

Acquisition of Object Scrambling by Bilingual Ukrainian Children: The Role of Specificity

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1. Introduction

Acquisition of scrambling is a complex process that reflects the interaction of different types of knowledge: syntactic, semantic and pragmatic. It has been shown that scrambling is linked to specificity¹ and definiteness in that the changes in the word order and semantic interpretation of a scrambled element interact (see Schaeffer 2000a, Barbier 2000, Krämer 2000, Avrutin and Brun 2001, Dyakonova 2004, Ilić and Deen 2004, Unsworth 2005, *inter alia*). Three major approaches to the acquisition of different aspects of this complex phenomenon have been discussed in the literature.

Schaeffer's (2000a) approach can be best defined as discourse-pragmatic. Schaeffer argues that scrambling in Dutch is triggered by a discourse-related feature – specificity. She further proposed that young children lack the pragmatic concept of non-shared knowledge, so they are not able to correctly mark specificity on the direct object DP, and thus specificity feature is underspecified in their grammar. Therefore, scrambling does not occur consistently in child speech due to lack of pragmatic knowledge.

Avrutin and Brun (2001) proposed a syntax-discourse approach to the acquisition of scrambling. They based their research on the assumption that word order interacts with specificity and definiteness, especially in Russian. It was shown that Russian children (age 1;7-2;3) place most arguments in correct positions, which suggests that they have the knowledge of specificity/definiteness from a very early age. Errors, if they exist, are due to children's egocentric assumption that the elements they refer to are known to the speaker and the hearer.

Unsworth (2004, 2005) showed some inadequacies of the pragmatic analysis and put forward a syntax-semantic approach to the acquisition of object scrambling. She suggested that errors in the acquisition of scrambling are not likely to be due to the lack of pragmatic knowledge since even adult learners show the same problems with scrambling as child learners (e.g., in L2 Dutch). In her view, errors in scrambling (especially in production) are linked to an unstable mapping between a semantic feature and syntax movement.

It remains open what is the role of specificity in the acquisition of scrambling in other languages, which theoretical approach to the acquisition of scrambling can be best supported by cross-linguistic data, and also how bilingual children acquire scrambling especially if their L1 lacks scrambling. The current paper provides novel evidence for syntax-semantic approach to the acquisition of scrambling, based on experimental data from Ukrainian-English bilingual children.

Assuming Full Access to Universal Grammar (UG) for child L2 (Schwartz 2003), we argue that bilingual children acquiring Ukrainian as their L2 have access to the specificity feature in UG (regardless of their L1), but that they may have difficulty in correlating syntactic and semantic components of the grammar. It is hypothesized that children have the knowledge of specificity in place in their grammar, but may scramble at a lower rate than adults due to unstable mapping between syntax (scrambling) and semantics (specificity feature). Under this hypothesis, we predict that children would not utter scrambled structures with non-specific interpretation, reflecting their knowledge of

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¹ We will provide a precise definition of “specificity” in section 2. Roughly, we use the term “specific” to mean that the speaker presupposes the existence of an individual.

specificity. In this paper, we show that our approach to optional scrambling is supported by the experimental study conducted with Ukrainian-English bilingual children. The results of our study reveal that there is no significant overuse of object scrambling in non-specific contexts. We evaluate our experimental results on the basis of three approaches to the acquisition of scrambling introduced above, and argue that the results support the syntax-semantic approach (Unsworth 2004, 2005), and pose an interesting challenge to the pragmatic approach (cf. Schaeffer 2000a).

The paper is organized as follows. First, previous experimental studies on the acquisition of scrambling are reviewed in section 2, and in section 3, their diverging predictions are discussed. Section 4 presents our predictions for scrambling in Ukrainian and provide a detailed description of our experimental study, and in section 5, the results are summarized. The paper concludes with a discussion of the findings and their implications for language acquisition theory.

2. Reviews of previous studies

A number of studies on the acquisition of object scrambling were conducted on languages with scrambling, such as Dutch and Russian. They reported optionality of scrambling in different age groups of L1 and L2 learners, attributing this phenomenon either to a pragmatic deficit (e.g., Schaeffer 2000a, Avrutin and Brun 2001) or to a syntactic-semantic mismatch (Unsworth 2004, 2005). Although the authors account for the optionality of the process in different terms, their findings document several convergent patterns in the acquisition of scrambling that can be tested cross-linguistically.

2.1. Discourse-pragmatic approach

Schaeffer (2000a, 2000b) assumes that object scrambling is driven by the feature [+specific] – [+specific] objects undergo scrambling, but [-specific] objects do not. The specificity (or ‘referentiality’ in Schaeffer (2000a)) was defined as follows:

- (1) 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 (Schaeffer 2000a: 24).

Importantly, Schaeffer argues that the specificity feature is *underspecified* in early child grammar. She predicts that at an early stage of acquisition, children may lack the concept of specificity and thus cannot associate it with scrambling. Consequently, children at this stage may scramble only optionally.

This hypothesis was tested with an experimental study which consisted of an elicited production task and a truth value judgment task. The subjects (49 Dutch children (2;4-6;10) and 23 adults) were shown short puppet shows with direct objects incorporated into a definite/specific, indefinite/specific, or indefinite/non-specific context. These contexts were designed to elicit a certain type of production from language learners. The target sentence may be accompanied with or without scrambling (over adverbs or negation), as exemplified in (2).²

- (2) a. Dat Marieke **een (bepaald/zeker) boek** gisteren gekocht heeft
 that Marieke a certain book yesterday bought has
 ‘That Marieke bought a certain book yesterday’
- b. Dat Marieke gisteren **een (of ander) boek** gekocht heeft
 that Marieke yesterday a/one or other book bought has
 ‘That Marieke bought some book or other yesterday’

² A similar experiment was also conducted with 35 Italian children (2;1–5;11) in order to show that the object scrambling across negation and adverbs in Dutch and object cliticization in Italian are similar syntactic processes.

