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Unravelling the complexity of Direct Object Scrambling

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ABSTRACT

This study investigates the complexity of Direct Object Scrambling (DOS) by testing this phenomenon experimentally in three Dutch-speaking groups of children between the ages of 6 and 14: SLI, HFA, and TD (Specific Language Impairment, High Functioning Autism, and Typically Developing). First, the results show that, despite the failure to scramble in both pathological groups, the children with HFA do not display any morpho-syntactic deficits, whereas the children with SLI do. This suggests that the children with SLI and the children with HFA fail to scramble for different reasons. It is argued that children with SLI do this because of a problem with syntactic object placement, whereas children with HFA leave referential direct objects unscrambled because they fail to consistently integrate the different components of DOS. These results from two different pathological groups uncover different components in the complex phenomenon of DOS, at the interface of grammar (including (morpho-)syntax and semantics) and pragmatics: syntactic object placement, definiteness/referentiality, speaker/hearer beliefs, and information structure. Earlier work on DOS in younger, TD Dutch-acquiring children identifies another component of DOS, namely the pragmatic knowledge that speaker and hearer are always independent (Concept of Non-Shared Assumptions, Schaeffer, 2000). As such, the current study demonstrates the important contribution of acquisition research in TD as well as pathological populations to the unravelling and understanding of complex linguistic phenomena.

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1. Introduction

This study investigates the complexity of Direct Object Scrambling (DOS) in Dutch from the perspective of impaired language acquisition. DOS concerns the placement of a direct object before or after an adverb or negation, as exemplified in (1)–(4):

(1)	Jan heeft het boek goed/niet gelezen	- <i>scrambled</i>
	John has the book well/not read	
	‘John read the book well.’ / ‘John didn’t read the book.’	
(2)	??Jan heeft goed/niet het boek gelezen (sentential negation)	- <i>non-scrambled</i>
	John has well/not the book read	

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- (3) Jan heeft **een boek** goed/niet gelezen (referential) - *scrambled*
 John has a book well/not read
 ‘John read a (certain)/one book well.’ / ‘John didn’t read a (certain)/one book.’
- (4) Jan heeft goed/niet **een boek/geen boek** gelezen (non-referential) - *non-scrambled*
 John has well/not a book / no book read
 ‘John read a book (any book) well.’ / ‘John didn’t read a (any) book.’

Referential objects tend to be scrambled, as illustrated in (1)–(3). In contrast, non-referential objects must remain unscrambled, as shown in (4). This will be further elaborated in section 2.

It is argued that children with Specific Language Impairment (SLI) and children with High Functioning Autism (HFA) both have problems with DOS, but for different reasons: children with SLI fail to scramble because of grammatical difficulties; children with HFA fail to scramble because of problems with the integration of information from different levels. This illuminates the complexity of DOS: it is a phenomenon at the interface of grammar and pragmatics, thus requiring knowledge of the relevant pragmatic and grammatical operations, plus the interaction between these different types of knowledge. I therefore propose a definition of complexity in terms of interface: the more interaction between language components the phenomenon involves, the more complex it is.

2. Background

2.1. The phenomenon of Direct Object Scrambling in adult Dutch

The examples in (1)–(3) suggest that it is the referentiality of direct objects that drives scrambling, i.e., the placement in a position preceding negation or an adverb. Before elaborating on the issue of scrambling it is necessary to define referentiality. For Fodor and Sag (1982) the most crucial property of referential nominal expressions is their “uniqueness”: a referential nominal refers to a unique entity in the world, which can be identified by someone. This “someone” is usually, but not necessarily, the speaker. Schaeffer (2000) proposes a definition of referentiality that is close to Fodor and Sag’s description, namely, a nominal expression is referential if it has a “fixed referent”, implying that it is known to the speaker and/or to someone whose propositional attitudes are being reported. This is stated in (5):

- (5) *Referentiality*
 A nominal expression is understood to be referential if it has a “fixed referent” in the
 (model of the) world, meaning that it can be identified by the speaker and/or by one of
 the people whose propositional attitudes are being reported.

Notice that referentiality is a semantic notion, i.e. it refers to the way a nominal expression is interpreted, or understood.

As hinted at in the definition in (5), and further elaborated on in Schaeffer and Matthewson (2005), like definiteness, referentiality is tied to the different states of speaker and hearer beliefs. Beliefs which are shared by all interlocutors in a discourse are said to be in the so-called COMMON GROUND of the discourse (see e.g. Stalnaker, 1974, 1978; Heim, 1982). The use of the definite article *the* requires the existence of a referent that is part of the shared beliefs between speaker and hearer, i.e. the COMMON GROUND. As such, noun phrases that have a referent in the COMMON GROUND are referential. As Schaeffer & Matthewson show, there are various ways for the existence of referents to become part of the COMMON GROUND, two of which are illustrated in (6).¹

- (6) a. This is a story about a girl. **The** girl lived in a big castle.
 b. **The** sun is shining today.

In (6a), the existence of a unique entity corresponding to the definite noun phrase *the girl* is part of the shared beliefs between speaker and hearer, i.e. the COMMON GROUND, because it was established in the previous discourse, namely by the indefinite noun phrase *a girl*. In (6b), the existence of a unique entity corresponding to the definite nominal expression *the sun* is likewise part of the COMMON GROUND, but for a different reason, namely that it is part of the long-term shared beliefs between speaker and hearer. The existence of the sun is always entailed by the COMMON GROUND and it need not be explicitly introduced in prior discourse.

¹ Note that there is another use of the definite article, namely the generic use, as in (i)

(i) The American citizen knows every insurance policy on the market.

As this use is not tested in the current study, it is not discussed here.

Sometimes, the speaker but not the hearer believes in the existence of an entity corresponding to the noun phrase. For example, in (7), the speaker has grounds for an existential assertion about movies, while the hearer does not. The sentence in (7) would be felicitous even if the hearer did not previously believe in the existence of any movies at all.

(7) I saw **a** movie last night.

An indefinite as in (7) is referred to as a ‘referential indefinite’. It is also possible for *neither* the speaker nor the hearer to have grounds for an existential assertion. Examples of this are given in (8).

- (8) a. My mother might build **a** house.
b. I haven’t read **a** book for weeks.

Indefinites such as the ones in (8) are referred to as ‘non-referential indefinites’. As Schaeffer and Matthewson (2005) propose, the three possible belief states can be schematized as in Table 1 (see also Ionin, 2006 for a similar, but four-way distinction). ‘Believed by X’ is shorthand for ‘X has grounds for an existential assertion’.

Table 1
Belief states of interlocutors in a discourse.

				English/Dutch
A	Believed by speaker and hearer	Part of COMMON GROUND	Definite – Referential	<i>the/de</i>
B	Believed by speaker only	Not part of COMMON GROUND	Indefinite – Referential	<i>a/een</i>
C	Believed by neither speaker nor hearer	Not part of COMMON GROUND	Indefinite – Non-referential	<i>a/een</i>

The description of referentiality provided above suggests that it requires both semantic knowledge (uniqueness, existentiality), and pragmatic knowledge (speaker/hearer beliefs). As such, it can be considered a phenomenon at the interface of semantics and pragmatics, and therefore complex.

Now, let’s return to the sentences in (1)–(4) in section 1. These examples suggest that referential direct objects tend to be scrambled, thus suggesting that a position preceding an adverb or negation renders a referential interpretation. However, it is possible to come up with sentences with referential direct objects in which both orders (scrambled and non-scrambled) seem fine. Consider, for example, the sentences in (9B), with a definite, referential object and a sentential adverb, as answers to the question by A (CAPITALS indicate stress):

- (9) A: Wat heeft Jan met **het boek** gedaan?
What has John with the book done
‘What did John do with the book?’
- B: a. Hij heeft waarschijnlijk/vaak **het boek** geLEzen
He has probably/often the book read
‘He probably/often read the book’
- b. Hij heeft **het boek** waarschijnlijk/vaak geLEzen
He has the book probably/often read

Native speakers of Dutch judge both sentences correct (cf. De Hoop, 2003, a.o.),² whereas they usually disfavor the non-scrambled order in (2) above. In Schaeffer (1997, 2000, 2012) I argue that this difference is due to the different types of adverbs being used: *goed* (‘well’) is a so-called low adverb, or VP adverb, while *waarschijnlijk* (‘probably’) or *vaak* (‘often’) is a high, or sentential (IP) adverb (see also Cinque, 1999). In case of a high adverb such as *waarschijnlijk/vaak*, the direct object possibly occupies a position higher than its base-generated sister-of-V position (i.e., scrambled), but still lower than the high adverb, which is assumed to be adjoined to IP. This way, the surface word order in (9Ba) resembles a non-scrambled order, but it is reasonable to assume that, underlyingly, the direct object occupies a higher, scrambled position, providing the direct object *het boek* with its referential interpretation. This implies that there are different positions to scramble to. For a detailed and extended analysis of these different scrambling positions the

² Nonetheless, in an experimental setting native Dutch speakers clearly prefer a definite direct object to precede high adverbs such as *waarschijnlijk*, as shown by Schaeffer (1997, 2000): in an Elicited Production Task the 23 Dutch-speaking adults scrambled referential objects over high adverbs 91% of the time.

reader is referred to [Schaeffer \(2000, 2012\)](#), who relates different types of referentiality to distinct scrambling positions.

