What Turkish Acquisition Tells Us about Underlying Word Order and Scrambling*

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Children acquiring fixed word order languages almost always obey the word order restrictions of their language (Brown, 1973). A critical question is whether children who are learning free word order languages also exhibit word order preferences. The goal of this study is to determine whether children, who speak Turkish (a free word order language), prefer certain word orders over others. In our study, Turkish-speaking children imitated and judged SOV, OVS, SVO and OSV sentences which were not overtly marked with accusative case. The results of our study indicate that, although both SOV and OVS are grammatical when objects are not case-marked, children treat SOV as being the word order for Turkish. We argue that this preference reflects the fact that SOV is the underlying word order in Turkish and all other word orders result from scrambling. The finding that Turkish children prefer SOV and OVS word orders to the ungrammatical word orders may reflect the fact that they have innate knowledge of the structural conditions under which verbs can assign structural case.

1 Properties of Turkish

A basic Turkish sentence with subject (S), object (O) and verb (V) can have six word orders, but the least pragmatically marked word order is SOV. Generally, subject-initial sentences are the most natural and verb-initial sentences are the least natural (Kural, 1992). Turkish is an agglutinative language with rich case-marking. Although direct objects receive (accusative) case whereas subject NPs do not receive overt case, subject and objects can scramble with equal ease (Erguvanlı, 1984; Kornfilt, 1994).

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1.1 Word Orders in the Presence of Overt Case-marking

The six Turkish case-markers indicate grammatical relations and thematic roles independently of word order, which conveys information about discourse and pragmatic factors (Kornfilt, 1994).[1] As illustrated in (1) below, all 6 possible word orders are grammatical

(1) a. S O$_{\text{-Acc}}$ V
Çocuk sandviç-i ye-di.
Child sandwich-Acc eat-past
'The child ate the sandwich' or 'The child ate <u>the sandwich</u>'

b. O$_{\text{-Acc}}$ V S
Sandviç-i yedi çocuk.
'(Speaking of) the sandwich, the child ate (it)'

c. O$_{\text{-Acc}}$ S V
Sandviç-i çocuk yedi.
(Speaking of) the sandwich, <u>the child</u> ate (it)'

d. S V O$_{\text{-Acc}}$
Çocuk yedi sandviç-i.
(Speaking of the) child, (the child) ate the sandwich'

e. V S O$_{\text{-Acc}}$
Yedi çocuk sandviç-I
(Speaking of) eating, <u>the child</u> (did eat) the sandwich'

f. V O$_{\text{-Acc}}$ S
Yedi sandviç-i çocuk.
(Speaking of eating), the child (did eat) <u>the sandwich</u>

1.2 Word Orders in the Absence of Overt Case-marking

As illustrated in (2) below, if the direct object is not case-marked, only SOV and OVS word orders are grammatical. If the direct object bears no overt case-marking it must be to the immediate left of the verb (Kornfilt, 1997).

[1] According to Kornfilt (1994, p. 171), "topicalized constituents are sentence-initial; back-grounded constituents are postverbal; new information or focused constituents are in immediately preverbal position."

(2) a. S O$_{-Ø}$ V
Çocuk sandviç ye -di.
'The child sandwich-Ø eat-past.
'The child ate a sandwich/sandwiches'
'The child was sandwich-eating'
b. O$_{-Ø}$ V S
Sandviç yedi çocuk
'(Speaking of) sandwich-eating, the child did it'
'(Speaking of) a sandwich, the child ate it'
c. *O$_{-Ø}$ S V
Sandviç çocuk yedi
d. *S V O$_{-Ø}$
*Çocuk yedi sandviç.
e. *V S O$_{-Ø}$
*Yedi çocuk sandviç.
f. *V O$_{-Ø}$ S
*Yedi sandviç çocuk.

2 Previous Studies

Children acquiring fixed word order languages almost always obey the word order restrictions of their language (Brown, 1973). For example, children learning English say "he big" but not "big he" (Bloom, 1990). However, this may merely reflect the input children receive: children acquiring English may not say "big he" because they never hear "big (is) he" in the input. A critical question is whether children who are learning free word order languages also exhibit word orders preferences. On the one hand, studies reveal that, in Turkish, both child-directed speech and children's utterances reflect the flexibility of Turkish word order (Slobin & Bever, 1982; Küntay & Slobin, 1996). On the other hand, in a longitudinal investigation of a Turkish-speaking child, Ekmekçi (1986) reported that by 1 year, 10 months (1;10) of age, the child always placed non-referential (non-casemarked) objects immediately before the verb (3a), but allowed case-marked objects to appear before (3b) or after (3c) the verb.

(3) a. O$_{-Ø}$ V
Kaem geti
pencil bring
Bring a pencil/pencils.

b. $O_{\text{-Acc}}$ V
Kaem-i geti
pencil-Acc bring
Bring the pencil.

c. V $O_{\text{-Acc}}$
Geti kaem-i
Bring pencil-Acc.
Bring the pencil.

The observation that this child only allowed case-marked constituents to scramble suggests that the child knew that scrambling is not freely permitted when structural case assignment is omitted.