Schaeffer observes two developmental stages in scrambling acquisition: At Stage 1, 2-year-old children scrambled highly optionally, and at Stage 2, 3-year-old and older children behave more adult-like: they obligatorily scramble the specific object (over negation). This is illustrated by Table 1.

Table 1. Placement of definite and indefinite direct objects with respect to negation

age	Definite		Indefinite	
	Pre-neg.	Post-neg.	Pre-neg.	Post-neg.
2	30%	70%	33%	67%
3	72%	28%	56%	44%
4	82%	18%	57%	43%
5	76%	24%	59%	41%
6	83%	17%	57%	43%
adults	96%	4%	66%	34%

Schaeffer claimed that the optionality of object scrambling at the early stage of acquisition results from the optional marking of specificity, which in turn depends on the acquisition of ‘Concept of Non-Shared Knowledge’ – speaker and hearer knowledge are always independent. Under this view, young children lack a specific pragmatic principle which leads to the lack of distinction between discourse-related (mentioned in the discourse, e.g. *the tree*) and non-discourse-related (part of the long-term shared knowledge, e.g. *the sun*) object DPs. The object, then, is not constantly marked with a relevant feature, and the syntactic process of scrambling does not always take place in child Dutch.

However, this analysis was developed mostly for definite DPs (including proper names and pronouns) and specific indefinite DPs that must precede the adverb and negation. Since the results from indefinite/specific and indefinite/non-specific were collapsed together (see Table 1), it is unclear whether children optionally scramble only in specific [referential] contexts or in any contexts across-the-board. We will return to this issue in section 3.

2.2. Syntax-discourse approach

Avrutin and Brun (2001) (and later Brun 2005) challenged Schaeffer’s (2000a, 2000b) claim about underspecification of specificity in child grammar. In their study, the terms ‘specificity’ and ‘non-specificity’ are used in “an intuitive pre-theoretical sense” and are defined along the lines of Yokoyama’s (1986) description of different states of interlocutors’ knowledge in discourse.

- (3) Specific expression denotes an individual already mentioned in the conversation and, therefore, familiar (“old”) with respect to a given discourse (Avrutin and Brun 2001:70).

The observation of Russian facts, which constitute the base of the study, may be summarized as follows: independently of the grammatical function (subject or object), preverbal elements are interpreted as specific and postverbal as non-specific.

- (4) a. **Mal’čik** činit igrušku.
 (the) boy-NOM is-fixing (a/some)toy-ACC
 ‘The boy is fixing a toy.’
- b. **Igrušku** činit mal’čik.
 (the)toy-ACC is-fixing (a-some)boy-NOM
 ‘A boy is fixing the toy.’

The authors pose a specific research question: to what extent young children know this dependency between word order and specificity and use it in their speech. If it is true that children lack knowledge of specificity, Russian children should misinterpret preverbal and post-verbal arguments.

Nonetheless, naturalistic data from four Russian children (1;7-2;3) showed that most of the arguments were placed correctly (90% of specific subjects and 89.4% of specific objects occurred preverbally).

Table 2. Distribution of subjects and objects in child speech (Avrutin and Brun 2001: 73)

Interpretation	Preverbal subject	Postverbal subject	Preverbal object	Postverbal object
specific	90.0%	10.0%	89.4%	10.6%
non-specific	32.2%	67.8%	9.7%	90.3%

Interestingly, only 9.7% of non-specific objects were scrambled over the verb. Therefore, Avrutin and Brun concluded that Russian children (unlike Dutch children from Schaeffer's study) show knowledge of specificity from a very early age. However, the high rate of preverbal non-specific subjects (32.2%) weakened the argument, so the authors suggested that this is due to pragmatic factors: "that is, to the child's erroneous presupposition that the referred individual is known to the listener and hence specific" (Avrutin and Brun 2001:79). It has remained unclear, however, why the object behaves in a different way from the subject in scrambling.

To sum up, it was shown that children know and use at an early age the mapping between position for the scrambled object and specificity. This mapping, thus, can be considered a part of an innate (or very early acquired) knowledge of the *syntax-discourse interface* rules. Furthermore, Avrutin and Brun suggested that the optionality of scrambling is related not to the featural underspecification (cf. Schaeffer 2000a), but to the optionality of the syntactic representation of the discourse referent.

2.3. *Syntax-semantic approach*

Unsworth (2005) compared child L1, child L2 and adult L2 acquisition of scrambling in Dutch. The main goal of her research was to examine whether English-speaking adult and child L2 learners go through the same developmental sequences in their acquisition of object scrambling in Dutch as L1 Dutch children. Unsworth employed both production and comprehension tasks in the experiment. The production task focuses on object scrambling over negation (based on Schaeffer's (2000) experiment). In the comprehension task, scrambling across the frequency adverbial *twee keer* 'twice' and negation was examined (based on Krämer's (2000) experiment).

Unsworth assumes that scrambling is movement to some VP-external position that has interpretive semantic effects. She notes that scrambled indefinite objects have been variously labeled as 'specific' (in the sense of Enç 1991), 'referential' (Fodor and Sag 1982), or 'presuppositional' (Diesing 1992). To avoid any confusion, she uses the cover-term 'specific', although, strictly-speaking, the reading which is tested in the relevant experimental conditions is partitive, in Hoop's (1992) terms.