Finally, consider the dialogues in (10) and (11), adopted from [Schaeffer \(2012\)](#).

(10) A: Wat zei je dat Saskia met de krant gedaan heeft?
What said you that Saskia with the newspaper done has
'What did you say Saskia did with the newspaper?'

B: a. Ik zei dat ze de krant waarschijnlijk gelezen heeft.
I said that she the newspaper probably read has
'I said that she probably read the newspaper.'

??b. Ik zei dat ze waarschijnlijk de krant gelezen heeft.
I said that she probably the newspaper read has

(11) A: Wat zei je dat Saskia gedaan heeft?
What said you that Saskia done has
'What did you say Saskia did?'

B: ??a. Ik zei dat ze de krant waarschijnlijk gelezen heeft
I said that she the newspaper prob. read has
b. Ik zei dat ze waarschijnlijk de krant gelezen heeft.
I said that she prob. the newspaper read has
'I said that she probably read the newspaper.'

If the referent of a definite direct object is directly available in the preceding discourse, as in (10), scrambling (even over a high adverb such as *waarschijnlijk*) is strongly preferred, while this scrambled word order is disfavored if the referent of the object is not available, as illustrated in (11Ba).

The question arises as to which position the direct object *de krant* occupies in (11Bb), which could be either the non-scrambled sister-of-V position, or a position slightly higher than that, but still lower than the adverb *waarschijnlijk*. I argue that in this case, the definite direct object *de krant* ('the newspaper') in (11Bb) remains truly unscrambled. This is confirmed by the sentence in (12), in which the high adverb *waarschijnlijk* from (11B) is replaced by the low adverb *zorgvuldig* ('carefully'), which is assumed to occupy a position just above VP (cf. [Cinque, 1999](#)):

(12) A: Wat zei je dat Saskia gedaan heeft?
What said you that Saskia done has
'What did you say Saskia did?'

B: ??a. Ik zei dat ze de krant zorgvuldig gelezen heeft
I said that she the newspaper carefully read has
b. Ik zei dat ze zorgvuldig de krant gelezen heeft.
I said that she carefully the newspaper read has
'I said that she probably read the newspaper.'

It is possible for the definite direct object *de krant* ('the newspaper') to remain unscrambled, because its referent is part of the long-term shared knowledge between the speaker and the hearer ([Schaeffer, 1997, 2000, 2012](#)), or, as Ionin (2006) argues, it is a non-specific definite, or, as [Erteschik-Shir \(2007\)](#) puts it, it concerns a so-called 'permanently available topic'. Similar to noun phrases such as *the queen*, *the sun* and *the Bible*, *de krant* ('the newspaper') can be definite without being mentioned in the preceding discourse, because of its status as a fixture in the (model of the) world.

Now, notice that, despite its 'permanently-available-topic' status, the definite direct object *de krant* in (11Bb) as an answer to the question in (11A) does require focus: it is part of the new information requested by speaker A. Interestingly, this naturally follows from [Cinque's \(1993\)](#) Nuclear Stress Rule (NSR), which states that main sentential stress is

assigned to the most deeply embedded constituent. If *de krant* in (11Bb) is truly unscrambled, i.e., occupies the sister-of-V position, it is the most deeply embedded constituent in the sentence, providing it with the required stress to mark focus. If it occupied a higher, scrambled position, it would not be the most deeply embedded constituent, and thus not automatically receive the required stress (through the NSR) to mark focus. Thus, while referential direct objects such as *het boek* in (9) are assumed to reside in a scrambled position (whether they precede or follow the high adverb *waarschijnlijk* or *vaak*), I argue that (non-specific, in Ionin's 2006 terms) definite direct objects such as *de krant* in (11Bb) remain in sister-of-V position, which is compatible with both their permanently-available-topic status and with their focus.

Summarizing the relationship between (different types of) direct objects and (non-)scrambled positions we can say that definite direct objects that are referential because their referent is available in the preceding discourse tend to be scrambled, whereas (non-specific in Ionin's, 2006 terms) definite direct objects with a permanently-available-topic status can occupy a non-scrambled position. In contrast, non-referential objects must always occur in non-scrambled position.

The discussion above suggests that DOS is an interface operation involving pragmatic, semantic and syntactic knowledge: First, consideration of both speaker and hearer beliefs (pragmatics) is necessary to establish definiteness and referentiality (semantics). Second, definiteness and referentiality need to be mapped onto the information structural notions of topic and focus (pragmatics), which, in turn, have certain positions in the sentence (syntax).

In the next section I discuss some previous studies on the acquisition of referentiality and DOS by typically developing (TD) children. The aim is to show that it is difficult to tease apart the different contributions of syntax, semantics and pragmatics to the development of DOS, because typical development of these phenomena is rapid, and syntactic, semantic and pragmatic development go hand-in-hand, which is unsurprising, given the analysis of DOS provided above.

2.2. Previous acquisition studies on referentiality and Direct Object Scrambling

It is well-known that young children overgenerate the definite article in indefinite contexts (English: Brown, 1973; Maratsos, 1974, 1976; Zehler and Brewer, 1982; French: Karmiloff-Smith, 1979; Hebrew: Armon-Lotem and Avram, 2005). However, most of these studies do not systematically distinguish between the two types of indefinite articles (see schema in (8)), namely "believed by speaker only" (the B contexts) and "believed by neither speaker nor hearer" (the C contexts). Schaeffer and Matthewson (2005) investigated the phenomenon of article choice in 26 monolingual English-acquiring children between the ages of 2 and 4 and a control group of 36 adults. Their Elicited Production Task tested all three belief states schematized in Table 1. Their results show that the children produce the definite article *the* 25% of the time in indefinite B-contexts, i.e., when the referent is believed to exist by the speaker only, whereas the adults virtually never did this (2%). In contrast, *the* was hardly ever overgenerated in C-contexts, i.e., when the referent is believed to exist by neither the speaker nor the hearer (children: 5%; adults: 3%). Finally, there was virtually no overgeneration of the indefinite article *a* in A-contexts (definite): both children and adults did this 2% of the time. In order to explain their results Schaeffer & Matthewson propose that young children under age 4 lack the pragmatic "Concept of Non-Shared Assumptions (CNSA)", which states that speaker and hearer assumptions are always independent (cf. Schaeffer, 1999, 2000). If the CNSA is absent, speaker and hearer assumptions are not always independent, implying that there are situations in which the speaker automatically attributes her/his own assumptions to the hearer. If a child attributes her own (speaker-) beliefs to the hearer, she will not distinguish environment B (believed by speaker only) from environment A (believed by speaker and hearer). In other words, *environment B becomes environment A*. In these cases, she will use the article appropriate for environment A, which is *the* in English. Thus, in the cases in which the child does not distinguish speaker and hearer beliefs, she groups together environment A and B, as opposed to C. The CNSA reminds of Theory of Mind, the cognitive ability to attribute mental states to one self and others (Premack and Woodruff, 1978). As such, the CNSA may well be a precursor or component of Theory of Mind. Concluding, the overgeneration of *the* in B-contexts by young TD children can be attributed to pragmatic, or even cognitive immaturity.

Turning now to the acquisition of DOS, Schaeffer (1997, 2000) carried out an Elicited Production Task on DOS over negation and different types of adverbs with 49 monolingual TD Dutch-acquiring children between the ages of 2 and 7. She found that 2- (and to a lesser extent) 3-year old TD Dutch-acquiring children often fail to scramble over negation in referential contexts (70% and 28%, respectively for definite DPs and 69% and 27%, respectively for proper names). Schaeffer attributes this to the failure to distinguish between different types of referentiality, namely between so-called 'discourse-related referentiality', in which referentiality is established on the basis of the preceding discourse, (as *the girl* in 6a), and 'non-discourse-related referentiality', in which referentiality is established on the basis of long-term shared knowledge, as *the sun* in (6b). Recall from example (11Bb) and the discussion following it that definite nouns such as *the newspaper*, *the sun*, *the queen* etc. have a special status in that they are part of long-term shared knowledge, or that they are a 'permanently available topic'. As such, they can remain unscrambled. Assuming a movement analysis of DOS, Schaeffer claims that as long as children do not distinguish between definites such as *the girl* and *the sun*, the correct syntactic [referential] feature (discourse-related or non-discourse-related) motivating this movement cannot be established, and scrambling of the referential direct object takes place optionally. As the relevant distinction relates to speaker/hearer assumptions and what they are based on, it is concluded that it is the children's underdeveloped pragmatics that causes the failure to scramble referential direct objects in young Dutch-speaking children. In other

words, Schaeffer claims that young Dutch-acquiring children who fail to scramble have immature pragmatics, rather than immature syntax or semantics.

Nevertheless, it is not always clear from the language acquisition of TD children what the underlying causes of their language errors are. Syntactic, semantic, pragmatic and cognitive development takes place rapidly, and often at similar rates. Therefore, it is not easy to tease apart the relative contributions of these different components to language development in typically developing children. Moreover, as noted in section 2.1, DOS is a complex phenomenon, at the interface of grammar and pragmatics, and many different theories have been proposed to account for it.

