequent. In the next section we consider how such a situation over time may affect the PLD that children are exposed to.

## 7. Information Structure Drift

We saw in section 5 that children easily learn different word orders that are dependent on information structure, e.g. V2 vs. non-V2 in Norwegian or VO vs. OV in Russian. This has also been attested in several other recent studies for other languages, e.g. de Cat (2003) for the topichood of subjects in French, and Gordishevsky & Avrutin (2003) for the acquisition of null subjects in Russian. This means that the mixed word order systems discussed for present-day and historical data in sections 3 and 4 should be easily learnable, and from an acquisition perspective such grammars should also be relatively stable diachronically.

The theoretical model of cue-based acquisition and change sketched in section 2 assumes that different word orders are distinguished by various syntactic ‘micro-cues’ (Westergaard submitted/a, Lightfoot & Westergaard submitted). These micro-cues may specify the clause type that the cue is relevant in (e.g. V2 in questions in English but not in declaratives), minor classes or categories that it may apply to (e.g. verb movement applying to auxiliaries in English but not lexical verbs), or patterns of information structure that are relevant (as in many of the examples discussed in section 3). Many of the historical examples in section 4 are also distinguished by such syntactic micro-cues at the different stages, e.g. certain initial elements such as *þa/þonne* ‘then’ requiring V2 in declaratives in OE, but not in late ME (see Westergaard submitted/b), or negated or quantificational objects requiring OV word order at a certain stage when other object types mainly appeared with VO.

As mentioned in section 2, under this view of language acquisition, gradualism in historical data is considered to be the result of ‘many small catastrophes’, reflecting the loss of one micro-cue at a time. And even though children are sensitive to very minor distinctions in language, a low frequency of the triggers for a particular cue in the PLD, and a correspondingly high frequency of a conflicting trigger, will make a micro-cue vulnerable to change. That is, structures with an extremely low input fre-

quency may be ignored by children in the acquisition process and disappear from the I-language grammar of the next generation.

In connection with this, the patterns of information structure in typical conversational language or child-directed speech are important. As we saw in the previous section, the predominance of informationally given subjects and informationally new objects should be robust in children's input. And with respect to constructions that allow mixed word orders dependent on the information value of these elements, the word orders linked to given subjects and new objects should be considerably more frequent than the other possible word orders.

In this scenario, a crucial factor is that input varies. Some children get a lot of input, some children less. Children also typically get input from many different speakers, both adults and other children. And the already low frequency of a construction in the spoken language generally may cause the cue to fall below the threshold for acquisition for *some* children, who will then develop a grammar with only one subject or object position. Since children also often provide input for each other, even short stages of a non-target system in some children may have a more long-term effect for other children.

Different stages of grammars that are distinguished by information structure have been identified in synchronic Norwegian data, where different frequencies of the variable word order in *wh*-questions have been identified as three distinct grammars; one truly mixed V2/non-V2 grammar (where the two word orders are clearly distinguished by information structure), a default V2 grammar (where V2 appears with all subject types and non-V2 is reserved for special cases) and a default non-V2 grammar (where it is V2 that only survives in special cases). That is, even though the three grammars are distinguished by further syntactic micro-cues (e.g. types of *wh*-elements or different classes of verbs affected by verb movement), the different patterns of information structure play an important role (Westergaard submitted/a). It should also be noted that the patterns of information structure are operative in relation to individual micro-cues, so that it is possible for a speaker to have e.g. a default V2 grammar in some clause types and a default non-V2 grammar in others (see Westergaard 2005b). In the history of English, different stages of similar V2/non-V2 grammars have been identified as separate systems distinguished by information structure (Westergaard 2005a, submitted/b).

The effect of information structure over time is here called Information Structure Drift. However, let me add that this is not considered to be an inevitable development once it has been initiated, as in a common definition of 'drift' in studies of historical language development. In the present model, where language acquisition and language change are closely

interrelated, such drift, which often spans several hundred years, is impossible, simply because children are only exposed to one stage of the development and obviously have no information about previous stages. Given the idea of micro-cues instead of major parameters, all stages of a development from e.g. a V2 to a non-V2 grammar or an OV to a VO grammar are learnable and thus in principle stable. This also means that a certain development may be reversed, if external factors and/or internal language development cause the PLD to change in a certain way. Such a reversal may be taking place in some present-day Norwegian dialects, where pressure from the standard language seems to cause a return from non-V2 to V2 (Westergaard 2005b). As mentioned in section 4, in historical data, there are obviously also cases of mixed word order systems that develop in the opposite direction of what has been shown for the examples discussed in this paper, e.g. mixed OV/VO in Middle High German developing into a more or less fixed OV grammar in Modern German (Hinterhölzl 2004, forthcoming). In such cases, external factors or the specific development of certain syntactic micro-cues must have had a more powerful effect than Information Structure Drift, which in this paper is argued to be one factor (presumably among many) in diachronic language development.

## 7. Summary/Conclusion

In this paper I have argued that in mixed grammars where the syntax allows two word orders with respect to subject and object positions, the two orders are normally not produced randomly, but are dependent on various syntactic micro-cues. Furthermore, patterns of information structure typically distinguish between the two, one word order being preferred for informationally given subjects or objects and the other word order for informationally new elements. Examples are provided both from present-day languages and historical data. The diachronic word order changes discussed here all involve survival of (high) subject positions that are reserved for informationally given elements and (low) object positions that are typically used for informationally new objects.

It has also been shown that mixed word order systems are easily learnable by children, indicating an early sensitivity to information structure. Nevertheless, children also display a certain delay in moving light elements (pronouns) to a higher position, and this could possibly be a factor for historical development in the direction of a low object position (OV/VO to VO).

The main argument of the paper is that an explanation of this type of development may be found in the input. It is shown that, in the E-language that children are typically exposed to, subjects are predominantly given information (often pronouns) and objects new (often full DPs or clauses). This is a very robust pattern both in English and in Norwegian and will over time cause a higher frequency of certain word orders in the PLD, viz. those word orders that are linked to informationally given subjects and word orders that are linked to informationally new or focused objects (Information Structure Drift). This statistical shift of word order frequencies in the input may eventually cause some children to develop a default grammar with only one subject or object position.

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