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On Focus Encoding in Adult and Child Hebrew

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1. Introduction

This paper reports the results of an experimental study on the complement order of the ditransitive verb *latet* and its interaction with Information Structure in adult and child Hebrew. The adult data provide psychological reality to the claim that the order of the Direct Object (DO) and the Indirect Object (IO) strongly depends on the respective status of topic or focus, while the child data show that the notions of topic and focus are known and employed as early as age 2;6.

As in many other languages, the Hebrew ditransitive verb *latet* ('give') allows for two linear orders of its verbal complements. Either the Direct Object (DO) precedes the Indirect Object (IO), or the DO follows the IO. This linear variation, often referred to as the *dative alternation* is illustrated in (1).

(1) a. DO-IO:
Avišag natna et ha- simla le-Liri
Avishag gave-f ACC the-dress to-Liri
Avishag gave the dress to Liri
b. IO-DO:
Avišag natna le-Liri et ha- simla
Avishag gave-f to-Liri ACC the-dress
Avishag gave Liri the dress

As example (1) shows, Hebrew differs from languages such as English in that it does not involve *to*-deletion in the IO-DO order. The Hebrew morpheme *le-* (the parallel to the English *to*) is considered a dative case marker rather than a preposition. As such, it is a prefix to the IO complement, regardless of the IO's position. Despite this subtle difference with English, we adopt Landau's (1994) claim that "the dative alternates in Hebrew constitute a natural, distinct grammatical phenomenon, just as they do in English" (p.17). [1]

According to Rappaport Hovav and Levin (2008) verbs participating in the dative alternation in English (e.g. *give*, *push, send*) are not necessarily semantically similar. More specifically, they claim that these verbs fall into one of three categories, depending on their association with the two possible meanings: Caused Motion and Caused Possession (see, for example, Harley 2002), as given in (2).

(2) a. Caused Motion verbs whose IO denotes a Location (e.g., *push*)
b. Caused Possession verbs whose IO argument denotes a Recipient, and may be realized by both dative alternates (e.g., *give*)
c. Verbs that can either denote a Caused Motion or a Caused Possession meaning. The IO argument of such a verb may be either a Recipient or a Location (e.g., *send*)

In their analysis, the verb *give* belongs to the category in (2b). It is not a reflex of polysemy and is only Caused Possession, selecting a recipient argument in addition to the theme argument.[2]

Recent studies on the dative alternation in Hebrew strongly support the suggestion that Rappaport Hovav and Levin's (2008) account for the dative alternation in English extends to Hebrew as well (e.g. Francez 2006 and Mishani 2012). We adopt this view, and take the verb *latet* to be monosemic and compatible only with the Caused Possession meaning. However, this does not explain why the two complements of *give* can occur in two different orders (DO-IO / IO-DO), as illustrated in (1) above. In fact, as Chomsky (1995) claims, no true optionality exists in natural language.

Indeed, various factors have been observed to affect the dative alternation. One such factor is weight, such that a heavier phrase tends to follow a lighter one (for English: Arnold et al. 2000; Bresnan et al. 2007 and Snyder 2003, a.o.). However, this finding is mostly based on corpus studies in which the context is often unclear and cannot be controlled for, rendering Information Structure a confounding factor. Moreover, Arnold et al.'s (2000) corpus and experimental study reveal that weight has more effect on constituent ordering only when newness makes "no prediction about the outcome" (p. 45), i.e. when both complements are given. Otherwise, both newness and heaviness are significant factors in determining the order of the verbal complements.

Other corpus studies on English adult and child language have found an additional animacy effect on word order. For example, English-acquiring children frequently place animate nouns in subject position and inanimate nouns in object position (e.g. Osgood and Bock 1975; Cannizzaro 2012). Likewise, inanimate agents and animate patients are generally associated with the passive voice, while animate agents and inanimate patients are associated with the active voice (e.g. McDonald et al. 1993). With respect to the dative alternation, animacy is found to be a significant variable predicting the English dative alternation in corpus studies (e.g. Bresnan et al. 2007). It was observed that an animate IO in adult English is more likely to be topical and to precede the inanimate DO (e.g. Ransom 1979; Snyder 2003 and Thompson 1995).[3] The explanation for such an effect is that animate entities are conceptually highly accessible and are therefore retrieved more easily (see Bock and Warren 1985) than inanimate entities. Yet, given that the verb *give* usually selects an animate IO, capable of possession, while the DO is more likely to be inanimate, animacy by itself cannot account for the existence of the two variants of the dative alternation.

We argue that the order of the verbal complements in ditransitive constructions is highly determined by their information status as topic or focus. Following Erteschik-Shir's (1997) proposal that Information Structure is part of Universal Grammar, we argue that the notions of topic and focus are available to children very early, and are possibly innate.