In an attempt to unravel this complexity and the respective roles of grammar and pragmatics in the adult Dutch phenomenon of DOS and in its development in child Dutch I turned to two types of pathology that express themselves in different kinds of language impairment: children with High-Functioning Autism (HFA), who often show weaknesses in pragmatics, and have problems integrating information from different levels, and children with Specific Language Impairment (SLI), whose primary impairment is in grammar (including morphosyntax and phonology). As we will see in the discussion section of this paper, the study of language impairment can help differentiate between existing analyses of a certain linguistic phenomenon, and even refine such analyses. The next sections discuss the kinds of language impairment in both groups and their potentially overlapping etiologies.

2.3. (*High-Functioning*) Autism

High Functioning Autism (HFA) is a subgroup of people with so-called Autism Spectrum Disorder (ASD). The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V; [American Psychiatric Association, 2013](#)) defines ASD as a neurodevelopmental disorder, associated with deficits in social communication and social interaction on the one hand, and restrictive, repetitive patterns of behavior, interests or activities on the other hand. These symptoms occur early in life, impair everyday functioning, and cannot be explained by global developmental delay or intellectual disabilities, although the latter frequently co-occurs with ASD. The spectrum illustrates the varying severity of the various forms of autism, with Autistic Disorder at the more severe end of the spectrum, through Asperger's Disorder, Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), and HFA at the least severe end of the spectrum ([Taylor et al., 2012](#)). Individuals with HFA are higher functioning than other individuals with autism: they attend regular schools and all acquire functional use of verbal language. However, the DSM-V states that even when formal linguistic skills such as vocabulary and grammar are intact, the use of language for communicative purposes is impaired in ASD.

Language acquisition studies involving children with autism largely support this description of language and language development in ASD, although mixed results have been reported (Grammar: [Tager-Flusberg et al., 1990](#); [Bartolucci et al., 1980](#); [Howlin, 1984](#); [Eigsti et al., 2007, 2011](#); Phonology: [Eigsti et al., 2011](#); [Bartak et al., 1975](#); [Kjelgaard and Tager-Flusberg, 2001](#); Pragmatics: [Ghaziuddin and Gerstein, 1996](#); [Adachi et al., 2004](#); [Kelley et al., 2006](#); [Baltaxe, 1977](#); [Baltaxe and D'Angiola, 1992](#); [Fine et al., 1994](#); [Arnold et al., 2009](#)). The results of these studies illustrate the problems individuals with autism have with discourse management, and discourse reference in particular. In a nutshell, children with autism have communicative impairments that are most evidently manifested in their pragmatic and discourse functioning. While children with ASD may have other linguistic deficits, e.g., in the domain of syntax, this is not necessarily the case (cf. [Perovic et al., 2013a,b](#)).

Recent neuroimaging studies suggest that ASD is a disorder of brain underconnectivity ([Minshew and Williams, 2007](#); [Just et al., 2012](#)). These studies have shown that synchronization of activation between different brain regions is lower in ASD. The patterns of neurological underconnectivity in ASD have been proposed as an explanation for the unrelatedness of the main symptoms of ASD, i.e., social and communicative impairments on the one hand, and restricted and repetitive patterns of behavior and interests on the other hand ([Just et al., 2012](#)). Importantly, according to the underconnectivity hypothesis, individuals with ASD are likely to experience difficulty in processes that involve high levels of information integration and require coordination of multiple neural systems, whereas cognitive abilities that involve local neural networks and that require low levels of information processing are intact ([Minshew and Williams, 2007](#)).

In terms of linguistic capacities, these findings have been related to impaired 'higher order' language abilities and intact 'formal' language skills in adults with ASD ([Minshew et al., 1997](#)) and in children with HFA ([Williams et al., 2006](#)). The linguistic abilities that are categorized as 'higher order' in these studies are almost exclusively pragmatic or discourse abilities, such as comprehension and creation of story themes, metaphors, inferences and idioms, while vocabulary and basic syntactic abilities, such as being able to parse a sentence structure, are considered 'formal' language skills. What crucially differentiates these different types of linguistic capacities is that higher-order abilities require high levels of information integration and involve multiple neural systems, while formal abilities demand low levels of information integration and are processed locally ([Minshew and Williams, 2007](#)).

2.4. *Specific Language Impairment*

In contrast, the primary language disorder in Specific Language Impairment (SLI) is often claimed to reside in grammar, including morphosyntax and phonology. SLI is defined as a combination of normal intelligence (an IQ equal to or greater than 85) and impaired performance on a battery of standardized language assessments (a composite language score of more than 1.25 SD below the mean) ([Leonard, 1998](#); [Tomblin et al., 1997](#)). Potential causes such as hearing loss, low general ability, or physical impairment of articulators are excluded. ASD is also excluded when making a diagnosis of SLI: the textbook example

of a child with SLI is of a child with normal social interaction and nonverbal communication, but with specific difficulties in mastering structural aspects of language, especially morphosyntax (Bishop, 2010).

Several researchers have identified an even more specific type of language impairment, namely Grammatical Specific Language Impairment, or GSLI, with impairment in only morphosyntax, while pragmatics and other cognitive skills are intact (Van der Lely and Stollwerck, 1997; Van der Lely et al., 2011; Van der Lely and Ullman, 2001; Friedmann and Novogrodsky, 2011; Schaeffer, 2012, among others).

However, recent research suggests that many children diagnosed with SLI have several additional impairments in cognition, such as a weak working memory and other executive functions, and in pragmatics. This has challenged the claim that SLI is *specific* to language (Lum et al., 2007, 2012; Henry et al., 2012; Evans et al., 2009).

2.5. Objectives of the study

In summary, the traditional assumption is that the primary language impairment of children with autism is concentrated in pragmatics and information integration, while children with SLI are primarily impaired in morphosyntax. However, some recent studies challenge these claims by showing that children with SLI also have pragmatic and cognitive impairments, and that children with ASD have additional grammatical impairments.

The objective of the current study on the acquisition of Direct Object Scrambling (DOS) in children with HFA and in children with SLI is not to resolve the debate on the exact characteristics of SLI and ASD. Rather, its goal is to show how the study of pathological populations can provide novel insights into the complexity of linguistic phenomena such as DOS. In the next section I lay out my hypotheses and predictions regarding DOS in HFA and SLI, based on the discussion provided in sections 2.1–2.5.

2.6. Hypotheses and predictions

Recall that Dutch direct objects prefer to occupy a position preceding negation or an adverb when they have a referential reading, i.e., when either both the speaker and the hearer believe the referent to exist (A-context) or only the speaker believes the referent to exist (B-context). Nonetheless, certain definite direct objects, such as *the sun*, *the queen*, can easily remain unscrambled, because of their special status of ‘permanently available topic’. When a direct object is non-referential, it must follow negation or the adverb (= non-scrambled position).

Based on these observations, I hypothesize that DOS is a complex phenomenon at the interface of pragmatics, semantics and syntax, as defined in (13):

(13) Hypothesis 1

Direct Object Scrambling is a complex phenomenon, requiring the integration of (at least) the following pragmatic, semantic and syntactic components:

- a) Knowledge of speaker/hearer beliefs – *pragmatics*
- b) Knowledge of definiteness/referentiality – *semantics*
- c) Knowledge of Information Structure, in particular the notions of topic and focus – *pragmatics*
- d) Knowledge of positions for direct objects in the sentence structure – *syntax*

Furthermore, following the traditional assumptions regarding language impairments in children with HFA and in children with SLI (see sections 2.2 and 2.3), I hypothesize that children with HFA have problems with the integration of information from different components, such as the ones described in Hypothesis 1, and that children with SLI have impaired syntax. This is formalized in (14) and (15):

(14) Hypothesis 2

Children with High Functioning Autism have impaired information integration, in particular, they have problems with the mapping of the different components involved in DOS

(15) Hypothesis 3

Children with Specific Language Impairment have impaired syntax, in particular, they have problems with direct object placement

The predictions that follow from these three hypotheses are listed in (16):

(16) *Predictions*

- a. Children with HFA above age 4 (> 4) fail to scramble in referential conditions (because of problems with the mapping of the different DOS components), but perform well on grammatical tests not involving pragmatics.
- b. Children with SLI above age 4 (> 4) fail to scramble in referential conditions (because of failing direct object placement), and also perform poorly on grammatical tests not involving pragmatics.

The next section describes what methods were used to test these predictions.

3. Methods

3.1. Participants

For the recruitment of the children with HFA autism groups on Facebook and Dutch organizations for autism were asked to post an advertisement on their websites and in their magazines. HFA participants were also recruited through personal contacts. This resulted in a group of 28 Dutch-speaking children with HFA, aged 5–14 (mean: 10;5; SD 2.37). All these children were diagnosed with an Autism Spectrum Disorder by means of the DSM-IV (American Psychiatric Association, 2000). Table 2 below presents the specific diagnoses for all children and their ages (Classical Autism, Asperger's Syndrome or Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS)).

