

Morphosyntax is Easy, Discourse/Pragmatics is Hard

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1. Introduction

Turkish is a highly inflected, agglutinative language in which subject NPs are never overtly casemarked, but object NPs often are. Although all six possible word orders are grammatical when objects are overtly casemarked, only SOV and OVS word orders are grammatical when objects lack overt case-marking. In imitation experiments, Batman-Ratyosyan and Stromswold (1999) found that 4- and 5-year-old Turkish children performed equally well on uninflected SOV and OVS sentences, whereas 3-year olds performed significantly worse on OVS sentences. However, in a comprehension experiment, Stromswold and Batman-Ratyosyan (1999) found that only 3-year olds did significantly better than chance on uninflected OVS sentences. One possible explanation for these finding is that the older children knew enough about Turkish discourse and pragmatics that they found uninflected OVS sentences (in which objects are indefinite/plural, focused and topicalized, see section 1.2) somewhat infelicitous without appropriate discourse context. In this study we investigate how Turkish children use word order, casemarking and discourse-context to determine the thematic roles of sentential constituents. We found that children did best on SOV sentences, and that casemarking only helped with OVS sentences. Although older children did slightly better when context was given, 2-year-old children did significantly worse when context was given. This could reflect 2-year olds' incomplete linguistic knowledge or inadequate exposure to language-specific rules of discourse/pragmatics. Alternatively, it could be the result of 2-year olds not understanding other people's intentions and knowledge states.

1.2. Properties of Turkish

Although Turkish is a free word order language, not all word orders are equally unmarked. The least pragmatically marked word order is SOV, and generally-speaking, subject-initial sentences are the most natural and verb-initial sentences are the least natural (Kural, 1992). Subject and objects can scramble with equal ease (Erguvanli, 1984; Kornfilt, 1994). As illustrated in (1) below, if the direct object is not casemarked, only SOV and OVS word orders are grammatical (Kornfilt, 1997). Non-casemarked objects receive an indefinite plural interpretation.

- (1) a. S O- \emptyset V
 ocuk sandviç ye -di.
 The child sandwich- \emptyset eat-PAST¹
 'The child ate a sandwich/sandwiches'
- b. O- \emptyset V S
 Sandviç yedi çocuk
 '(Speaking of) a sandwich, the child ate it'

The six Turkish case-markers indicate grammatical relations and thematic roles independently of word order. Word order conveys discourse and pragmatic information (Kornfilt, 1994). According to Kornfilt (1994), topicalized constituents move to the sentence-initial position, backgrounded constituents move to the post-verbal position; and new information or focused constituents occur immediately before the verb. For example, in (2a) the constituents of the sentence are in the canonical position. In (2b) constituents have been moved to different positions to convey pragmatic information, and *Mektup* is the topic, *Ali* is focused, and *Hasan* is backgrounded.

- (2) a. Hasan Ali'ye mektub-u ver-di.
 Hasan Ali-DAT letter-ACC give-PAST
 'Hasan gave the letter to Ali'
- b. Mektub-u Ali-ye verdi Hasan.
 '(Speaking of) the letter, it was Ali (that) Hasan gave (it) to.'

1.3. Previous Studies

Children acquiring fixed word order languages almost always obey the word order restrictions of their language (e.g., Brown, 1973). Early studies characterized children's strategies for learning the grammatical and thematic roles of constituents as being dependent on word order (Brown & Fraser, 1964; Brown, 1973). For example, some researchers (e.g., Bever, 1970; Borer & Wexler, 1987; Lempert, 1990) report that English-speaking children interpret semantically reversible full passives as if they were active (e.g. they interpret *the lion was chased by the tiger* as 'the lion chased the tiger'). This suggests they map the wrong thematic role onto the subject.