2. Information Structure: Topic and Focus

As Erteschik-Shir (1997:11) puts it, focus represents the constituent "which the speaker intends to direct the attention of his/her hearer(s) to".[4] Thus, the focused element can be a completely new entity added to the discourse or an element already available to both the speaker and the hearer ('the common ground'), conditional on it also being the element to which the speaker wishes to draw his/her hearer's attention.[5]

This type of 'new information focus' can be defined operationally as a well-formed answer to a Wh-question (e.g. Gunter 1966, Rochemont and Culicover 1990, Lambrecht 1994, and Erteschik-Shir 2007, a.o.). Consider the following example in English (the focus in the answer is underlined):

(3) What did Avishag eat?
a.*<u>Avishag</u> ate the apple.
b. Avishag ate <u>the apple</u>.

The question in (3) forces focus assignment on the object *the apple*, which is the answer to the Wh-question. Thus, in spite of the fact that both answers (3a) and (3b) provide the same proposition (i.e. the agent is Avishag and the apple was eaten by her), the only appropriate answer to the question in (3) is one that provides the required Information Structure with focus on the subject – (3b).[6]

In contrast, a topic is a referential NP with a discourse antecedent available in the discourse (e.g. Gundel 1974; Chafe 1976; Erteschik-Shir 1997; De Cat 2002, a.o.), as illustrated in (4):

(4) a. I saw a little girl.
b. The girl/She was crying.

The subject of (4a) is the speaker, whose reference is available at the beginning of the discourse. *A little girl* is introduced into the discourse by the speaker, licensing it as a potential topic of the following utterance. As such, it is instantiated as a definite NP or a pronoun (4b).

2.1. Topic and focus encoding

Focus in Hebrew is always marked by main stress. The way focus is assigned main stress depends on its location in the sentence. According to Cinque's (1993) Nuclear Stress Rule (NSR), main stress is assigned to the most embedded constituent in the clause. In a right branching language (like English and Hebrew) this is the rightmost position. Thus, constituents in final position receive main stress by the application of the NSR, as illustrated in (5). Main stress is marked in bold.

(5) a. Ma axla Liri?
what ate-f. Liri?
What did Liri eat?
b. Liri axla **tapu'ax**
Liri ate apple
Liri ate an apple
c. [Liri [axla [tapu'ax]]]

As Cinque (1993) argues, the NSR is automatic, i.e., it always applies, and follows for free from syntax.

Nevertheless, the NSR cannot explain how main stress is assigned to the focused constituent when it occurs in a non-final position, as in (6):

(6) a. Mi axal tapu'ax?
Who ate an apple
Who ate an apple?
b. **Liri** axla tapu'ax
Liri ate-f. an apple.
Liri ate an apple

The question in (6a) elicits focus on the subject – the answer to the Wh-question. As we see, the canonical SVO order for Hebrew is not compromised here for focus stress assignment: despite its focus, the subject remains in its canonical (non-final) position. Stress in this position cannot be explained by the NSR.

Here we follow Reinhart's (1995; 2006) Interface Theory, which states that the prosodic difference between two Information Structures of the same linear order (e.g. focus on the final DO in (5b) vs. focus on the (non-final) subject in (6b)) becomes relevant for focus identification only at the interface. While stress on a focused constituent in final (most-embedded) position is projected for free by Cinque's (1993) NSR, non-final focused constituents as in (6b) cannot obtain the intended focus reading by maintaining main stress by the NSR and a special (phonological) Stress-Shift operation needs to apply at the interface, yielding marked stress. A derivation that requires a Stress-Shift Operation is uneconomical and has serious processing costs, due to a violation of a core principle of the Computational System (the NSR). Such a violation is not allowed superfluously, but permitted as a last resort to satisfy an interface requirement.

Consider now the following Wh-questions in Hebrew:

(7) a. Le-mi natna Avišag et ha-simla?
to-who gave-f. Avishag ACC the-dress
Who did Avishag give the dress to?
b. Ma natna Avišag le-Liri?
what gave-f. Avishag to-Liri
What did Avishag give to Liri?

As we can see, the question in (7a) asks for the second object – the IO, while it introduces the object *ha-simla* ('the dress').. Thus, in a potential answer to this question, the DO is topical and the IO is focused. Similarly, in a potential answer to (7b), the object *Liri*, which is introduced in the question, is topical and the DO, which answers the question, is focused.