Table 2
Specific diagnoses for children with HFA.

	N	Age range	Mean age (SD)
Classical Autism	4	5–13	9;3 (3.31)
Asperger's Syndrome	11	6–13	10;6 (1.86)
PDD-NOS	10	6–14	10;6 (2.89)
ASD – not further specified	3	10–12	11;3 (0.92)

Furthermore, 28 children with SLI aged 6–14 (mean: 10;1, SD 2.11) were selected from special schools for children with speech and language problems in The Netherlands. Children with an IQ < 85 and/or officially diagnosed with any additional disorder (such as autism in the SLI group or language impairment in the HFA group) or AD(H)D were not included. Nevertheless, we do not exclude the existence of comorbidity with other developmental disorders in both the SLI and the HFA group. 28 typically developing (TD) children aged 6–14 (mean: 10;4 SD 2.15) served as a control group. All child participants were individually matched with respect to age and gender. Age-normalized scores of expressive and receptive linguistic ability were obtained from the Dutch version of the Clinical Evaluation of Language Fundamentals (CELF-4-NL) (Semel et al., 2008). Whereas the SLI group performed far below the norm score of the 50th percentile (mean 7.9th percentile, SD 7.34), the HFA and TD groups performed around or above the norm score (HFA mean 53.7th percentile, SD 29.46, TD mean 73.4th percentile, SD 24.85). Furthermore, Non-Word Repetition (Rispen and Baker, 2012) scores obtained from each group confirm the specific impairment of the children with SLI, as opposed to that of the children with HFA³: The SLI group's NWR score was 33.2%, vs. 62.6% for the HFA group, and 70.2% for the TD group. Additionally, parents of all HFA and of 15 SLI participants completed the Dutch version of the Children's Communication Checklist (CCC-2-NL) (Geurts, 2007). The CCC is a parents' questionnaire, and one of its main goals is to give an impression of pragmatic and grammatical difficulties. Subtracting the sum of scores on the 'language areas' (speech, syntax, semantics and coherence) from the sum of scores on pragmatic areas' (initiation, nonverbal communication, social relations and interests) derives the Social Interaction Difference Index (SIDI). This is a difference score that is given as a percentile. Children who score beneath the 10th percentile have more structural language problems than pragmatic difficulties, whereas the opposite is true for children scoring above the 90th percentile. As expected, the HFA group has a high SIS score (mean 81.6, SD = 19.8), whereas the SLI group has a low SIS score (mean = 14.9, SD = 12.9). This shows that the HFA group experiences more pragmatic difficulties, while the SLI group has more structural language problems.

Finally, 16 adult native speakers of Dutch aged 20–56 (mean: 34; SD 14.26) were tested to ensure the psychological reality of the expected target responses of all experiments.

³ Children with SLI often score significantly lower than TD children on the NWR (cf. Rispen and Baker, 2012; among others).

3.2. Materials and procedure

The Direct Object Scrambling (DOS) Task used for the current study is part of a much larger battery of 16 tests designed to investigate the grammatical, pragmatic and cognitive development of children with SLI and children with HFA, in collaboration with Iris Duinmeijer, at the University of Amsterdam. For the purposes of this study, we focus here on the description of the DOS materials. The tasks of some of the other phenomena to which DOS performance is compared are briefly mentioned in section 4.2.

The DOS materials consist of an Elicited Production Task (Schaeffer, 1997, 2000; Unsworth, 2005) in which the participants are asked to describe an event in a picture displayed on a computer screen to an experimenter (A) who cannot see the screen while a second experimenter (B) is sitting next to the participant. While watching the picture on the screen the participant and experimenter A listen to a story told by experimenter B. After this, experimenter A (who cannot see the screen) asks a question or makes a comment. As part of the introduction to the experiment the participant is told that experimenter A is not always paying attention and that experimenter A needs to be corrected if s/he says something wrong.

All experimental items concern Direct Object Scrambling with respect to sentential negation, rather than adverbs for the following reason: Sentences with sentential negation present the clearest cases for Direct Object Scrambling in Dutch, because negation occupies one and the same position in the sentence structure. As discussed in section 2.1, there are different types of adverbs (e.g., high vs. low) which occupy different positions in the sentence structure. Therefore, it is sometimes difficult to determine the exact position (scrambled or non-scrambled) of the direct object, especially when it is used in combination with a high adverb. Negation circumvents this problem by occurring in a fixed, and relatively low position, allowing us to observe whether the object is in a non-scrambled sister-of-V position, or in a scrambled position higher up.

Following Schaeffer and Matthewson's (2005) schema on definiteness and referentiality as presented in section 2.1, three different conditions are distinguished, namely (i) definite (6 test items), (ii) indefinite-referential (6 test items), and (iii) indefinite-non-referential (6 test items). Furthermore, the experiment contains 18 fillers, eliciting utterances with a definite or an indefinite noun phrase (which were used for a different study – cf. Schaeffer et al., 2014, 2015). The conditions are schematized in Table 3, and sample scenarios of each condition are provided in (17a through c).⁴

Table 3
Experimental conditions Elicited Production Task on Direct Object Scrambling.

Condition	Number of items
1 – Definite	6
2 – Indefinite referential	6
3 – Indefinite non-referential	6
Total experimental items	18
Fillers	18

(17a) Sample item Definite condition

B: Patrick verveelt zich en kijkt of er iets leuks te doen is. “Hé”, zegt Patrick,
 “een boek! Maar ik houd niet van boeken.”
 ‘Patrick is bored and he is looking for something to do. “Hey”, Patrick
 says, “a book! But I don’t like books”.’

⁴ Capitals indicate stress.

“Dus dat ga ik NIET⁴ lezen”.

so that go I not read

‘So I’m not going to read it.’

A: *Ik weet het. Het boek gaat Patrick WEL lezen.*

I know it. The book goes Patrick yes read

‘I know. Patrick is going to read the book.’

Participant: Nee!

‘No’.

B: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

‘No? What’s really happening?’

Participant:

Target: Patrick gaat het boek NIET lezen. (scrambled)

Patrick goes the book not read

‘Patrick is not going to read the book.’

Non-target: Patrick gaat NIET het boek lezen. (non-scrambled)

Patrick goes not the book read

Note that in the preamble by experimenter B there is a sentence containing both negation *niet* and a direct object (*dat* – ‘that’). Yet, the direct object is in neither scrambled nor non-scrambled position. Dutch allows for a third position for a direct object, namely the topicalized position at the beginning of the structure. By employing this topicalized position for the direct object giving away a (non-)scrambled order in the preamble is avoided.

In the Indefinite referential condition a cartoon figure and three identical objects were shown on the screen, as illustrated in (17b):

(17b) *Sample item Indefinite referential condition*

A: He, wie zie je op het plaatje?

‘Hey, who do you see in the picture?’

Participant: Elmo!

- B: “He”, zegt Elmo, “drie kranten: 1, 2, 3.”
 “Hey”, says Elmo, “three newspapers: 1, 2, 3.”

 “Twee kranten ga ik NIET lezen”.
 Two newspapers go I not read
 ‘I’m not going to read two newspapers.’
- A: Ik weet het! Twee kranten gaat Elmo WEL lezen.
 I know it! Two newspapers goes Elmo yes read
 ‘I know! Elmo is going to read two newspapers.’
- Participant: Nee.
 ‘No.’

- B: Nee, he? Wat gebeurt er echt?
 No huh? What happens there really?
 ‘No? What’s really happening?’
- Participant:
- Target: Elmo gaat twee kranten NIET lezen. (scrambled)
 Elmo goes two newspapers not read
 ‘Elmo is not going to read two newspapers.’
- Non-target: Elmo gaat NIET twee kranten lezen. (non-scrambled)
 Elmo goes not two newspapers read

The reason a plural rather than a singular direct object was chosen in this condition is the fact that in experimental situations like this singular referential indefinites often get changed into a definite, as witnessed by the scrambling study in [Schaeffer \(1997, 2000\)](#).

Finally, in the indefinite non-referential condition, no objects are shown. Only a cartoon figure is presented. Here the participant is not asked to correct experimenter A, but rather, experimenter A is not paying attention and asks the participant for help. A sample item is given in (17c):

(17c) *Sample item Indefinite non-referential*

- A: He, wie zie je op het plaatje?
 ‘Hey, who do you see in the picture?’

Participant: Dora

B: “He”, zegt Dora, “ik heb zin om naar een tuin te gaan en een bloem te plukken. Maar dat mag niet zo maar”.
 “Hey”, says Dora, “I feel like going to a garden to pick a flower, but that’s not allowed”.’

“Dus dat ga ik niet doen”.

so that go I not do

‘So I’m not going to do that.’

A: Oh ik heb het niet goed gehoord. Wat gaat Dora niet doen?
 Oh, I have it not well heard. What goes Dora not do
 ‘Oh, I didn’t hear very well. What is Dora not going to do?’

Participant:

Target: Dora gaat niet een / geen bloem plukken. (non-scrambled)

Dora goes not a / no flower pick

‘Dora is not going to pick a flower.’

Non-target: Dora gaat een bloem niet plukken. (scrambled)

Dora goes a flower not pick

A complete list of experimental items can be found in the [Appendix](#).