The goal of Unsworth's experimental production study was to determine whether learners know the interpretive constraints on scrambling. For instance, scrambling over negation is obligatory for specific direct objects, as in (5b), but it is not allowed for non-specific direct objects, as in (5a).

(5) a. Brigit heeft geen (niet+een) **roos** geplukt
 Brigit has no (not+a) rose picked
 'Brigit didn't pick a(ny) rose.'

b. Brigit heeft [**een roos**] niet geplukt
 Brigit has a rose not picked
 'Brigit didn't pick a (certain) rose.'

Based on the elicited production task conducted with three different learner groups (13 L1 children, 25 L2 children, and 23 L2 adults), Unsworth analyzed the developmental stages of scrambling acquisition.

The results showed that adult Dutch L2 learners' initial stage corresponds to their L1 (English SVO) word order, but the next stages are similar for L1 and L2 learners. It was concluded, then, that

since both adults and children pass through the same optional scrambling stage (see a shaded row in Table 4, for example), they make use of the same mechanisms in language acquisition.

Table 3. L1 child and L1 adult object scrambling (Unsworth 2005: 226)

age	Condition		
	definite	specific indefinite	non-specific indefinite
5	71.7%	61.3%	15.2%
adults	98.5%	92.9%	0%

Table 4. L2 child and L2 adult object scrambling per condition (Unsworth 2005: 243, 244)

	definite		specific indefinite		non-specific indefinite	
	L2 children	L2 adults	L2 children	L2 adults	L2 children	L2 adults
Low	22.1%	19.3%	23.3%	14.3%	23.3%	20.0%
Mid	80.0%	88.9%	71.7%	58.3%	30.0%	13.3%
High	88.1%	87.5%	91.7%	85.7%	16.7%	0%

Overall, results of Unsworth's study demonstrate that L2 children and adults are able to overcome the poverty-of-the-stimulus in the infrequent input for scrambling and make a connection between semantic notion of specificity and syntactic movement. The existence of an optional scrambling stage in the L2 data was claimed to be inconsistent with Schaeffer's (2000a) approach discussed above. The L2 subjects tested were old enough to know pragmatic principles, and yet, they scrambled optionally.

These findings imply that syntactic-semantic factors might play a more important role in Dutch scrambling acquisition than knowledge of a certain pragmatic concept. However, more research on languages other than Dutch is needed in order to evaluate the validity of syntax-semantic approach to scrambling and specificity. The current study aims to contribute to this by presenting evidence from acquisition of object scrambling in Ukrainian.

3. Diverging hypotheses and predictions for acquisition of scrambling

3.1. Direct object scrambling in adult Ukrainian grammar

Ukrainian lacks articles and there is no lexical item that obligatorily marks *definiteness* or *specificity*.³ Word order permutations, on the other hand, can be considered the best means of encoding definiteness and specificity in Ukrainian.

We assume that definiteness and specificity are different semantic notions related to the state of discourse participants in the following way:

- (6) If a Determiner Phrase (DP) of the form [D NP] is...
 - a. [+definite], then the speaker assumes that the hearer shares the speaker's presupposition of the existence of a unique individual in the set denoted by the NP (based on Heim 1991)
 - b. [+specific], then the speaker presupposes the existence of an individual in the set denoted by the NP (based on Enç 1991)⁴.

In the current study we are concerned only with one word order change known as *direct object scrambling*. Without delving into different definitions of scrambling offered in the literature, we

³ Demonstratives such as *cej, cja, ce, ci* 'this' and *toj, ta, te, ti* 'that' can be optionally used to mark a referential definite (unlike English *the*). The cardinal numeral 'one' in various gender and number forms of *odyn, odna, odne, odni* often serves as a specificity marker with the meaning 'a certain', but it is not obligatory used, either.

⁴ A cautionary note on the term "specific" is required. Enç (1991) suggests that there are two sub-types of specificity: specificity encoded by *partitive* DPs, which are related to a previously mentioned set, and specificity encoded by elements such as *a certain* in English, which involve *speaker intent to refer* (Fodor and Sag 1982, and Ionin et al. 2004, among others). In our experimental study, we are mainly interested in the former notion of 'specificity' which is often termed as 'partitive' (Ko et al. 2006) and 'presuppositional' (Diesing 1992).

simply assume its pre-theoretical meaning – scrambling as a change in word order from the base order.

Ukrainian has an SVO base structure. Similarly to Dutch, Ukrainian allows object scrambling only when the object is specific, as in (7). Unlike Dutch, in-situ objects in Ukrainian can be specific or non-specific, as in (8). Adults, however, strongly prefer a non-specific reading for in-situ objects.

- | | | | | |
|-----|---|---------------------|------------------------------|------------------|
| | ∇ | | | |
| (7) | Taras | knyžku _i | čytaje | t _i . |
| | Taras | book [+specific] | reads | |
| | ‘Taras is reading a specific book.’ | | | |
| | | | | |
| (8) | Taras | čytaje | knyžku. | |
| | Taras | reads | book [-specific]/[+specific] | |
| | ‘Taras is reading any/a specific book.’ | | | |

Object scrambling in Ukrainian may alter semantic interpretation of the sentence. In particular, *cja* ‘this’ and *jakas* ‘some/any’ can be used to test these changes. In the basic structure (9), either of these determiners is acceptable and the sentence can mean: (a) there is *a certain book* that will be read by Taras *or* (b) there will be *some event of book-reading*.