There are two possible linear orders in which the questions in (7a) and (7b) can be answered. In one order, the topical object precedes the focus, as in (8) and (9), respectively:

(8) a. Avišag natna et ha-simla le-Liri
Avishag gave-f. ACC the-dress to-Liri
Avishag gave the dress to Liri
b. [$_{IP}$ Avishag …[$_{VP}$ [$_{V'}$ [$_{V}$ natna] [$_{VP}$[$_{NP}$ et ha-simla][$_{V'}$[$_{V}$ t][$_{NP}$ le-**Liri**]]]]]][7]
(9) a. Avišag natna le-Liri et ha-**simla**
Avishag gave-f. to-Liri ACC the dress
Avishag gave Liri the dress
b. [$_{IP}$ Avishag …[$_{VP}$ [$_{V'}$ [$_{V}$ natna] [$_{VP}$[$_{NP}$ le-Liri][$_{V'}$[$_{V}$ t][$_{NP}$ et ha-**simla**]]]]]]

As the examples show, the focused objects *Liri* (in (8a)) and *ha-simla* (in (9a)) occur in final position (rightmost) and are the most embedded constituents in the sentence, which allows them to receive main stress through the application of the NSR.

In the other linear option, the focused object precedes the topic, as in (10) and (11), respectively:

(10) a. Avishag natna le-**Liri** et ha-simla.
Avishag gave to-Liri ACC the dress
Avishag gave Liri the dress
b. [$_{IP}$ Avishag …[$_{VP}$ [$_{V'}$ [$_{V}$ natna] [$_{VP}$[$_{NP}$ le-**Liri**][$_{V'}$[$_{V}$ t][$_{NP}$ et ha-simla]]]]]]
(11) a. Avishag natna et ha-**simla** le-Liri.
Avishag gave-f. ACC the-dress to-Liri
Avishag gave the dress to Liri
b. [$_{IP}$ Avishag …[$_{VP}$ [$_{V'}$ [$_{V}$ natna] [$_{VP}$[$_{NP}$ et ha-**simla**][$_{V'}$[$_{V}$ t][$_{NP}$ le-Liri]]]]]]

Unlike in the previous order, when focus is non-final, as in (10) and (11), the NSR cannot account for main stress on the focused object and a Stress Shift Operation must apply to allow for the focus to be assigned (marked) main stress.

The difference between unmarked and marked stress is that the latter requires computational complexity, which is not involved in the former. As Reinhart (1995; 2006) argues, the interpretation of sentences with Stress-Shift involves an on-line comparison of the two focus sets, which imposes an excessive processing load. The focus set of a sentence consists of all, and only, the constituents that contain the main stress of that sentence.

Consider the following examples illustrating a focus set derived by the NSR in (9a) and (10a) and a focus set

derived by stress-shift in (9b) and (10b). Main stress is marked in bold.

(12) a. Avišag natna le-Liri (et ha)**simla**
Focus set: {IP, VP, DO}
b. Avišag natna (et ha)**simla** le-Liri
Focus set: {IP, VP, DO}
(13) a. Avišag natna et hasimla le-**Liri**
Focus set: {IP, VP, IO}
b. Avišag natna le-**Liri** et hasimla
Focus set: {IP, VP, IO}

The interpretation of a sentence with stress-shift, as in (12b), requires an evaluation of the focus sets of both (12b) and (13a). Similarly, the interpretation of (10b), implies an evaluation of the focus sets of both (12a) and (13b). The result of these evaluations is that the only reading of (12b) is the focused DO reading and the only reading of (13b) is a focused IO. However, these readings cannot be derived by the NSR. Consequently, the (costly) Stress-Shift Operation must apply to give (12b) and (13b) the desired focus reading.

As for production, Reinhart (2006) argues that, when producing an utterance, the speaker already knows what s/he intends to say and thus focus set evaluation is not required. Yet, stress assignment to non-final constituents is costly, since the stress automatically assigned by the NSR to the most embedded (right-most) constituent in the sentence must be shifted to a different constituent by a special Stress-Shift Operation. In other words, the speaker first applies the NSR, because it is an automatic rule, as part of the computational system. Then, only if the intended focus is not in the focus set, Stress-Shift is used. This undoing of steps in the derivation (i.e. undoing of the initially applied NSR) is costly.

Basically then, in Reinhart's theory, when focus occurs in final position it is unmarked and when it occurs in non-final position it is marked and costly, which is why speakers prefer the topic-before-focus order, as is widely observed across languages.

In contrast to focused constituents, topical constituents never receive stress. In addition, topics can be encoded by pronominalization, as illustrated in (4) adapted in (14).

(14) a. I saw a little girl.
b. She was crying.

What licenses the use of a pronoun in the subject position in (14a) is the fact that a reference for the speaker is always available at the beginning of the discourse. Then, the introduction of *a little girl* in (14a) licenses the use of a pronoun in (14b). According to Lambrecht (1994) the primary function of pronouns is to signal to the interlocutors that the discourse continues to address the same entity, and for Erteschik-Shir (1997: 71) "a pronoun's function is to signal coreference with some discoursally prominent NP […]". For similar reasons, topic phrases can sometimes be entirely dropped if they are recoverable from the discourse.