4. Results and discussion

4.1. Results on Direct Object Scrambling

In this section I present the results according to the three experimental conditions of the Elicited Production task on Direct Object Scrambling: 1) definite; 2) indefinite referential; 3) indefinite non-referential. Recall that the first two conditions require scrambling of the direct object, while the third condition does not.

As the graph in [Fig. 1](#) shows, both the children with HFA and children with SLI fail to scramble the definite direct object at substantial rates in obligatory contexts:

Fig. 1. Proportions of scrambled, non-scrambled and irrelevant responses in definite condition.

As expected, the adults and the TD children perform almost at ceiling, and virtually never produce non-scrambled structures in this condition. Recall that the youngest TD children are 6 years old, i.e., much beyond the age of acquisition of Direct Object Scrambling as proposed by Schaeffer (1997, 2000), which is the age of 4.

However, examining the white bars of the HFA and the SLI groups, we see that the children with HFA produce only 70% (SD: 35%) scrambled structures, and the children with SLI a mere 49% (SD: 35%). Statistical comparison (Mann–Whitney U-tests) with the results of the TD children reveals that both the HFA group and the SLI group perform significantly worse than the TD group (mean: 91%; SD: 20%). (HFA – TD: $U = 233$, $p < .005$, SLI – TD: $U = 127.5$, $p < .001$). Interestingly, the number of non-scrambled responses in the HFA group (16%) does not significantly differ from that of the TD children, while the number of non-scrambled responses in the SLI group (33%) does. This suggests a slightly lesser problem with DOS in HFA than in SLI.

Irrelevant answers in the definite condition include the use of non-referential indefinite NPs and personal pronouns as shown in (18a and 18b).

- (18) a. Het aapje tekent geen giraffe.
The monkey draws not a giraffe.
'The monkey doesn't draw a giraffe.'
(Target: Het aapje gaat de giraffe niet tekenen.)
- b. Hij gaat hem niet plukken.
He goes him not pick.
He will not pick it.
(Target: Beer gaat de grote bloem niet plukken.)

The result pattern of the definite condition is similar to that of the indefinite referential condition, as illustrated in Fig. 2:

Fig. 2. Proportions of scrambled, non-scrambled and irrelevant responses in indefinite referential condition.

The results for the adults in Fig. 2 indicate that indefinite referential contexts impose a slightly weaker obligation to scramble the direct object than the definite condition: 13% of the responses contained a non-scrambled direct object. The same pattern can be seen in the TD children (9% non-scrambling). There are no differences between the adult group and the TD child group ($U = 186.5$, $p = .288$). Nevertheless, the vast majority of indefinite referential direct objects in this condition get scrambled, indicating at least a strong preference for scrambling in typical populations.

In contrast, both the HFA group and the SLI group leave indefinite referential direct objects unscrambled at a rate of 37% and 47%, respectively. In both cases this is significantly more than the TD children (HFA – TD: $U = 244$, $p < .01$, SLI – TD:

$U = 162, p < .001$). Interestingly, the number of (correctly) scrambled responses in the HFA group (57%) is not significantly lower than in the TD group, while the number of (correctly) scrambled responses in the SLI group (41%) is. Again, this suggests more knowledge of scrambling in HFA than in SLI.

Irrelevant answers in the indefinite conditions include topicalized direct objects (19a) or the lack of sentential negation (19b):

Merging the two referential conditions together, a clear picture of the failure to scramble referential direct objects by children with HFA and SLI emerges:

(19) a. Een vogel gaat hij niet tekenen.

A bird goes he not draw

'A bird he isn't going to draw.

(Target: He is not going to draw a bird.)

b. Gerrit gaat eentje maar opeten.

Gerrit goes one only eat.

'Gerrit is only going to eat one.'

(Target: Gerrit gaat twee cakejes niet opeten.)

Fig. 3 shows that there is no difference between the proportions of scrambled items between the adult group (mean: 91%; SD: 17%) and the TD child group (mean: 84%; SD: 23%; $U = 191, p = .378$). Both groups show a clear preference for scrambling referential objects.

Fig. 3. Proportions of scrambled, non-scrambled and irrelevant responses in referential conditions (definite and indefinite referential conditions collapsed).

However, the HFA group scrambles referential direct objects only at a rate of 63%, while the children with SLI do this even less often: 45%. In both cases this is significantly lower than the scrambling rate of the TD group (84%) (HFA – TD: $U = 231, p < .01$, SLI – TD: $U = 116, p < .001$). Looking at it from the perspective of non-scrambled structures, both the HFA and the SLI group fail to scramble referential direct objects significantly more often than their TD peers: the HFA group does this at a rate of 27%, and the SLI group at a rate of 40% (HFA – TD: $U = 232.5, p < .01$, SLI – TD: $U = 97.5, p < .001$).

Nonetheless, the analysis of the responses in the third condition – the indefinite non-referential condition – suggests that Direct Object Scrambling is not random in the HFA and SLI groups, as shown in Fig. 4:

Fig. 4. Proportions of scrambled, non-scrambled and irrelevant responses in indefinite non-referential condition.

As indicated by the light grey bars for each group, virtually all indefinite non-referential direct objects remain unscrambled. In fact, a Kruskal–Wallis test reveals that there are no significant differences between the proportion of direct objects correctly left unscrambled between the child groups and the adult group ($\chi^2 = 7.611$, $p = .055$).

Additionally, there is no significant difference regarding the other types of responses (scrambled and irrelevant) between the four groups either (Kruskal–Wallis test: $\chi^2 = 3.716$, $p = .294$ and $\chi^2 = 6.608$, $p = .086$ respectively).

To summarize the results, both children with HFA and children with SLI often fail to scramble in referential conditions. The children with HFA do this 27% of the time, the children with SLI 40%. The lower DOS failure rate in the HFA group suggests that children with HFA may have more knowledge of DOS than children with SLI (to be elaborated on in section 4.3). Furthermore, the children with HFA and the children with SLI behave target-like in the non-referential contexts: they do not scramble. This suggests that DOS is not random in these populations.

Given the usual heterogeneity of impaired populations, and the wide age-range investigated in this study, some obvious questions to arise are a) whether DOS failure in each group is perhaps due to just a few participants and b) whether the younger children perform worse than the older children on DOS. An individual analysis of so-called ‘failers’ and ‘passers’ on DOS reveals that the answer to both questions is ‘no’. Participants were assigned a ‘pass’ if they left no more than 2 out of 12 referential items unscrambled, and a ‘fail’ if they left at least 3 out of 12 referential items unscrambled. This resulted in 18/28 (64%) failers in the SLI group, 15/28 (54%) failers in the HFA group, 1 failer in the TD group (the youngest child) and no failers in the adult group. Thus, each impaired group contains a fair amount of failers, and the numbers of failers in both impaired groups are comparable. Furthermore, the 18 SLI failers ranged in age between 6 and 13, with a mean age of 9;11, and the 15 HFA failers ranged in age between 5 and 14, with a mean age of 9;10. This indicates that, contrary to what is known about DOS in TD children (Schaeffer, 1997, 2000), failing on DOS is not associated with age in children with SLI or with HFA. In other words, the individual results replicate the group results.

Now, recall the predictions that children with HFA fail to scramble because of problems with the integration of the different components involved in DOS, and that children with SLI fail to scramble because of deficient syntax. The prediction that both groups have problems with scrambling is borne out, yet, the results presented so far cannot tell us anything about the underlying reasons. To this end, I examined all the children’s scores on some other pragmatic and grammatical tasks that were part of the larger test battery, as mentioned in section 3. The results for the children with SLI are presented and discussed in section 4.2, the ones for the children with HFA in section 4.3.

4.2. Performance of children with SLI on other pragmatics and morpho-syntax tests

As discussed in section 2, the choice between a definite and an indefinite article is partially driven by the pragmatic knowledge that speaker and hearer assumptions are always independent – Schaeffer and Matthewson’s (2005) Concept of Non-Shared Assumptions (CNSA), which may be related to Theory of Mind.

The results of an Elicited Production Task on Article Choice show that the same children with SLI as the ones participating in the DOS experiment never overgenerate the definite article in (referential or non-referential) indefinite contexts (Schaeffer et al., 2014, 2015). These results are corroborated by the scores on a non-verbal Theory of Mind task (Colle et al., 2007): a one-way ANOVA revealed no significant differences between SLI, HFA and TD child groups ($F = 1.619$, $p = .19$) on this task (for a further discussion of the HFA performance on Theory of Mind, see section 4.3). Thus, the failure to scramble by the children with SLI in this study cannot be attributed to problems with referentiality, due to the lack of the CNSA or Theory of Mind, as was suggested for younger Dutch-acquiring TD children by Schaeffer (1997, 2000). This is not surprising in light of the traditional hypothesis that children with SLI are mainly impaired in their grammar (including morphosyntax), and that pragmatics is relatively spared.