- | | | | | | | |
|--------|--|--------|---------------|---------------------|--------|---------|
| (9) a. | Taras | bude | <u>švydko</u> | čytaty | cju | knyžku. |
| | Taras | be-FUT | quickly | read _{INF} | this | book |
| | ‘Taras is going to read the book quickly.’ | | | | | |
| | | | | | | |
| b. | Taras | bude | <u>švydko</u> | čytaty | jakus’ | knyžku. |
| | Taras | be-FUT | quickly | read _{INF} | any | book |
| | ‘Taras is going to read a book quickly.’ | | | | | |

After object scrambling, however, the sentences become unacceptable with *jakas* ‘some/any’, as illustrated in (10). This indicates that only specific interpretation is possible with the scrambled object.

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|------|--|--------|-----------|---------------------|---------------|---------------------|------------------|
| (10) | Taras | bude | (*jakus’) | knyžku _i | <u>švydko</u> | čytaty | t _i . |
| | Taras | be-FUT | any | book-ACC | quickly | read _{INF} | |
| | ‘Taras is going to read a book quickly.’ | | | | | | |

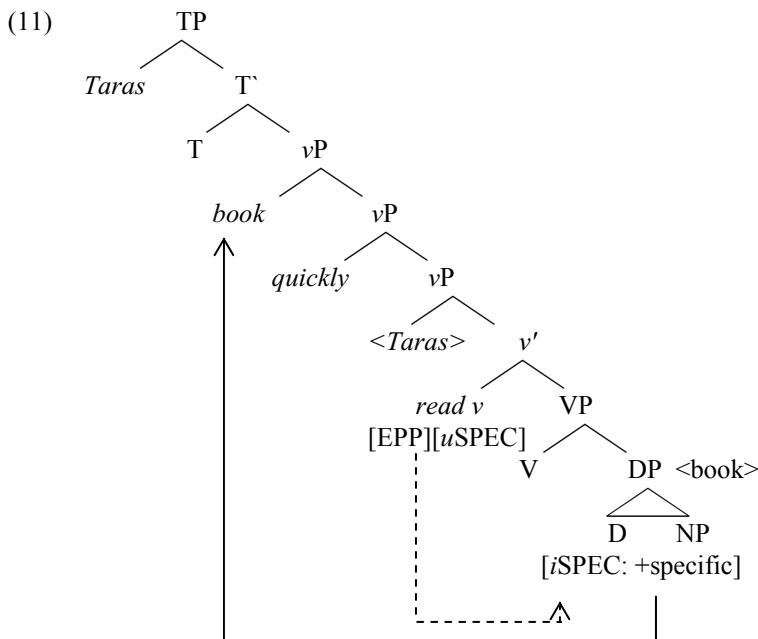
We present the mechanism of direct object scrambling in Ukrainian along the lines of the *Phase Theory* proposed by Chomsky (2001). Specifically, we argue that scrambling is triggered by a probe-goal Search (Chomsky 2001, Ko 2005). The direct object, as a *goal*, is selected by the *probe* ν , and they both have a [SPEC] feature, which marks the specificity value. The goal has an interpretable [SPEC] feature: [*i*SPEC], and the head ν contains an uninterpretable [SPEC] feature: [*u*SPEC], which must agree with [*i*SPEC].⁵ When the [SPEC] features of the object and ν match with each other, they undergo syntactic Agree. Next, the object undergoes movement due to the presence of EPP on ν . Adapting Pesetsky and Torrego (2001), we propose that EPP is a sub-feature of [*i*SPEC]. On this view, movement of the object is a consequence of Agree between ν and D, and optionality of movement comes from the optional insertion of EPP with [*i*SPEC].

The structure in (11) illustrates this process: Agree is established between ν and D for [SPEC] feature; the association between [SPEC] and EPP triggers movement of the DP *book* to the ν P edge that is marked by the adverbial *quickly*. Note that this proposal is in harmony with Chomsky’s view

⁵ Placement of the specificity feature in ν is justified by the fact that specificity can be realized in verbal morphology in some languages. For instance, in Swahili, specificity is marked by an object agreement affix (OA) on the verb (Deen 2006):

- | | | | | | | | |
|-----|-----------------------------------|---------|-------|----------------|---------|---|----------|
| (i) | Juma | a- | li- | mw- | on- | a | m-tu. |
| | Juma | SA.3sg- | past- | OA.3sg- | see-IND | | I-person |
| | ‘Juma saw the person/ *a person.’ | | | | | | |

that movement to edge positions (e.g. vP -edges, CP-edges) yields discourse-related effects such as focus and specificity. (In (11), the subject undergoes additional movement from Spec vP to SpecTP due to EPP-requirement of T.)



Crucially for our analysis, if the object contains [-specific] value (e.g. [*iSPEC: -specific*]), the sub-feature EPP cannot be added to the v even after Agree between v and D. Based on this assumption, we derive the fact that there is no scrambling of non-specific object in Ukrainian.⁶

To sum up, our account of object scrambling links availability of the syntactic movement to the semantic feature of specificity. Adults are able to establish the connection between the EPP sub-feature and the specific semantic feature, and utter scrambled structures. In the next section, we turn to the possible predictions for child scrambling.

3.2. Diverging predictions for Ukrainian scrambling

Given our analysis of scrambling in adult Ukrainian, several questions arise regarding the status of scrambling in child grammar. First, do children have knowledge of specificity at all? Next, do they scramble specific objects? Finally, do children know that non-specific objects cannot undergo scrambling? Proponents of different approaches to the acquisition of scrambling would address these questions from different perspectives.