3. Previous acquisition studies, hypotheses and predictions

There are a few studies on the effect of Information Structure on the dative alternation in child language.

Comprehension studies on children's interpretation of narrow and wide focus in ditransitive constructions (i.e. object focus and VP focus, respectively) show that while children's performance is adult-like on the unmarked stress condition – stress on IO in final position, they sometimes fail to interpret stress-shift as a strategy for assigning narrow focus to the DO – stress on the DO in non-final position (e.g. Szendröi 2003 and Costa and Szendröi 2006).

Szendröi (2003) suggests that young children are unable to handle the ambiguity between the narrow and the wide reading due to their limited working memory resources. Following Reinhart's (1999) Interface Theory, she further suggests that the comparison of full derivations at the interface, as involved in stress-shift operations, is also taxing for working memory. Szendröi explains that wide focus reading, which is not excluded in the grammar, is disallowed at the interface as a result of focus set computation. Children who assign VP-readings do not exclude this reading as a failure to execute this computation.

Importantly, the child behavior, as observed in comprehension studies, is not contradictory to previous findings that young children's competence with respect to focus and topic identification and encoding is intact (e.g. focus - Hornby and Hass 1970 and Müller et al. 2006, a.o.; topic - Allen 2000, Gordishevsky and Schaeffer 2002, Tedeschi 2009 and Anderssen et al 2012, a.o.), especially given the authors' explanation for this behavior. Reinhart's (1995) Interface Theory is a processing approach in which children do have access to the focus set in stress-shift cases (i.e. their competence is intact), but their difficulties are claimed to stem from excessive computation load imposed by focus set computation and limited working memory (non-linguistic factors). Note however, that as argued by Reinhart (2004), on-line focus set computation is only required for the *interpretation* of focus and not for production. Therefore, although in comprehension children are unable to compute the on-line comparison of the focus sets required by the stress-shift operation because of their limited working-memory resources, they do not have difficulties in the production of focus. In other words, working memory limitations do not affect the production of focus, which does not involve focus set computation. Indeed, unlike the results of comprehension studies, production studies on the

effect of topichood, or givenness of one of the complements on the realization of ditransitive constructions in child language, reveal that children do employ topic and focus encoding mechanisms correctly (e.g. Snyder 2003, Stephens 2010, and Anderssen et al. 2012).

Nevertheless, elicited production tasks systematically and carefully controlling for Information Structure, weight and animacy are cross-linguistically rare, and have not yet been carried out for Hebrew. The present study fills part of this gap. The Information Structure theories we described in section 2, and the acquisition studies discussed above, lead to the following hypotheses and predictions in (15) and (16), respectively.

(15) **Hypotheses**

I. The DO-IO order in ditransitive constructions is determined by Information Structure (topic/focus status)
II. (Focus) stress is unmarked/economical if it is assigned by the NSR, but marked/costly if assigned by a Stress-Shift Operation
III. Information Structure is part of Universal Grammar (Erteschik-Shir, 1997)
IV. Universal Grammar is innate (Chomsky, 1959)

(16) **Predictions**

(i) (Hebrew-speaking) adults prefer focused constituents in final (most embedded) position, rendering topic-focus order
(ii) Young (Hebrew-acquiring) children have and employ the notions of focus and topic
(iii) Young (Hebrew-acquiring) children prefer focused constituents in final (most embedded) position, rendering topic-focus order

4. Methods

4.1. Participants

In order to test our predictions, we conducted an elicited production task (see below) with 30 adult monolingual native speakers of Hebrew, and 150 monolingual Hebrew-acquiring children of 6 age groups, as schematized in (17):

(17) **Description of participants**

		Age range	Mean age	Number of		Total
				males	females	
Adults		20-36		10	20	30
Children	Group 1	2;6-3;0	2;9;19	15	15	30
	Group 2	3;0-3;6	3;2;13	10	20	30
	Group 3	3;6-4;0	3;8;22	8	22	30
	Group 4	4;0-5;0	4;2;25	13	17	30
	Group 5	5;0-6;0	5;4;26	12	18	30
	Group 6	6;0-7;0	6;1;6	9	21	30
	Total number of child participants					180

The participants were recruited from regular (not special education) kindergartens and schools in the southern part of Israel. The adult participants were all parents of children who participated in the study.

4.2. Materials and procedure

We designed an Elicited Production Task to investigate the complement orders employed in Hebrew ditransitive constructions with the monosemic verb *latet* ('give'). Other than the ability to easily manipulate the informational status of the complements, without compromising their meaning, using the verb *give* for our studies is essentially motivated by the claim that grammatical construction depicting a transfer of an item from one entity to another, is universal (e.g. Newman 1996, a.o). In addition, the verb *give* is lexically available to young children, and so are the structures associated with it. In this respect, see for example, Gropen et al (1989) who found that grammatical *give* DO-IO and IO-DO orders appear around the second birthday in children's spontaneous speech. More specifically for the experimental context, using the verb *give* has the advantage that the action of giving is easy to convey in an experimental setting (for example in a picture or a clip).