1.3.1. Turkish Children's Performance on Casemarked Sentences

A critical question is whether children who speak free word order languages exhibit similar word order preferences. In a landmark study, Slobin and Bever (1982) had 30 Turkish-speaking children (mean age 3;9) act-out SO_iV, O_iVS, O_iSV, SVO_i, VSO_i, and VO_iS sentences that contained casemarked objects. According to Slobin and Bever (1982, page 248) children were "consistently

sensitive to inflection regardless of word order". Children's did well overall (73% correct), but they did best on SO_iV sentences (98% correct). These results suggest that, although Turkish-speaking children allow multiple word orders when sentences have casemarked objects, they prefer SO_iV sentences. Slobin and Bever also analyzed the relative frequencies of the different word orders in Turkish children's and adults' speech. Although SO_iV was the most common word order used by adults and children, it accounted for less than 50% of utterances (see Table 1). As shown in Table 1, adults used subject-initial word orders more than object-initial word orders, whereas children used SO_iV and O_iVS word orders most frequently.

Table 1. Frequency of Turkish word orders (Slobin & Bever, 1982).

	SO _i V	SVO _i	O _i VS	O _i SV	VSO _i	VO _i S
Adults	48%	25%	13%	8%	6%	0%
Children	46%	17%	20%	7%	10%	0%

1.3.2. Imitation and Judgment of Non-Casemarked Sentences

Slobin and Bever (1982) demonstrated that Turkish children can correctly assign grammatical roles to constituents when objects are casemarked. In a series of experiments, we have examined what Turkish children do when objects are not casemarked. In two imitation experiments, Turkish children repeated non-casemarked SOV, OVS, *SVO and *OSV sentences (Batman-Ratyosyan and Stromswold, 1999). In both studies, 4- and 5- year old children repeated the grammatical SOV and OVS sentences equally well, whereas the 3-year olds correctly repeated the SOV sentences more often than the OVS sentences ($p=.01$ for both studies). The 3-year olds' behavior suggests that Turkish children initially treat SOV as being the word order for Turkish. By age 4, Turkish children have learned that Turkish is head-final, and that the verb can assign case to its object if that object is immediately to the left of the verb. Thus, by age 4, Turkish children treat both OVS and SOV sentences as grammatical.

To test this hypothesis, we had Turkish adults and 5-year old Turkish children judge the grammaticality of non-casemarked SOV, OVS, *SVO and *OSV sentences (Batman-Ratyosyan and Stromswold, 1999). Consistent with the results of our imitation experiments, the children judged the grammatical sentences to be significantly better than the ungrammatical sentences ($p = .04$). Also consistent with our imitation results, the children judged the SOV and OVS sentences to be equally grammatical and SVO and OSV to be equally ungrammatical (both p 's $> .10$). Like the children, the adults preferred the grammatical SOV and OVS sentences to the ungrammatical SVO and OSV sentences ($p = .0005$). However, unlike the children, the adults judged the SOV sentences to be significantly better than the OVS sentences and the OSV sentences to be significantly worse than the SVO sentences (both p 's = .0005).

1.3.3. Comprehension of Non-Casemarked Sentences

Our imitation and grammaticality judgment results just tell us what word orders Turkish children think are grammatical. Comprehension studies are necessary to determine whether Turkish children can use word order to assign grammatical roles to constituents. In a previous study, we tested Turkish children's comprehension of semantically reversible SOV and OVS sentences (Stromswold & Batman-Ratyosyan, 1999). Because we used sentences in which the two Ns were equally plausible as the subject of the sentence and the objects were not casemarked, word order is the only available cue for assigning the grammatical roles to the two NPs. (If a sentence is NNV then the first N is the subject and the second N is the object. If a sentence is NVN, the first N is the object and the second N is the subject.) We divided the 30 children we tested into 3 age groups (mean ages 3;4, 4;1, and 5;1). Children in all three age groups performed above chance on the SOV sentences. However, only the 3-year-old children performed above chance on OVS sentences.