The discourse-pragmatic approach would predict totally random use of scrambling in young children speech. Since under this approach the specificity feature is underspecified in child grammar, the direct object will not be always marked with an appropriate semantic feature (see Schaeffer 2000a). It further implies that object scrambling (which occurs only when the DP is marked as [*iSPEC: +specific*]) will not always take place in specific contexts. Moreover, children might produce sentences with a scrambled object even in non-specific contexts, using syntactic movement across-the-board.

⁶ We note that our proposal for non-specific objects raises a more fundamental question of why the EPP feature is incompatible with [-specific] value. This question has been a long-standing puzzle in the scrambling literature for other languages as well (e.g., Scandinavian Object Shift and scrambling in German and Dutch). As Thrainsson (2001:193) points out, the generalization seems to be that a weak/existential reading is incompatible with Object Shift, but the objects with a strong/quantificational/specific reading do not necessarily have to shift or scramble. The exact nature of this optionality deserves further research. We leave this important question open.

The syntax-discourse account of the word order acquisition, put forward by Avrutin and Brun (2001), would also predict certain amounts of scrambling in all contexts. In particular, since the errors in scrambling are attributed to children's egocentricity, children might misinterpret listener knowledge, and thus mark a [-specific] object as [+specific/definite] according to their own beliefs, which in turn will trigger incorrect scrambling of non-specific objects. Thus, on this analysis, overgeneralization of scrambling is expected in speech of child learners of Ukrainian.

The syntax-semantic approach, on the other hand, would predict a systematic error pattern in acquisition of scrambling. Since the proponents of this approach assume that specificity is fully available in child grammar, the direct object DP will always be valued as [+specific] or [-specific] (Unsworth 2004). Furthermore, Agree for [SPEC] feature can be established between v and D only if D is [*i*SPEC:+specific], which excludes scrambling of [-specific] objects. Children may show optional scrambling in specific contexts due to the lack of mapping between [SPEC] and its sub-feature EPP in v -head. The syntax-semantic approach thus predicts that children acquiring Ukrainian may *undergenerate* scrambling with specific objects, but that they would not *overgenerate* scrambling with non-specific objects.

The main goal of our research is to verify which theoretical approach to the acquisition of scrambling can be best supported by the data collected from Ukrainian-English bilingual children. The experimental study designed with this intent is the main topic of the following discussion.

4. Experimental design

4.1. Our predictions

Based on the syntax-semantic analysis of scrambling and the premise that (bilingual) children have full access to UG, we hypothesize the followings:

- (12) a. Scrambling is a consequence of syntax-semantics mapping (i.e. association between EPP on v and [+specificity] on D).
- b. (Bilingual) children have the knowledge of specificity from an early stage due to full access to UG, regardless of their L1.
- c. Children may have difficulty in understanding the mapping between syntax (the EPP feature) and semantics (specificity).

We make various predictions concerning possible and impossible patterns of word order in child grammar. First, if children have the knowledge of specificity, they will be able to utter sentences with the scrambled object. On this view, we crucially diverge from the discourse-pragmatic approach that children lack the knowledge of specificity and consequently would not utter scrambled sentences consistently (cf. Schaeffer 2000).

Second, if children may have difficulty in associating the EPP-feature (a pure syntactic feature) with [+specific] feature (a semantic feature), we expect that children may apply less scrambling to specific objects than adults. In this respect, we depart from Avrutin and Brun (2001) who predict that children, if they make errors, will overgenerate scrambling due to their egocentricity.

Thirdly, we expect that children will not scramble objects randomly. If children can make a distinction between specific objects and non-specific objects (reflecting knowledge of specificity), they would not wrongly scramble non-specific objects. Our view is in line with Unsworth (2004, 2005) who claims that child L2-learners can make a connection between semantic notion of specificity and syntactic movement. Our predictions are summarized in (13).

- (13) a. Children may utter scrambled sentences with specific objects.
- b. Children may apply less scrambling than adults
- c. Children will not randomly scramble non-specific objects (cf. pragmatic approach).

In discourse contexts which differ in specificity and definiteness, we expect children to follow the aforementioned patterns of scrambling. Our experimental design to test our predictions is given below.

4.2. Subjects

41 bilingual Ukrainian-English children and a control group of 4 adult Ukrainian speakers participated in the experiment. The age range of children was from 2;10 to 7;11: 6 children from 2;10 to 3;8 (mean 3;3), 16 children from 4;6 to 5;11 (mean 5), and 19 children from 6 to 7;11 (mean 6;7)). The primary language (L1) of majority of children was English (which lacks scrambling) and secondary language (L2) was Ukrainian. By choosing these children as our main participants, we tested the effect of specificity in scrambling in child grammar and the availability of UG access in child L2 *simultaneously*.

4.3. Method

We designed our experiment as a combination of a truth value judgment task and an elicited production task (based on Schaeffer 2000a). The procedure was as follows. Each subject was presented with short puppet shows with two characters and a number of props (pictures or toys). First, one puppet (either Winnie the Pooh, Piglet, or Roo) presented his story, and then, another puppet that is silly and does not know Ukrainian well (Tigger) either made a comment or asked for clarification. The subject, then, was asked to help by saying whether Tigger's comment was true or false, and if it was false by correcting it. The puppet comments and questions were designed in such a way that in responding to them, children would produce a sentence with scrambled or non-scrambled word order and either with an adverb or negation.⁷

Four conditions were tested in the experiment: definite specific (as in (14)), indefinite specific (as in (15)), indefinite non-specific (as in (16)) and definite pronominal (as in (17)). The pronominal condition had the same context as definite specific, but additional questions were included to trigger production of a personal pronoun as direct object. The stimuli used in the study are exemplified below. (In the actual experiment, the whole scenario was given in Ukrainian, but we provide English translation of our stimuli here for the ease of presentation.):

(14) Definite specific DP with an adverb

Roo: Look, what a nice butterfly. I have a new net, and I am going to catch it QUICKLY.
 Tigger: Roo is going to catch the butterfly SLOWLY.
 Exp: What is really happening?