In our set-up, an experimenter, the participant, and a hand puppet (Edna) look at a picture while the experimenter describes the picture. Then, the experimenter turns the picture upside down and asks Edna whether she remembers the story. Edna does not always remember, and asks the participant a Wh-question about one of the verbal complements. The participant is requested to respond with a full sentence. When necessary, the experimenter prompts the response by starting with the subject and/or the verb.

There were two conditions, with 10 items each, as schematized in (18). Sample scenarios are provided in (19).

(18) **Experimental conditions**

Condition	Elicited target	Sample question
A (10 items)	Focused DO	What did Avishag give to Liri?
B (10 items)	Focused IO	Who did Avishag give the dress to?

(19) **Experimental items-sample scenarios**

Exp.: Here is Moti. He has a ball. Here is Moti's friend Rina.
Rina wants the ball and Moti agrees.
(Turning the picture) Edna do you remember the story?

a. **Condition A:**
Puppet: Ken, aval, ma noten Moti le Rina?
yes but what gives Moti to-Rina
Yes, but what is Moti giving Rina?

b. **Condition B:**
Puppet: Ken, aval, lemi noten Moti et ha-kadur?
yes but to-who gives Moti acc the-ball
Yes, but who is Moti giving the ball to?

Note that there is no significant difference in weight between the DO and the IO in the experimental items, and that the IO is always animate, and the DO is always inanimate.

In addition to the experimental items, we had ten fillers using non-ditransitive verbs. In five fillers we elicited an object NP, similar to condition A, and in the other five fillers, we elicited prepositional phrases, similar to condition B. All items (experimental and fillers) were divided into two sessions. Each session consisted of ten experimental items (either condition A item or condition B item of a particular scenario), and five filler items. The items were randomized in order to avoid order effects. The two sessions were administered to all participants, on different days.

4.3. Data analysis

In order to identify stress and focus in the responses, we asked five naïve adult speakers of Hebrew to listen to the responses and indicate a) which constituent(s) they perceived as 'prominent', and b) what they thought the preceding question was. The exact instructions to the raters are replicated in (20):

(20) *Utterance evaluation procedure – Instructions to the raters*
The sentences you are about to hear represent a person's response to a certain question.
1. Listen to the sentence carefully. (e.g. Avishag gave Liri the dress.)
2. Which of the following questions do you think this sentence answers?
(E.g., a. Who gave Liri the dress?
b. What did Avishag give to Liri?
c. Who did Avishag give the dress to?)
3. Underline the word(s) you perceive as more prominent in the utterance.
If you underline more than one word, indicate their level of prominence by number (1=most prominent).

Furthermore, we distinguished four types of responses, as listed in (21):

(21) *Four types of responses* (Focus = underlined, main stress = bold):

Ma notenet Avishag leLiri? ('What is Avishag giving to Liri?')

a. *Two-complements response*
Avišag notenet le Liri et ha- **simla**.
Avishag gives-f. to-Liri acc the-dress

b. *Pronoun-complement response*
Avišag notenet la et ha-**simla**.
Avishag gives-f. her acc the-dress

c. *Omitted topic response*
Avišag notenet et ha-**simla**.
Avishag gives-f. acc the-dress

d. (*Non-sentential) Focus-only response*
et ha **simla**.
acc the-dress

5. Results & Discussion

Regarding focus, our results show that all the participants (adults and children) always put main stress correctly on the focus object (DO or IO), and never on the topic object (100% vs. 0%, respectively). This suggests that even the youngest children (2;6-year-old) encode focus correctly, and clearly differentiate between focus and topic.

Furthermore, as shown by Figures 1 and 2 below, all the participants (including the youngest children) employ both of the possible orders of the verbal complements. This indicates that even the youngest children are able to apply both the NSR and the Stress-Shift Operation.[8]

Figure 1
Condition A (DO Focus): Proportions of the different orders in two-complements responses