At first blush, these results are in direct conflict with our imitation results: only the 3-year old children imitated the OVS sentences more poorly than the SOV sentences, yet only the 3-year old children did better than chance on comprehending the OVS sentences. One possible way of reconciling the imitation and comprehension results is to argue that the older children know uninflected OVS sentences are grammatical in Turkish, and this knowledge permits them to imitate and judge OVS sentences correctly. However, they also know enough about Turkish discourse and pragmatics to find uninflected OVS sentences pragmatically infelicitous in the absence of appropriate discourse context, and so they have difficulty acting-out OVS sentences. Younger children don't know enough about pragmatics to be bothered by these sentences.

2. Word Order, Casemarking and Discourse Cues for Grammatical Roles

2.1. Discourse/Pragmatic Problems with our Previous Experiments

In Turkish, casemarked objects have a definite reading, and non-casemarked objects have an indefinite or plural reading (see examples 1a and 1b). Thus, in our previous experiments, the objects in OVS sentences were indefinite yet topicalized. Hence, these sentences were pragmatically equivalent to English sentences such as *An elephant, the horse pushed*. OVS sentences can be made more felicitous if they are introduced by a context sentence that supports the topic NP. In our previous study, none of the sentences contained determiners. The only determiner in Turkish is the indefinite determiner *bir 'a'*. (It also means 'one'.) In general, it is not necessary to use an indefinite determiner with indefinite objects. However, if the object is animate (e.g., animals) the sentence is more felicitous if the determiner is present.

subject and object. In all sentences, three distinct tokens of each animal type were used to allow indefinite reading of nouns. Animal pairs, verbs, and trial types were counterbalanced.

2.3. Procedure

Subjects were recruited from daycare centers and preschools in Istanbul, Turkey. All of the children were monolingual Turkish speakers, and all were developing normally according to their teachers and parents. Thirty-one children between the ages of 2;6 and 5;6 participated in the study. These children were divided into four age groups with mean ages 2;6, 3;4, 4;2 and 5;2. Children were tested individually in a quiet room, and all sessions were audiotaped. Children used stuffed bendable animals to act out the meanings of the sentences. Experimenters gave children six practice trials prior to the beginning of the experimental trials. For each trial, the experimenter recorded which animal the child used as the agent of the sentence.

2.4. Results

A 4 (Age) x 2 (Word Order) x 2 (Context) x 2 (Casemarking) ANOVA revealed a significant main effect for Age, $F(3,27) = 7.91, p = .001$. Two-year-old children correctly acted out 60% of the sentences, 3-year-old children correctly acted out 73% of the sentences, 4-year-old children correctly acted out 79% of the sentences, and 5-year-old children correctly acted out 93% of the sentences. Children did significantly better on SOV than OVS sentences (81% correct versus 73% correct, $F(1,27) = 5.99, p = 0.02$). Children did significantly better on casemarked sentences than non-casemarked sentences (80% versus 74% correct, $F(1, 27) = 5.34, p = .03$). There was an interaction between Word Order and Casemarking ($F(1, 27) = 7.79, p = .01$). Casemarking improved performance on OVS sentences (81% versus 66% correct, $F(1, 27) = 14.19, p = .001$), but did not affect performance on SOV sentences (80% correct for casemarked vs. 82% for non-casemarked SOV sentences, $p > .10$).

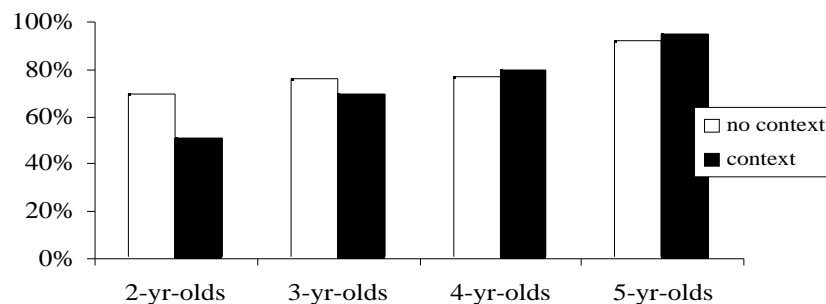


Figure 1. Interaction of Age and Context

We added discourse context because we thought it would improve the children's performance on non-casemarked sentences. However, there was no main effect for Context ($p > .10$). There was a significant interaction between Age and Context, $F(3, 27) = 2.99, p = .05$, but this was due to context hurting 2-year-old children's performance rather than the predicted effect of context helping older children (see Figure 1). When 2 year old children's data were excluded from the analysis, this interaction was not significant ($p = .49$). There was also a significant interaction between Casemarking and Context, $F(1, 27) = 4.86, p = .04$, which was due to children doing approximately 10 percentage points better on context-less casemarked sentences than on the other 3 trial types. When the 2-year-old children's data were excluded, the interaction was not significant ($p = .14$).