Child:	Kenhuru	<u>metelyka</u>	ŠVYDKO	zlovyt'.
	Roo	butterfly	quickly	will.catch
	Kenhuru	švydko	zlovyt'	<u>metelyka.</u>
	Roo	quickly	will.catch	butterfly
		'Roo is going to catch the butterfly QUICKLY.'		

(15) Indefinite specific DP with an adverb

Piglet: Look, two cats: 1, 2. I am going to draw one of them. And I'm going to do it NICELY!
 Tigger: Piglet is going to draw one cat IN AN UGLY WAY!
 Exp: What is really happening?

Child:	Porosjatko	<u>odnoho kotyka</u>	HARNO	namaljuje.
	Piglet	one cat	nicely	will.draw
	Porosjatko	harno	namaljuje	<u>odnoho kotyka.</u>
	Piglet	beautifully	will.draw	one cat
		'Piglet is going to draw one cat NICELY.'		

⁷ There was a simple question-answer test for screening children who do not know Ukrainian and cannot participate in the experiment. 4 children were excluded based on this pre-test.

(16) Indefinite non-specific DP with an adverb

Winnie: I feel like catching something big. What can I catch? I can catch a whale, a shark, or a crocodile. [Child response...]. OK! And I am not going to do that CAREFULLY!
 Tigger: Oh, I haven't understood it very well. What is Winnie going to do carefully?

Child: Winnie oberežno bude lovyty (akulu).
 Winnie carefully will catch shark

[*]Winnie (akulu) oberežno bude lovyty.
 Winnie shark carefully will catch
 'Winnie will catch a shark carefully.'

(17) Definite pronominal DP with negation

Winnie: Look, a boot is in the pond. I have a good fishing rode, but you can not catch boots. So, I am not going to catch it.
 Tigger: Winnie is going to catch it.
 Exp: What is Winnie really going to do with the boot?

Child: Winnie joho NE BUDE lovyty.
 Winnie him not will catch

[*]Winnie ne bude lovyty joho.
 Winnie not will catch him
 'Winnie will not catch it.'

In (14) and (15), scrambled and non-scrambled orderings are all grammatical in adult speech. In (16), however, the use of scrambled structure is not acceptable due to non-specific interpretation of the object. In (17), a scrambled structure is strongly preferred in adult speech since pronominals are prototypical definite (and specific) elements.

In order to ensure presence of the direct object in child responses only telic verbs were selected⁸: *zlovyty* 'to catch up', *namaljuvaty* 'to draw', *vyrizaty* 'to cut out', *vykydaty* 'to throw out'. Following Schaeffer (2000a), adverbs or negation were used in order to mark a landing site of a scrambled object and to control for the object focusing by stressing an adverb or negation instead. In half of the testing stimuli, negation was contrasted with affirmation. In the other half, antonymous pairs of low adverbs were used: *svydko/povil'no* 'quickly/slowly', *harno/pohano* 'nicely/wrongly', *pravyl'no/nepravyl'no* 'well/wrongly', *oxajno/neoxajno* 'neatly/messily'. There were 8 context types with 4 tokens each (32 tokens in total). The stimuli were interspersed with 8 fillers that were designed similarly, but always triggering a 'yes' response from a subject. Fillers were necessary to test if children are still paying attention to the experiment, and to prevent them from forming strategies in answering questions.

5. Results

5.1. Child and adult group data

The data is analyzed in terms of the percentage rate of scrambling in four tested conditions (number of responses with scrambled objects relative to a total number of tokens per condition). The experimental results for two groups (children subjects and adult controls) are summarized in Table 5.

⁸ Since only future events were discussed in the dialogs, subjects could use any of two forms of future tense. For example, for 3sg these forms are: *zlovyt' / bude lovyty* 'will catch'; *namaljuje / bude maljuvaty* 'will draw', *vyriže / bude vyrizaty* 'will cut out', *vykyne / bude vykydaty* 'will throw out'. Although distribution of telic verbs can interact with specificity of the direct object (Slabakova 1999), the current study did not focus on this issue.

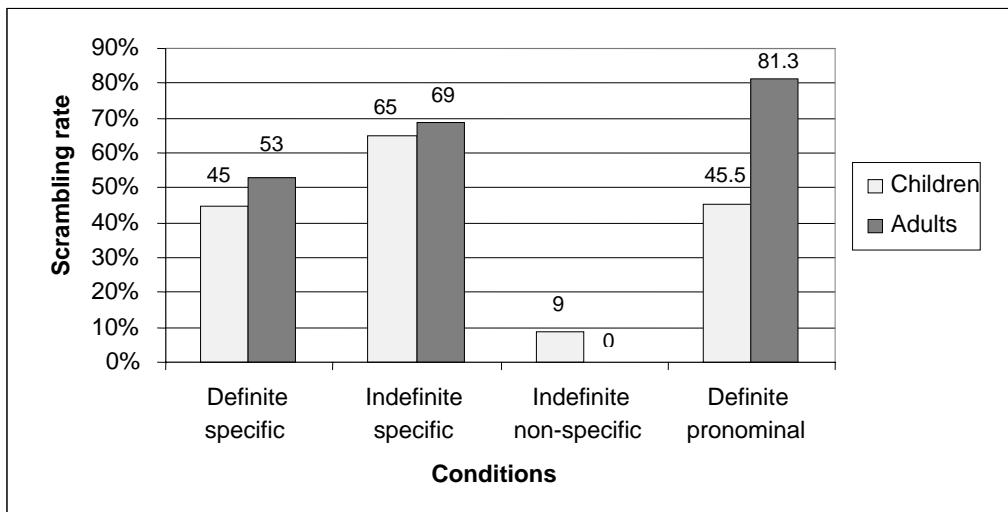
They show that both adult Ukrainian speakers and bilingual Ukrainian/English children employ direct object movement in three specific contexts, and thus exhibit knowledge of the correlation between word order and semantic interpretation. In both children and adult data, scrambling occurs optionally, but not randomly.