So what causes this failure to scramble in children with SLI? An investigation of the children's morpho-syntactic skills provides a key to answering this question. As mentioned in section 3, the DOS task is part of a larger test battery, including morpho-syntax tests such as the Dutch version of the CELF-IV (Core Language Score, Footnote 5), a Picture Selection Task on the mass-count distinction, crucially depending on the nominal plural morpheme (Van Witteloostuijn, 2013; Van Witteloostuijn and Schaeffer, 2015), and an Elicited Production Task on subject-verb agreement (Duinmeijer, 2012a, 2017). Table 4 shows that the children with SLI perform much worse than their TD peers on all three morpho-syntax tests:

Table 4
SLI scores on morpho-syntax tests.

	CELF-IV ^a	Mass-count distinction ^b	Subject-verb agreement
SLI	7.9th percentile* (SD: 7.3)	68%* (SD: 20%)	83%* (SD: 26%)
TD	73.4th percentile (SD: 24.9)	93% (SD: 11%)	96% (SD: 18%)

* = significantly worse than TD ($\alpha = .05$).

^a The Core language score of the CELF-IV includes the following sub-tests on grammar (crucially: NOT pragmatics): Concepts and Following Directions, Word Structure, Recalling Sentences, Formulated Sentences.

^b The percentages in this column reflect accuracy in the flexible conditions of the mass-count experiment (e.g., *pizza* vs. *pizzas*).

Mann–Whitney U-tests regarding the differences between the SLI group and the TD group reveal that these are significant for all tasks (CELF: $U = 19$, $p < .001$; Mass-count: $U = 227.5$, $p < .01$; SVP: $U = 130$, $p < .001$).

These results are in line with the hypothesis that children with SLI have impairments in their morpho-syntax, and suggest that their difficulty with Direct Object Scrambling stems from a syntactic weakness, as indicated in section 2.6. Spearman's Rank–Order Correlations further confirm this for some of the morpho-syntax tests in the SLI group: a significant correlation is found between DOS (% scrambled in referential conditions) and the CELF percentile: .409, $p < .05$; a strong trend is found between DOS (% scrambled in referential conditions) and Subject–Verb Production: .383, $p = .053$. The correlation between DOS and Mass-count (accuracy flexible nouns) is non-significant: .150, $p = .455$.

I therefore propose that children with SLI fail to scramble referential objects because they have problems with syntactic object placement. Of course, a pragmatic cause cannot be excluded until pragmatics in children with SLI has been independently tested. In addition, it could be that children with SLI have difficulty with the semantic notions of uniqueness and existentiality. As none of the tests in our test battery specifically tested uniqueness and existentiality, future research with children with SLI should point out whether this is true or not. Yet, direct syntactic support for this hypothesis could come from three other syntax tests on object placement included in our larger test battery, namely a Picture Selection Task, a Judgment Task and an Elicited Production Task on Subject and Object Relative Clauses (Duinmeijer, 2012b, 2017). As the data for SLI are currently being analyzed, no hard numbers can be provided here, but the strong impression is that the children with SLI have indeed larger problems with the comprehension, judgment and production of Object Relative clauses than their TD peers (Duinmeijer, 2017).

In the next section I discuss the additional pragmatics and morpho-syntax results for the children with HFA.

4.3. Performance of children with HFA on other pragmatics and morpho-syntax tests

Examination of the HFA group's performance on the (pragmatic) Article Choice task reveals a pattern similar to that of the SLI group: the same children with HFA as the ones participating in the DOS experiment never overgenerate the definite article in (referential or non-referential) indefinite contexts (Schaeffer et al., 2014, 2015). As already mentioned in section 4.2 on SLI above, the HFA group does not differ from the TD and SLI groups in terms of Theory of Mind scores either. Although this may be surprising in light of the common assumption that children with autism lack Theory of Mind (Baron-Cohen, 1988) it is in line with the Article Choice findings, and indicates that not all children with autism have a Theory of Mind deficit.

The results on Article Choice and Theory of Mind suggest that, like the children with SLI, the children with HFA do not lack the CNSA, and that they know that speaker and hearer assumptions are always independent. In other words, the children with HFA have no difficulty distinguishing referential indefinites from non-referential indefinites and from definites. The children with HFA in this study resemble the children with SLI in that their failure to scramble cannot be attributed to problems with referentiality, due to the lack of the pragmatic CNSA or Theory of Mind, as was suggested for younger Dutch-acquiring TD children by Schaeffer (1997, 2000).

To obtain a picture of the HFA group's morpho-syntactic skills, I analyzed their performance on the same morpho-syntax tests as mentioned in section 4.2 on SLI: the Dutch version of the CELF-IV (Core Language Score), a Picture Selection Task on the mass-count distinction, and an Elicited Production Task on subject-verb agreement. The results are presented in Table 5:

Table 5
HFA scores on morpho-syntax tests.

	CELF-IV	Mass-count distinction	Subject-verb agreement
HFA	53.7th percentile (SD: 29.5)	82% (SD: 19%)	95% (SD: 15%)
TD	73.4th percentile (SD: 24.9)	92% (SD: 11%)	96% (SD: 18%)

As Table 5 shows, the children with HFA perform well on the mass-count distinction (82% correct). Compared to the TD children (92% correct) there is no significant difference ($p = .352$). The scores on the Subject-verb Production task show the same pattern: 95% correct as compared to 96% for the TD children, and again, no significant difference between the groups ($U = 297$, $p = .158$). The CELF scores indicate percentiles, so 50 can be considered the norm. As the last column demonstrates, the TD children performed well on the CELF (73.4th percentile), and higher than the HFA group (53.7th percentile). This difference is significant ($U = 220.5$, $p < .05$). Nonetheless, the children with HFA performed around the norm, and thus well on this task. Thus, the children with HFA in the current study perform well on grammatical tasks, and do not seem to be grammatically impaired. Correlations between the DOS scores and the three grammatical tasks, respectively, were not found either (Spearman's Rank-Order Correlation: DOS (% scrambled in referential conditions) – CELF percentile: .326, $p = .097$; DOS (% scrambled in referential conditions) – mass/count (accuracy flexible nouns): .141, $p = .482$; DOS (% scrambled in referential conditions) – SVP: .309, $p = .116$).

To summarize, the children with HFA do not lack the pragmatic CNSA, show no morpho-syntactic impairment, and can therefore be hypothesized to know the syntax of object placement. This hypothesis gets support from the preliminary results of the grammatical Relative Clause tests that were also part of the larger test battery as mentioned above (Schaeffer and Siekman, 2016). In terms of producing, judging and comprehending Object Relative Clauses, the children with HFA do not differ significantly from their TD matches, as shown in Table 6⁵:

Table 6
Percentage of object relative clauses in production, comprehension and judgment.

	Production % of OR ^a	Comprehension % correct	Judgment % correct
HFA	12 (SD: 24%)	53 (SD: 37%)	35 (SD: 26%)
TD	13 (SD: 21%)	42 (SD: 34%)	36 (SD: 23%)

^a As the reader will notice, the percentages of correct OR production are very low, both for the children with HFA and the TD children. The main reason for this is the high number of passives provided instead of ORs. This was found in the adult control group as well. Although passives are a perfectly grammatical response to the elicitation prompt, they could not be scored as target ORs.

Mann–Whitney U-tests reveal that children with HFA are not outperformed by their TD age-mates on relative clause comprehension ($U = 224$, $p = .274$), judgment ($U = 263.5$, $p = .616$) or production ($U = 299$, $p = .774$).

Thus, despite their TD-like competence on the pragmatic (referential) and the syntactic components of DOS, children with HFA still underperform on DOS, but do slightly better than the children with SLI. These results are compatible with the hypothesis that children with HFA have problems with the integration of information from different levels and for the more specific hypothesis that children with HFA have problems to consistently map the different pragmatic, semantic and syntactic components of DOS: the establishment of referentiality and definiteness by considering speaker and hearer assumptions, the mapping of referentiality and definiteness to information structural notions such as topic and focus, and, in turn, the mapping of topic and focus to syntactic positions. When the information about speaker and hearer assumptions, referentiality/definiteness, information structure and syntactic object placement cannot be integrated, DOS fails to take place. I propose that it is exactly the occasional failure of this mapping process that causes children with HFA to leave referential objects to remain unscrambled sometimes. This may also explain why the children with HFA seem to perform slightly better on DOS than the children with SLI in this study: the children with HFA possess all the necessary knowledge of the separate components of DOS, but do not always manage to integrate this knowledge appropriately. In contrast, children with SLI lack one important component of DOS, namely, stable syntactic knowledge, blocking them from always placing the direct object in the correct position.

Recall from section 2.1 that an object in non-scrambled position may attract main sentential stress through the Nuclear Stress Rule, indicating focus. If children with HFA do not always scramble referential direct objects, i.e., place them 'out-of-focus', the question arises as to whether they are also not aware of information structural requirements, or whether they perhaps do not apply the Nuclear Stress Rule. Future research on the prosody of children with HFA should answer this question. For example, it should be possible to analyze the HFA children's prosody of the responses in the current experiment and determine whether the non-scrambled direct objects have main sentential stress or not, and whether the scrambled direct objects lack this.

In summary, the results discussed above suggest that children with HFA are not syntactically impaired, but that their impairment lies in a mapping/integration failure, as hypothesized in section 2.6.