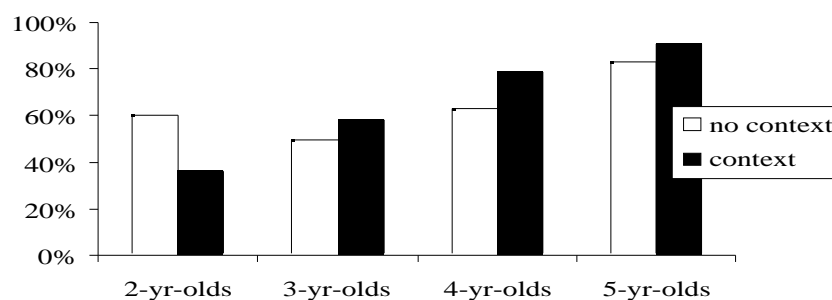


Figure 2. Effect of Context on Non-casemarked OVS Sentences

2.5. Discussion

We predicted that context would make non-casemarked OVS sentences pragmatically more felicitous for older children and, consequently improve their performance on these sentences. As shown in Figure 2, the 3-, 4- and 5-year olds did do better on non-casemarked OVS sentences presented with context than without, but the difference was not significant for any age group (all p 's $> .25$). Post hoc analyses revealed that even if the data from the 4- and 5-year olds (or 3-, 4- and 5-year olds) are combined, the positive effect of context on uninflected OVS sentences is not significant (both p 's $> .10$). The 5-year olds in this experiment did better on uninflected OVS sentences than the 5-year olds in our previous comprehension experiment (82% vs. 62% correct). It is interesting to note that 4-year olds did no better on context-less, uninflected OVS sentences in this experiment than in our previous experiment (63% vs. 60% correct), and 3-year olds actually did worse on these sentences in this experiment (50% vs. 68% correct). We suspect that the improvement in 5-year olds' performance on context-less, uninflected OVS sentences is due to the presence of the indefinite determiner in this experiment, but not in the previous experiment. If we are

correct about this, it suggests that children younger than 5 are not bothered by the infelicity of using an animate object without an indefinite determiner.

What other factors might be responsible for the differences in performance between the two experiments? It is unlikely that the differences are due to subject differences because the mean ages of the 3-, 4- and 5-year olds were almost identical in the two studies (3;4, 4;1 and 5;1 in the first study, and 3;4, 4;2 and 5;2 in this study), and the children came from the same daycare centers. The differences are not due to practice effects because no child was tested in both studies. The length of the two studies was very similar (20 sentences in the first study and 24 in this study). We used eight types of animals in the first study and three types in this study. However, we doubt that this caused the differences because in both experiments we made sure that children knew the names of the animals, and the 3-year olds did better in the experiment with 8 animals. One last difference is that this study only had OVS and SOV sentences, whereas our first study also had passives and reflexives. We cannot rule out the possibility that this affected children's performance, but we think the presence of the indefinite determiner is a much more likely explanation.