Table 5. Group results for scrambling across condition

Group	n	Condition							
		definite specific		indefinite specific		indefinite non-specific		definite pronominal	
		%	n	%	n	%	n	%	n
Children	41	45	36/80	65	52/80	9	7/80	45.45	40/88
Adults	4	53	17/32	69	22/32	0	0/32	81.25	26/32

Overall, children show less scrambling than adults: 41.16% (135/328) vs. 50.78% (65/128). However, scrambling rates per condition indicate important similarities between children and adult group data, as presented in Figure 1. Adults consistently scramble pronominal direct objects (81.25%), but never scramble the object in a non-specific indefinite condition. Their group data show optional scrambling in definite specific (53%) and indefinite specific (69%) conditions.⁹ Children's data from the same conditions show the same tendency: they scramble 45% in definite/specific contexts and 65% in indefinite/specific contexts, but they rarely allow object scrambling in non-specific contexts (9%).

Figure 1. Scrambling rate: Children vs adults

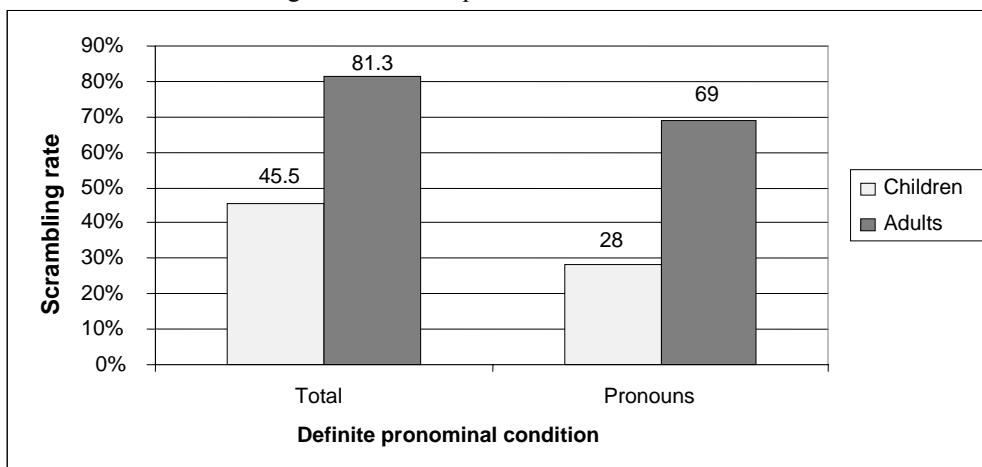


As for the pronominal direct object scrambling, children show greater optionality than the adults: 28.41% (children) vs 68.75% (adults) scrambled pronouns in the definite pronominal condition. The low rate of pronoun scrambling from children is partly due to the fact that children do not produce many pronouns. When we compute scrambling rates of full DP and pronouns together, the total percentage in this condition (45.45%) amounts to that obtained in the definite specific context (45%).

⁹ The individual scrambling rates for the adult controls are as follows: AS-1 - 56.25%; AS-2 - 62.5%; AS-3 - 34.38%; AS-4 - 50%. No subjects scramble in the indefinite non-specific condition. As expected, all of the subjects scramble pronominal direct objects at a very high rate: from 75% to 100%. The rate of scrambling for the other conditions varies from 25% in a definite specific context to 100% in an indefinite specific context, which confirms that the movement is optional in adult grammar.

This suggests that children follow the same rules in both contexts, but might have difficulty with pronominal production.

Figure 2. Pronominal scrambling in the definite pronominal condition



Finally, a detailed statistical analysis of child data supports the prediction about the non-random nature of scrambling in language learners' grammar. The one-way repeated measures analyses of variance (ANOVAs) show that there is a significant main effect of specificity on the word order choice in child production [$F(3,41)=9.992$, $p<.0001$]. The planned comparison results show that the difference between the indefinite specific and the indefinite non-specific condition is highly significant ($p<.0001$). The difference between the definite specific and the indefinite non-specific condition is also significant ($p=.001$) as well as the difference between the definite pronominal and the indefinite non-specific condition ($p=.001$). Furthermore, the planned comparison also shows that there is no significant difference between the definite specific and the indefinite specific conditions ($p=.065$) and the definite specific and the definite pronominal ($p=.965$). This suggests that specificity, instead of definiteness, significantly contributes to object scrambling by the learners.

Although it was not the goal of this study to establish developmental stages in scrambling acquisition, it seems that, in general, there was no strong correlation between the child's age and the ability to scramble. Moreover, older children (6-7-year-old) do not scramble more often than younger children (3-year-old), as shown in Table 2.