5. Concluding remarks on complexity

The results presented and discussed in the previous sections bear on issues of linguistic complexity and how learners deal with such complexity in their language acquisition process. The following, final sections reflect on the role of the (interface)

⁵ It is clear from the numbers in Table 6 that neither the TD children nor the children with HFA are particularly good at Object Relative Clauses, which calls for an explanation in and of itself. Nevertheless, it is striking that the children with HFA are no different from their TD peers on Object Relative Clauses, while they are outperformed by their TD peers on Direct Object Scrambling.

complexity of Direct Object Scrambling in the linguistic development of children with language impairments, and, in turn, on how the linguistic behavior of such pathological populations can provide insight in the complexity of Direct Object Scrambling.

5.1. Summary and conclusions

This study investigated the ability to scramble referential direct objects in children with High Functioning Autism (HFA) and children with Specific Language Impairment (SLI) between the ages of 6 and 14, and their typically developing (TD) controls. The results show that, like younger TD Dutch-acquiring children, both the children with HFA and the children with SLI failed to scramble significantly more often than their TD age-mates.

The study demonstrates how the investigation of pathological populations can provide insight in the complexity of linguistic phenomena, such as Direct Object Scrambling (DOS). While the investigation of young TD Dutch-acquiring children has revealed the necessity of the CNSA for establishing definiteness and referentiality, and thus for DOS (cf. Schaeffer, 1997, 2000), the study of children with SLI suggests the need for syntactic knowledge of object placement for correct DOS. Finally, the study of children with HFA shows the importance of the ability to map the different pragmatic, semantic and syntactic components of DOS to each other.

This is summarized in (20):

(20) Complexity of Direct Object Scrambling (DOS)

Scrambling requires (at least)

- Knowledge of speaker/hearer beliefs - *pragmatics*
- Knowledge of definiteness and referentiality - *semantics*
- Knowledge of Information Structure, in particular the notions of topic and focus - *pragmatics*
- Knowledge of positions for direct objects in the sentence structure - *syntax*

These components of DOS indicate that it is a phenomenon at the interface of (at least) pragmatics, semantics and syntax. Although uniqueness and existentiality were not scrutinized in this study, they are obvious candidates for semantic components of DOS as well.

5.2. Directions for future research

The current study sparks several new investigations. First, as mentioned in section 2.1, an object in non-scrambled position can attract main sentential stress through the Nuclear Stress Rule, indicating focus. If children with HFA do not always scramble referential direct objects, i.e., do not always place them 'out-of-focus', the question arises as to whether they are not aware of information structural requirements, or whether they perhaps do not apply the Nuclear Stress Rule. Future research on the prosody of children with HFA should answer this question. For example, it should be possible to analyze the HFA children's prosody of the responses in the current experiment and determine whether the non-scrambled direct objects have main sentential stress or not, and whether the scrambled direct objects lack this. Studies on complexity never discuss the contribution of prosody to linguistic expression, but this study shows that we cannot reach a full understanding of complexity and how it is processed without taking into account intonational patterns.

Second, in section 4 it was suggested that, besides syntactic difficulties, the children with SLI may have problems with the semantic notions of uniqueness and existentiality. For a further and more detailed explanation of the failure to scramble by children with SLI it is important to find out whether semantics (as part of grammar) is impaired in SLI as well. A grammar impairment hypothesis for SLI would predict that, in addition to problems in morphosyntax, children with SLI have weak semantics. If this turns out to be true, it would further unravel the complexity of Direct Object Scrambling, by showing that the semantic notions of uniqueness and existentiality are crucial components of the phenomenon, which can be impaired separately.

Concluding, this study demonstrates that Direct Object Scrambling is a complex, multi-faced phenomenon, requiring the investigation of syntax, semantics, pragmatics and prosody.

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Appendix. Complete list of experimental items

Scenario's eliciting definite direct objects

(1) A picture of Patrick and a book is shown

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Patrick!

'Patrick!'

Experimenter A: Patrick verveelt zich en kijkt of er iets leuks te doen is. He, zegt Patrick, een boek! Maar ik houd niet van boeken.

'Patrick is bored and he is looking for something to do. Hey, Patrick says, a book! But I don't like books'.

Dus dat ga ik NIET lezen.

So that will I NOT read.

'So I am not going to read that.'

Experimenter B: Ik weet het! Het boek gaat Patrick WEL lezen!

I know it! The book will Patrick *wel* read!

'I know! Patrick is going to read the book!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Patrick gaat het boek NIET lezen.

Patrick will the book not read

'Patrick will not read the book.'

(2) A picture of Octo and a sandwich is shown

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Octo!

'Octo!'

Experimenter A: Octo heeft zin in iets lekkers. He, zegt ie, een boterham. Bah, die lust ik niet.

'Octo fancies a snack. He, he says, a sandwich. Yuck, I don't like that one'.

Dus die ga ik NIET opeten.

So that will I NOT eat.

'So I am not going to eat that one.'

Experimenter B: Ik weet het! De boterham gaat Octo WEL opeten!

I know it! The sandwich will Octo *wel* eat! 'I know! Octo is going to eat the sandwich!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Octo gaat het boek NIET lezen.

Octo will the sandwich not eat 'Octo will not eat the sandwich.'

(3) A picture of Boots and a giraffe is shown

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Boots!

'Boots!'

Experimenter A: Boots wil iets natekenen. He, een giraffe! Wat een grote giraffe. Maar die is echt te groot.

'Boots wants to draw something. Hey, a giraffe! What a big giraffe. But that one is really too big'.

Dus die ga ik NIET natekenen.

So that one will I NOT draw.

'So I am not going to draw that one.'

Experimenter B: Ik weet het! De giraffe gaat Boots WEL natekenen!

I know it! The giraffe will Boots *wel* draw! 'I know! Boots is going to draw the giraffe!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Boots gaat de giraffe NIET natekenen.

Boots will the giraffe not draw 'Boots will not draw the giraffe.'

(4) *A picture of Dora and a pond containing a boot is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Dora!

'Dora!'

Experimenter A: Dora heeft een nieuwe hengel gekregen. Ze wil er iets mee vangen. Maar er zwemmen geen vissen in de vijver. Er ligt een laars in de vijver. He, zegt Dora, een laars. Maar die kun je niet eten.

'Dora got a new fishing rod. She wants to catch something with it. But there are no fish in the pond. A boot lies in the pond. He, Dora says, a boot. But you cannot eat that.'

Dus die ga ik NIET vangen.

So that one will I NOT catch.

'So I am not going to catch that one.'

Experimenter B: Ik weet het! De laars gaat Dora WEL vangen!

I know it! The boot will Dora *wel* catch! 'I know! Dora is going to catch the boot!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Dora gaat de laars NIET vangen.

Dora will the boot not catch 'Dora will not catch the boot.'

(5) *A picture of Paddington Bear, who is holding flowers, and one big flower is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Paddington!

'Paddington!'

Experimenter A: Paddington wil bloemen plukken voor zijn moeder. Hij heeft al een paar bloemen. He, zegt Paddington, nog een bloem. Maar die vind ik te groot.

'Paddington wants to pick flowers for his mother. He already has some flowers. Hey, Paddington says, another flower. But that one I find too big.'

Dus die ga ik NIET plukken.

So that one will I NOT pick.

'So I am not going to pick that one.'

Experimenter B: Ik weet het! De bloem gaat Paddington WEL plukken!

I know it! The flower will Paddington *wel* pick! 'I know! Paddington is going to pick the flower!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Paddington gaat de bloem NIET plukken.

Paddington will the flower not pick 'Paddington will not pick the flower.'

(6) *A picture of Spongebob and a drawing of a teddy bear is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Spongebob!

'Spongebob!'

Experimenter A: Spongebob is aan het knutselen. Hij wil iets uitknippen. He, zegt hij, een teddybeer. Nou, die vind ik helemaal niet mooi.

'Spongebob is doing crafts. Hij wants to cut out something. Hey, he says, a teddy bear. Well, I don't like that one at all.'

Dus die ga ik NIET uitknippen.

So that one will I NOT pick.

'So I am not going to pick that one.'

Experimenter B: Ik weet het! De teddybeer gaat Spongebob WEL uitknippen!

I know it! The teddy bear will Spongebob *wel* pick! 'I know! Spongebob is going to pick the teddy bear!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Spongebob gaat de teddybeer NIET uitknippen.

Spongebob will the teddy bear not pick 'Spongebob will not pick the teddy bear.'

Scenario's eliciting referential indefinite direct objects

(1) *A picture of Elmo and three newspapers is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Elmo!

'Elmo!'

Experimenter A: He, zegt Elmo, drie kranten: 1, 2, 3. Twee kranten ga ik NIET lezen.

Hey, says Elmo, three newspapers: 1, 2, 3. Two newspapers will I NOT read

'Hey, Elmo says, three newspapers: 1, 2, 3. Two newspapers I am not going to read.'

Experimenter B: Ik weet het! Twee kranten gaat Elmo WEL lezen!

I know it! Two newspapers will Elmo *wel* read!

'I know! Elmo will read two newspapers'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Elmo gaat twee kranten NIET lezen.