3. Why Does Context Hurt 2-Year Old Children's Performance?

We scrutinized the 2-year old children's data to determine why they made more errors when context was provided than when it was absent. As shown in Table 2, they made fewest errors on context-less casemarked SOV and OVS sentences. For both SOV and OVS sentences, almost all of their errors involved switching the agent and the patient.³

Table 2. Two-year-old children's error rates

	Non-Casemarked		Casemarked	
	No Context	Context	No Context	Context
SOV	30%	45%	20%	42%
OVS	42%	52%	20%	36%

3.1. Mismatch of Grammatical Roles

One possible explanation for 2-year-olds' poor performance in the presence of context involves the mismatch of grammatical roles between context and topic sentences in OVS trials. In OVS trials, the same noun is presented as a subject in the context sentence, and as an object in the experimental sentence (see 4b). A mismatch in grammatical roles cannot be the correct explanation for why context hurts 2-year olds. The reason is that 2-year olds did just as poorly on SOV sentences presented with context, and for SOV sentences, the noun is a subject in both context and trial sentences.

3.2. Focus and Thematic Roles

In the presence of context, 2-year-olds treated the first NP in an OVS sentence as the agent of the sentence, but they treated the second NP in an SOV sentence as the agent of the sentence. Recall that, in Turkish, the constituent immediately to the left of the verb is focused. Perhaps 2-year-old Turkish children mistakenly think focused elements are agents. For example, in the presence of context, children might think that the NP to the left of the verb (which carries the patient theta-role) moves up the thematic hierarchy and becomes an agent. However, it is not clear why children should think this. An additional problem is that, because children also make this error when objects are casemarked, this account implies that context overrides morphology.

3.3. Processing Overload

A third possibility is that 2-year-old children processed the context sentence independent of the trial sentence, and it was harder for them to parse and act out two sentences than one sentence. We observed that as they listened to the context sentence, some children made the topicalized animal jump around (i.e., they acted out the context sentence). One could test the processing overload account by seeing whether children's error rates are affected by the content of the context sentence. For example, the existential predicate *var* ('there exists/there is') could be used in the context sentence instead of the verb *oyna* ('play'). The verb *var* is one of the earliest words Turkish children utter, and one would expect that children would be less tempted to act out context sentences containing an existential verb than an actional verb (cf. 'There are horses here' and 'Horses play in this game'). If children make fewer errors on context sentences containing existential predicates, this would be consistent with the processing overload account. One could also explore why context hurts by conducting an experiment in which half of the sentences are preceded by a sentence related to the trial sentence (e.g., the context trials in this experiment) and half of the sentences are preceded by a sentence unrelated to the trial sentence (e.g. the preceding sentence might state that parrots have beautiful colors, then the trial sentence might be about a sheep and a pig kissing). If children make equal number of errors on both trial types or if they make more errors on the unrelated trials, this would be consistent with the processing overload account. If, on the other hand, they make more errors on the true context trials, this would be consistent with the account given in 3.2.

3.4. Morphosyntactic Cues, Pragmatic Cues and Theory of Mind

Turkish children must know the basic morphosyntactic rules of Turkish before they can start learning its discourse/pragmatic rules. Specifically, until Turkish children know that SOV is the underlying word order of Turkish, they cannot know which constituents have been moved and, therefore, they cannot

begin to learn that constituents that are moved to certain sentential positions have particular discourse/pragmatic roles. By 30 months of age, Turkish-speaking children already know the underlying word order of Turkish and some important aspects of verbal and nominal morphology by around 2 years of age (e.g., Aksu-Koc & Slobin, 1985; Batman-Ratyosyan & Stromswold, 1999, 2000; Ekmekçi, 1982; Slobin & Bever, 1985; Stromswold and Batman-Ratyosyan, 1999). So why does it take them another two or three years to learn the basic discourse/pragmatic rules of Turkish? One possibility is that the range of possible morphosyntactic rules a language may exhibit is smaller than the range of possible discourse/pragmatic. For example, Cinque (1999) has argued that functional projections appear in the same order in all languages, and if this is true, it would certainly simplify the task of learning the morphosyntax of one's language. An extreme version of this position would be that Universal Grammar constrains morphosyntax but not discourse/pragmatics. Although this is possible, the observed cross-linguistic typological regularities in discourse/pragmatics make it unlikely to be the case.