Table 6. Children: Age groups

age	Condition							
	definite specific		indefinite specific		indefinite nonspecific		definite pronominal	
	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>
3	56	9/16	62.5	10/16	12.5	1/8	50	4/8
4-5	50	16/32	75	12/16	7.5	3/40	42.5	17/40
6-7	34.4	11/32	62.5	30/48	9.4	3/32	47.5	19/40

5.2. Produced sentence structures

More should be said about the obtained data in terms of the scrambled structure types. While only two main word orders were predicted as clear cases of scrambling, namely SOAdvV and SONegV, there were more variations in the actual results.

Scrambling over negation (SONegV) was used at the highest rate, especially by adults. However, since all scenarios triggered response about a future event and the future tense that can be expressed in Ukrainian either as one or two words, subjects could use either of the structures: without or with a future auxiliary. When the auxiliary was used, some subjects preferred ‘shorter’ scrambling - SNegAuxOV over ‘longer’ scrambling- SONegAuxV. These responses were still coded as scrambling because they showed object movement to a higher situated pre-verbal position which can be associated with specificity in Ukrainian. Scrambling over adverbs (SOAdvV) was less productive due to different reasons. Some subjects (mostly adults) focused on adverbs and changed the word order to emphasize the adverb and not the object, while others (mostly young children) had difficulty using adverbs at all (as was noticed in Schaeffer 2000a, too) and produced them with a delay at the end of utterance. Thus, the structure SVOAdv was used by adults and children, but was considered as unscrambled¹⁰.

To summarize, our results demonstrate that the effect of specificity on scrambling established for adult speakers remains significant for children as well. Children acquiring Ukrainian do not perform at random and appear to be aware of interpretative constraints on scrambling.

6. Discussion

Our experimental results suggest that approaches presented in pragmatic terms are unlikely to account for optionality in scrambling observed in the study. The discourse-pragmatic approach, for instance, predicted high optionality and totally random use of scrambling. On Schaeffer’s (2000a, 2000b) view, the specificity feature is underspecified in child grammar, so children might utter very little scrambling or produce sentences with a scrambled object even in non-specific contexts, using syntactic movement across-the-board. In the syntax-discourse analysis by Avrutin and Brun (2001) pragmatic knowledge also plays an important role in word order acquisition. Extending their analysis to Ukrainian scrambling, we could expect that egocentricity of children would lead to obligatory scrambling everywhere. In particular, children could mark [-specific] object as specific/definite according to their own beliefs, which in turn would trigger more scrambling. Consistent with any of these [intrinsically pragmatic] approaches, it could be predicted that Ukrainian children would produce sentences with a scrambled object even in non-specific contexts. However, the obtained experimental data show that this was not the case: optional child scrambling in Ukrainian did not exhibit significant overuse of object movement in the non-specific condition at any age group (Table 6), and, thus, the pragmatic approaches are not supported.

The syntax-semantic approach, on the other hand, fares better with regard to Ukrainian scrambling acquisition.

First, the results of our experiment clearly show that specificity interacts with object scrambling in child Ukrainian, as predicted in (13a). Children scrambled significantly more often in specific contexts than in non-specific. This result provides further arguments for the view that children do have the knowledge of specificity in their grammar from a very early stage (Avrutin and Brun 2001, Ilić and Deen 2004). This, in turn, poses a considerable challenge to the proposal that specificity feature is underspecified in child grammar (cf. Schaeffer 2000a, 2000b).

Next, our data demonstrate that children use less scrambling than adults, as predicted in (13b). Adults are able to establish association between syntactic knowledge (EPP on ν) and semantic knowledge (SPEC on D) and freely use scrambling in order to convey specific interpretation of the direct object. Children, on the other hand, may have difficulty in SPEC-EPP correlation. It suggests that a low rate of scrambling in child Ukrainian stems from a lack of syntactic-semantic mapping and, thus, it can be taken as evidence for syntax-semantic approach to the acquisition of scrambling proposed by Unsworth (2004). This result also provides further support for the proposal that L2-learners have problems with mapping issues at the interface (e.g. Prevost & White (2000) for mis-mapping between syntax and morphology).

¹⁰ SVOAdv structure could also be analyzed as such that was derived by a ν P movement. However, since adverbs in such sentences were always focused, we assume a different, non-scrambling, analysis for these structures.

Finally, it has been shown that children scramble optionally, but not randomly. They scrambled mostly [+specific] objects, as predicted in (13 c)¹¹. This allows us to suppose that child grammar is constrained by the same rule as adult grammar. Assuming syntax-semantic approach to the acquisition of Ukrainian scrambling, we expected that children would show a specific pattern in scrambling production: when they scramble direct object, they scramble only specific objects. Our experimental study provided evidence for such a pattern in acquisition of scrambling by Ukrainian L2 child learners.

7. Conclusion

In this paper, we have investigated the role of specificity and definiteness in a ‘free-word-order’, article-less language – Ukrainian. Our elicited production study has shown that bilingual Ukrainian-English children have knowledge of specificity, and they are aware of correlation between specificity and scrambling in Ukrainian. However, they scramble at a lower rate than adults, which suggests that children sometimes fail to map the semantic feature of specificity and the syntactic feature responsible for scrambling. Crucially, however, there is no significant overuse of object scrambling in non-specific contexts both in the child and adult data, contrary to what is predicted under the pragmatic approach. This result, thus, further suggests that the syntax-semantic approach provides a better explanation of optionality in object scrambling.

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¹¹ There were infrequent instances of scrambling in non-specific contexts, but since the group scrambling rate in non-specific contexts was only 9%, we take those data as performance errors.

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