Elmo will two newspapers not read

'Elmo will not read two newspapers.'

(2) *A picture of Paddington Bear and a drawing of three balloons is shown*

Experimenter B: Wie is dit?

'Who is this?'

Child: Paddington!

'Paddington!'

Experimenter A: He, zegt Paddington, drie ballonnen: 1, 2, 3. Twee ballonnen ga ik NIET uitknippen.

Hey, says Paddington, three balloons: 1, 2, 3. Two balloons will I NOT cut.out

'Hey, Paddington says, three balloons: 1, 2, 3. Two balloons I am not going to cut out.'

Experimenter B: Ik weet het! Twee ballonnen gaat Paddington WEL uitknippen!

I know it! Two balloons will Elmo *wel* cut.out!

'I know! Elmo will cut out two balloons!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Paddington gaat twee ballonnen NIET uitknippen.

Paddington will two balloons not cut.out

'Paddington will not cut out two balloons.'

(3) *A picture of Spongebob and three cars is shown*

Experimenter B: Wie is dit?

'Who is this?'

Child: Spongebob!

'Spongebob!'

Experimenter A: He, zegt Spongebob, drie auto's: 1, 2, 3. Twee auto's ga ik NIET natekenen.

Hey, says Spongebob, three cars: 1, 2, 3. Two cars will I NOT draw

'Hey, Spongebob says, three cars: 1, 2, 3. Two cars I am not going to draw.'

Experimenter B: Ik weet het! Twee auto's gaat Spongebob WEL natekenen!

I know it! Two cars will Spongebob *wel* draw!

'I know! Spongebob will draw two cars!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Spongebob gaat twee auto's NIET natekenen.

Spongebob will two cars not draw

'Spongebob will not draw two cars.'

(4) A picture of Patrick and three cupcakes is shown

Experimenter B: Wie is dit?

'Who is this?'

Child: Patrick!

'Patrick!'

Experimenter A: He, zegt Patrick, drie cakejes: 1, 2, 3. Twee cakejes ga ik NIET opeten.

Hey, says Patrick, three cupcakes: 1, 2, 3. Two cupcakes will I NOT eat

'Hey, Patrick says, three cupcakes: 1, 2, 3. Two cupcakes I am not going to eat.'

Experimenter B: Ik weet het! Twee cakejes gaat Patrick WEL opeten!

I know it! Two cupcakes will Patrick *wel* eat!

'I know! Patrick will eat two cupcakes!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Patrick gaat twee cakejes NIET opeten.

Patrick will two cupcakes not eat 'Patrick will not eat two cupcakes.'

(5) A picture of Dora and three magazines is shown

Experimenter B: Wie is dit?

'Who is this?'

Child: Dora!

'Dora!'

Experimenter A: He, zegt Dora, drie tijdschriften: 1, 2, 3. Twee tijdschriften ga ik NIET lezen.

Hey, says Dora, three magazines: 1, 2, 3. Two magazines will I NOT read

'Hey, Dora says, three magazines: 1, 2, 3. Two magazines I am not going to read.'

Experimenter B: Ik weet het! Twee tijdschriften gaat Dora WEL lezen!

I know it! Two magazines will Dora *wel* read!

'I know! Dora will read two magazines!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Dora gaat twee tijdschriften NIET lezen.

Dora will two magazines not read

'Dora will not read two magazines.'

(6) A picture of Octo and three jellyfish is shown

Experimenter B: Wie is dit?

'Who is this?'

Child: Octo!

'Octo!'

Experimenter A: He, zegt Octo, drie kwallen: 1, 2, 3. Twee kwallen ga ik NIET vangen.

Hey, says Octo, three jellyfish: 1, 2, 3. Two jellyfish will I NOT catch

'Hey, Octo says, three jellyfish: 1, 2, 3. Two jellyfish I am not going to catch.'

Experimenter B: Ik weet het! Twee kwallen gaat Octo WEL vangen!

I know it! Two jellyfish will Octo *wel* catch!

'I know! Octo will catch two jellyfish!'

Child: Nee!

'No'.

Experimenter A: Nee, he? Wat gebeurt er echt?

No huh? What happens there really?

'No? What's really happening?'

Target: Octo gaat twee kwallen NIET vangen.

Octo will two jellyfish not catch

'Octo will not catch two jellyfish.'

Scenario's eliciting non-referential indefinite direct objects

(1) *A picture of Octo is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Octo!

'Octo!'

Experimenter A: Mmmmm, zegt Octo, ik heb zin om iets te tekenen. Ik wil eigenlijk wel een vogel natekenen, maar dat is heel moeilijk. Ik denk niet dat ik dat kan.

'Mmmmm, Octo says, I would like to draw something. Actually, I would like to draw a bird, but that is very difficult. I don't think I can do that.'

Dus dat ga ik NIET doen.

So that will I NOT do

'So I am not going to do that.'

Experimenter B: Oh, ik heb het niet goed gehoord. Wat gaat Octo niet doen?

Oh, I have it not well heard. What will Octo not do

'Oh, I didn't hear it. What will Octo not do?'

Target: Octo gaat NIET een vogel tekenen.

Octo will NOT a bird draw

'Octo is not going to draw a bird.'

(2) *A picture of Paddington Bear and a library is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Paddington!

'Paddington!'

Experimenter A: He, zegt Paddington, de bibliotheek. Daar zijn heel veel boeken. Ik wil heel graag een boek lezen. Maar ik ben mijn bril vergeten.

'Hey, Paddington says, the library. There are lots of books over there. I would love to read a book. But I forgot my glasses.'

Dus dat ga ik NIET doen.

So that will I NOT do

'So I am not going to do that.'

Experimenter B: Oh, ik heb het niet goed gehoord. Wat gaat Paddington niet doen?

Oh, I have it not well heard. What will Paddington not do

'Oh, I didn't hear it. What will Paddington not do?'

Target: Paddington gaat NIET een boek lezen.

Paddington will NOT a book read

'Paddington is not going to read a book.'

(3) *A picture of Patrick is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Patrick!

'Patrick!'

Experimenter A: Mmm, zegt Patrick, ik zou graag heel moedig zijn en een boef vangen. Maar dat durf ik niet.

'Mmm, Patrick says, I would like to be very brave and catch a crook. But I don't dare to.'

Dus dat ga ik NIET doen.

So that will I NOT do

'So I am not going to do that.'

Experimenter B: Oh, ik heb het niet goed gehoord. Wat gaat Patrick niet doen?

Oh, I have it not well heard. What will Patrick not do

'Oh, I didn't hear it. What will Patrick not do?'

Target: Patrick gaat NIET een boef vangen.

Patrick will NOT a crook catch

'Patrick is not going to catch a crook.'

(4) *A picture of Spongebob is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Spongebob!

'Spongebob!'

Experimenter A: Mmmmm, zegt Spongebob, ik heb zin om iets te eten. Ik kan een snoepje eten, maar dat is slecht voor je tanden.

'Mmmmm, Spongebob says, I would like to eat something. I can eat a sweet, but that is bad for your teeth.'

Dus dat ga ik NIET doen.

So that will I NOT do

'So I am not going to do that.'

Experimenter B: Oh, ik heb het niet goed gehoord. Wat gaat Spongebob niet doen?

Oh, I have it not well heard. What will Spongebob not do

'Oh, I didn't hear it. What will Spongebob not do?'

Target: Spongebob gaat NIET een snoepje eten.

Spongebob will NOT a sweet eat

'Spongebob is not going to eat a sweet.'

(5) *A picture of Boots with a piece of paper and a pair of scissors is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Boots!

'Boots!'

Experimenter A: Mmmmm, zegt Boots, ik heb zin om iets te knippen. Ik kan een vliegtuig knippen, maar dat vind ik te moeilijk.

'Mmmmm, Boots says, I would like to cut something. I can cut out an airplane, but I find that too difficult.'

Dus dat ga ik NIET doen.

So that will I NOT do

'So I am not going to do that.'

Experimenter B: Oh, ik heb het niet goed gehoord. Wat gaat Boots niet doen?

Oh, I have it not well heard. What will Boots not do

'Oh, I didn't hear it. What will Boots not do?'

Target: Boots gaat NIET een vliegtuig knippen.

Boots will NOT an airplane cut

'Boots is not going to cut out an airplane.'

(6) *A picture of Dora is shown*

Experimenter B: Hé, wie zie je op het plaatje?

'Hey, who do you see in the picture?'

Child: Dora!

'Dora!'

Experimenter A: He, zegt Dora, ik heb zin om naar een tuin te gaan en een bloem te plukken. Maar dat mag niet zomaar.

'He, Dora says, I would like to go to a garden and pick a flower. But that is not allowed.'

Dus dat ga ik NIET doen.

So that will I NOT do

'So I am not going to do that.'

Experimenter B: Oh, ik heb het niet goed gehoord. Wat gaat Dora niet doen?

Oh, I have it not well heard. What will Dora not do

'Oh, I didn't hear it. What will Dora not do?'

Target: Dora gaat NIET een bloem plukken.

Dora will NOT a flower pick

'Dora is not going to pick a flower.'

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