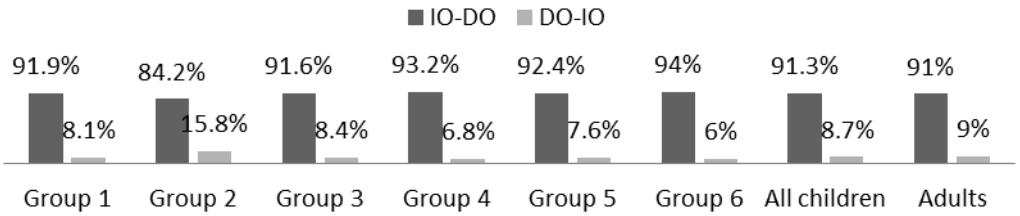
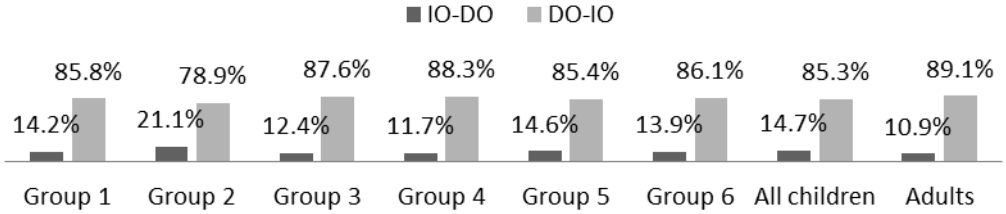


Figure 2
Condition B (IO Focus): Proportions of the different orders in two-complements responses



Figures 1 and 2 also show a strong preference for placing the focused object in final position following the topic. This suggests that focus encoding by the NSR is more economical than focus encoding by the Stress-Shift Operation.

Interestingly, this preference is observed in Condition B (Figure 2), in which the animate IO is the elicited focus: despite its animacy, the focused IO prefers a sentence-final position, suggesting that Informational Structural effects are usually stronger than animacy effects. In this respect, note that none of the child groups differ significantly from the adult group in their proportions of DO-IO vs. IO-DO order, except Group 2 (3-3;6) (Condition A: $Chi^2=5.1$ $p<0.05$; condition B: $Chi^2=10.3$ $p<0.01$). To further investigate this curious effect we conducted a qualitative analysis of the responses by Group 2.

For Condition A (eliciting a focused DO) this revealed that the weight of the topical object sometimes competed with the focused object, as illustrated by the responses in (22).

(22) Condition A (eliciting focused DO):
Ma noten Roni la kelev?
what gives Roni to-the-dog
What is Roni giving the dog?
a. Roni noten la kelev et ha glida (šelo) (IO topic - focused DO)
Roni gives to-the-dog acc the-ice-cream his
b. Roni noten et ha glida la kelev šelo (focused DO - heavy IO topic)
Roni gives acc the-ice-cream to-the-dog his
c. Roni noten la kelev šelo et ha glida (heavy IO topic - focused DO)
Roni gives to-the-dog his acc the-ice-cream

Evidently, the 3-3;6-year-olds sometimes added a possessive pronoun to one of the complements, making this object heavier. As discussed in the introduction, heavy constituents tend to occupy sentence-final positions (Arnold et al., 2000; Bresnan et al., 2007, a.o.). Whenever this extra weight was added to the focused object, as in (22a), no competition occurred, because both focused and heavy objects prefer to be in sentence-final position. However, in cases in which a possessive pronoun is added to a topical object, as in (22b), the heavier topical object and the focused object compete for the same sentence-final position, and the weight of the topical object wins out over the focus status of the focused object, resulting in non-final focus. Yet, this competition between weight and focus for sentence-final position does not always result in an advantage for weight, as exemplified in (22c), in which the heavy IO topic precedes the focused DO in final position.

Thus, although end-weight is a factor affecting the dative alternation, Information Structure properties such as focus compete with weight, and usually override weight, except in some of the responses by the children in Group 2. Despite the fact that this qualitative analysis can explain the use of the marked focus-before-topic orders in condition A across age-groups, it cannot explain why only the 3-3;6-year-old children (Group 2) do this significantly more often than the adults do. Children in this age group more often added a possessive pronoun to the topical IO, causing it to be heavier than the DO and therefore to occupy sentence-final position. All other groups do this, too, but less often.

In Condition B (eliciting a focused IO), the children in Group 2 also place the topical complement (DO) in final position significantly more often than the adults. However, these cases cannot be explained by weight, as in (23):

(23) Condition B (eliciting focused IO):
Lemi noten Roni et ha glida?
To-who gives Roni acc the-ice-cream
To whom is Roni giving the ice-cream?
a. Roni noten <u>lakelev</u> et haglida (šelo) (focus-topic)
Roni gives to-the-dog acc the-ice-cream his
b. Roni noten <u>lakelev šelo</u> et haglida (focus-topic)
Roni gives to-the-dog his acc the-ice-cream
c. Roni noten et haglida <u>lakelev (šelo)</u>
Roni gives acc the-ice-cream to-the-dog his

The response in (23a) shows that the 3-3;6-year-olds place Condition B topics with and without a possessive pronoun in sentence-final position. Moreover, the response in (23b) demonstrates that even heavy focused DOs are sometimes placed in non-final position by Group 2. However, in (23c) we see that topical DOs in Condition B are also placed in non-final position, as expected. Thus, weight cannot explain the higher proportions of final topics in Group 2.