An alternative explanation is that mastering the morphosyntax of one's language is a relatively automatic process that only involves using one's linguistic module(s), whereas mastering the discourse/pragmatics of one's language requires additional, non-linguistic abilities. In order to learn the discourse/pragmatic rules of one's language, it is not enough to know the basic word order of one's language, and to recognize that sometimes constituents do not appear in their underlying position. One needs to recognize why constituents appear in different positions, and this requires noticing that when constituents appear in certain sentential positions, these constituents tend to have particular discourse/pragmatic roles. The only way one can recognize the position/pragmatic correlations is to be aware of other speakers' intentions and to know what knowledge is available to different participants in a discourse.

Developmental psychologists have long noted that young children are quite poor at tasks that critically require them to understand other people's state of knowledge. Consider the following classic Theory of Mind task (Baron-Cohen, Leslie, & Frith, 1985): A child watches a scene in which Sally sees Mary hide a doll in a drawer. Subsequently, Sally leaves the room and Mary takes the doll from the drawer and hides it behind the pillow. Two- and three- year old subjects assume that when Sally comes back in the room she will look for the doll behind the pillow. It isn't until age 4 that children realize that Sally should look for the doll in the drawer because that reflects her state of knowledge. If Theory of Mind adherents are correct that, until age 4, children ascribe their own state of knowledge to other people, it is no wonder that they cannot learn an aspect of language such as discourse/pragmatics that critically requires them to correctly model other's intentions and state of knowledge.

The 2-year olds in our study might have been hurt by context for the same reason that preschool age children often fail to unambiguously establish the referent of pronouns in their narratives. In an intriguing study, Scheaffer (2000) reports that 2-year-old Dutch children failed to scramble direct objects in

obligatory (adult) contexts and, thus, they failed to convey discourse-related referentiality. Schaeffer attributes children's failure to establish discourse-relatedness to their inability to recognize that certain information is neither present in the discourse nor shared by the speaker and listener. She calls this concept the *Concept of Non-Shared Knowledge*. Although our view about the role of pragmatic knowledge in morphosyntactic acquisition differs drastically from Schaeffer's, we believe that the high error rates of 2-year-olds in our study and Schaeffer's study may be due (at least in part) to 2-year old children having an incomplete understanding of other people's minds.

4. Conclusion

As was the case in our previous studies, we found much support for SOV being the underlying word order of Turkish. First, children did best on SOV sentences regardless of inflection or context. Second, overt case-marking only improved performance on OVS sentences. Third, younger children benefited more from the presence of casemarking than did older children. In this study, we introduced indefinite determiners and context to improve the pragmatic felicity of non-casemarked OVS sentences. We discovered that the presence of an indefinite determiner improved older children's performance on non-casemarked OVS sentences. However, providing context did not significantly improve older children's performance on these sentences. We were surprised that 2-year old children did worse when context was provided. At this point we cannot say for sure why this is so. But the fact that 2-year old children benefited greatly from morphosyntactic cues, but were hurt by discourse/pragmatic cues is intriguing. One possibility is that this merely reflects that one cannot learn the discourse/pragmatics of Turkish if one doesn't know the basic morphosyntax of Turkish. Another possibility is that one needs more input (or richer input) to learn discourse/pragmatics than to learn morphosyntax, perhaps because the rules governing discourse/pragmatics are more complex, or because there is more cross-linguistic variation in discourse/pragmatics than in morphosyntax. A third possibility is that acquiring morphosyntax is a relatively automatic process that only involves using one's linguistic module(s), whereas mastering the discourse/pragmatics of one's language requires additional, non-linguistic abilities. Specifically, acquiring discourse/pragmatics requires that one be aware of the intentions and knowledge states of others, and this requires an adult-like understanding of other people's minds.

Endnotes

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1. We will use the following linguistic abbreviations: * = ungrammatical, O_i = inflected/casemarked object, ACC = accusative case, DAT = dative case, NP = noun phrase, OPT = optative mood, PAST = past tense, PL = Plural.
2. The subject NPs in the context sentence are plural to allow an indefinite reading for the object NPs in the trial sentence.
3. Only very rarely did children pick the third (unmentioned) animal as the agent. We excluded such cases from the figures reported in Table 2.

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