As mentioned in the Introduction, animacy is another factor that affects complement order in ditransitive constructions. Recall that in our experiment the DOs are always inanimate and the IOs always animate. Since animate complements tend to occupy positions close to the verb (e.g. Thompson 1995), the (focused) animate IOs in Condition B compete with the topical DOs for the non-final position. As we see in (23 a and b), the focused IO is not final because its animacy pushes it to a position close to the verb. Furthermore, in (23b) the IO is in a position closer to the verb and not in final position despite the extra weight and the focus on the IO. Thus, in Condition B, eliciting focused, animate IOs, animacy competes with the Information Structural element topic, and sometimes 'wins', as is most evident in the responses of the 3-3;6-year-olds. These results corroborate Snyder's (2003) findings that although children (ages 3-4) are sensitive to Information Structure factors, they tend to place an animate DO before the (in)animate IO - a tendency that decreases with age. Nonetheless, even the children in Group 2 prefer, by far, placing the focused IO in final position, suggesting that Informational Structural effects are usually stronger than animacy effects.

Regarding topic encoding, children as well as adults sometimes pronominalize or omit topic-objects, but never focus-objects, as illustrated by the graphs in Figures 3 (IO topic) and 4 (DO topic):

Figure 3
Condition A (IO topic): Proportions of pronominal objects

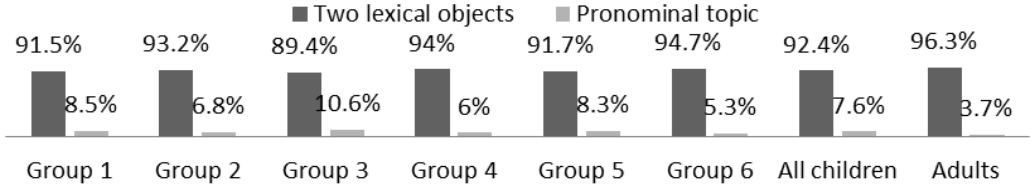
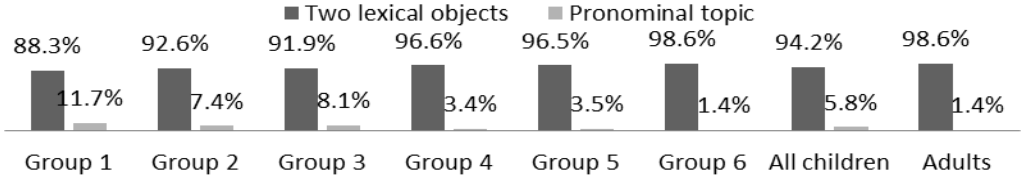


Figure 4
Condition B (DO topic): Proportions of pronominal objects



Our data show that although pronouns are rarely used in our experiment, children produce them significantly more than adults in the two conditions together (5.8% by the children compared with 1.4% by the adults – $Chi^2 = 8.8$ $p<0.01$).[9] This corroborates previous findings that children generally exhibit a higher tendency to pronominalize (and omit) topical arguments, compared to their adult counterparts (e.g. Allen 2000 and Tedeschi 2009 a.o.). Tedeschi (2009) proposes that children's overuse of pronominal elements in comparison to adults depends on general cognitive resources, such as working memory capacity or speed of processing. Limitations in these resources may lead a child to either omit a topical argument more often or to replace a topical full NP, which is a more costly form of reference, with the more economical pronoun. More relevant to us is the fact that none of the participants ever pronominalized focused objects demonstrates that even the youngest children know the difference between a focus and a topic.

This is also reflected in the other way of topic encoding, namely topic omission. Figures 5 and 6 show that in both Condition A and B, topic objects are sometimes omitted, but focus objects are always overt – either in a sentential response excluding the topic or in a non-sentential response (focus-only response).

Figure 5
Condition A (IO topic): Proportions of omitted topical IO

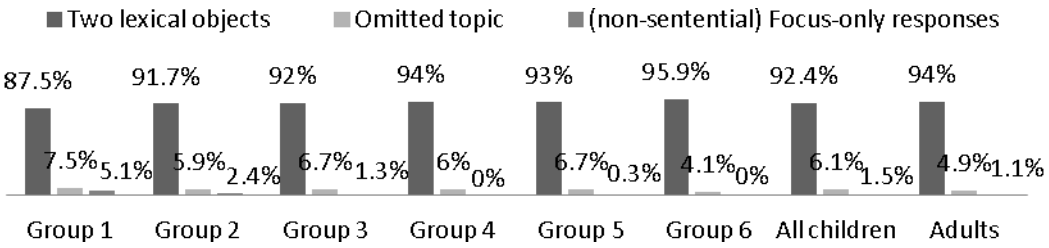
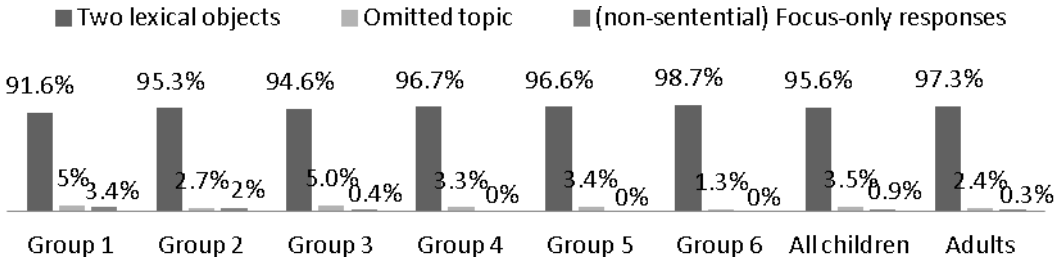


Figure 6
Condition B (DO topic): Proportions of omitted topical Dos



Although it is true that the percentages of topic omission are (slightly) higher for the children than the adults, statistical analysis shows that in condition A as well as in condition B there is no significant difference between the children (in any of the groups) and the adults (chi-square test of independence, $p>0.05$). Again, the fact that even the 2;6-year-olds never omit a focus object shows that even very young children clearly differentiate between topic and focus.

6. Conclusion

In this study we conducted an Elicited Production Task with 180 monolingual Hebrew-acquiring children and 30 monolingual Hebrew-speaking adults on the complement order of the ditransitive verb *latet* ('give'). Our adult results show that the preferred position for the focused object, whether direct or indirect, is the sentence-final position. This provides psychological reality to the claim that besides factors such as weight and animacy, Information Structure is a strong determiner of the order of the complements in ditransitive constructions, and usually overrides the effects of weight and animacy. It also supports Cinque's (1993) and Reinhart's (1995; 2006) claims that stress assignment to the most embedded position in the sentence (in Hebrew: sentence-final) by the Nuclear Stress Rule is the most economical way for a focused element to obtain stress. Thus, the dative alternation in ditransitive constructions is not optional, but strongly driven by Information Structure.

Our child results demonstrate that even the youngest children (of 2;6) prefer focused objects to be in sentence-final position, suggesting that children employ the Nuclear Stress Rule in an adultlike way to encode focus. Furthermore, like adults, all the children encode topic objects by a) no stress; b) pronominalization, or c) omission. We therefore conclude that the notions focus and topic (and their use) are available very early, if not innate, providing evidence for Erteschik-Shir's (1997) claim that Information Structure is part of Universal Grammar.

If this is true, we predict similar results for other languages with dative alternation in ditransitive constructions. Future research with both children and adults should indicate whether this prediction is indeed true.

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[1] For discussion see Landau (1994).
[2] See Rappaport-Hovav and Levin (2008) for evidence supporting their approach.
[3] de Marneffe et al. (2012), on the other hand, do not find animacy to be predictive of the dative alternation in their English child data. However, they argue that this is a consequence of the semantics of the verbs they use in their analysis - the IO in their corpus is mostly animate, and there is therefore insufficient variation in animacy.
[4] In this paper, we relate to **non**-contrastive foci only.
[5] There are various possibilities how an entity can be part of the common ground. To name just a few, it may be information that has been previously introduced into the discourse, it may be part of the long-term shared beliefs between speaker and hearer, e.g. the existence of the sun (see Schaeffer 1997 and references cited therein), it can be part of the stage (e.g. a poster on the wall or birds in the sky), or part of the shared knowledge between the participants (e.g. people that both speaker and hearer are familiar with).
[6] Note that a speaker may choose to produce a non-sentential answer – i.e.an utterance which overtly consists of nothing else but the focused constituent - the direct answer to the Wh-question.
[7] According to Landau (1994), *le-* is ambiguous between two distinct functions. The first is a dative case marker, the other is a preposition (as well as a case assigner) that introduces non v-selected PP arguments, equivalent of other P-clitics, such as be- ('in') and me- ('from'). As a result, *le*-complements are categorically ambiguous between NPs and PPs. See Landau (1994) for a detailed discussion on the different categorical tests to demonstrate that syntactically dative *le*-complements pattern with NPs (and contrast with PPs).
[8] Note in this respect that a posthoc examination of all the stress-shift occurrences did not reveal any syntactic priming effects – the focus-because-topic order was not the result of previous items giving rise to the respective word order.
[9] Note, however, that unlike in condition A (Figure 3), that exhibits a significant difference between the adults and each of the child groups, in condition B there is a statistical difference only between the adults and the children in Group 1 (Chi^2=22.8 3 (Chi^2=12.7 $p<0.001$)$p<0.001$), Group 2 (Chi^2=10.7 $p<0.001$) and Group .