In a landmark cross-linguistic study, Slobin and Bever (1982) asked 30 Turkish-speaking children (mean age 3;9) to imitate SOV, OVS, OSV, SVO, VSO, and VOS sentences that contained case-marked NPs. Although their performance was quite good overall (73% correct), the children were best at imitating SOV sentences (98% correct) and worse at imitating VSO sentences (67% correct). When they failed to imitate sentences exactly, their reorderings mirrored the relative frequency of word orders in Turkish: V-final strings were almost never reordered, and NVN sentences were reordered less frequently than VNN sentences. When NVN sentences were reordered they were always reordered as NNV. These results suggest that, although Turkish-speaking children allow multiple word orders when sentences contain case-marked NPs, they prefer one word order (SOV). Slobin and Bever also analyzed the relative frequency of the different word orders in children's and adults' speech (see Table 1). Looking only at sentences which contained case-marked NPs, they found that the relative frequency of NNV (**N**oun, **N**oun, **V**erbs), NVN, and VNN were similar for adults and children. All of children's and adult's VNN sentences were VSO[2].

Slobin and Bever (1982) also presented the children with sentences with non-casemarked objects. However, the results are reported juxtaposed with case-marked word orders, which makes them difficult to interpret. Aksu-Koç and Slobin (1985) interpret the children's responses to non-casemarked word-orders as being random.

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[2] VOS is a grammatical word order but it was not present in the speech samples collected by Slobin and Bever.

	Children 2;3-3;8		Adults
NNV (SOV+OSV)		**53%**	**56%**
	SOV	87%	86%
	OSV	13%	14%
NVN (SVO+OVS)		**37%**	**38%**
	SVO	46%	66%
	OVS	54%	34%
VNN (VOS+VSO)		**10%**	**6%**
	VSO	100%	100%

Table 1. Occurrence of word order types with overt case-marking in child and adult speech, adapted from Slobin and Bever (1982).

3 Experiment I

3.1 Subjects

Subjects were 31 monolingual Turkish-speaking children between the ages of 2;10 and 5;8. Subjects were divided into 3 groups with mean ages of 3;3, 4;2 and 5;2, respectively.

3.2 Procedure

Children were asked to imitate grammatical and ungrammatical sentences that systematically varied in plurality and word order. Following the procedures generally used for imitation experiments and outlined by Lust, Flynn and Foley (1996), children were asked to repeat exactly what the experimenter said. If the child did not respond or gave a single word response, the experimenter said “let’s listen to that one another time. ” Only one prompt was given per sentence. In order to receive credit for correctly imitating a sentence, the children had to repeat the sentence exactly.

3.3 Stimuli

The experiment consisted of 16 singular and 16 plural sentences, for a total of 32 sentences. Each sentence contained a subject NP (with an adjective), a verb, and an non-casemarked object NP. The experiment consisted of 8 SOV, 8 SVO, 8 OVS, and 8 OSV sentences, with each word order type occurring equally often as singular and plural sentences.[3] As shown in (4), half of the sentences were grammatical (the SOV and OVS sentences), and half were ungrammatical (the OSV and SVO sentences). Sentences were presented in random order with the restriction that no more than 4 sentences in a row have the same value for plurality or grammaticality. Half of the children received the sentences in the forward order, and half in the reverse order.

(4)	a.	SOV Grammatical	Siyah karınca-lar yem topla -dı -lar. Black ant -Pl food gather-Past-3^{rd}Pl The black ants gathered food.
	b.	OVS Grammatical	Mektup yaz -dı sarışın kız. Letter write-PAST blond girl. The blond girl wrote letter/letters.
	c.	OSV Ungrammatical	Ekmek aç adam ye -di. Bread hungry man eat-PAST The hungry man ate bread.
	d.	SVO Ungrammatical	Şanslı adam kazan-dı ödül. Lucky man win -Past prize The lucky man won a prize/prizes.

3.4 Results

A 3 (Age) x 2 (Length) x 4 (SOV, OVS, OSV, and SVO) ANOVA with correct vs. incorrect imitation as the dependent variable revealed the following significant main effects and interactions.[4] (Planned pair-wise comparisons were also performed and the results used to determine the source of main effects and interactions.) There was a significant main effect for Word Order (mean correct imitation for SOV = 72%, OVS = 60%, SVO = 46%, OSV = 43%), $F(3, 84) = 23.55$, $p<.0005$. There were also significant main effects for Age ($F(2, 28) = 21.12$, $p < .0005$, older children were more

[3] On average, plural sentences were 12.4 syllables long and singular sentences were 9.5 syllables long and, hence, plurality and length were confounded.

[4] A 3 (Age) x 2 (Plurality) x 4 (SOV, OVS, OSV, SVO) ANOVA revealed similar findings. There were significant main effects of Word Order ($F(3, 84) = 19.39$, $p<.0005$) and Age ($F(2, 28) = 20.39$, $p<.0005$), Plurality ($F(1,28) = 46.76$, $p<.0005$, children did better on singular sentences which were on average shorter than plural sentences). There were, however, no significant interactions among these variables.

successful imitators than younger children) and Length ($F(1, 28) = 69.29$, $p <.0005$, short sentences were imitated better than long sentences). As shown in Figure 1, there was a significant interaction between Word Order and Age, $F(6, 84) = 2.65$, $p < .05$, with older children imitating ungrammatical word orders more successfully than younger children. There was also a significant interaction between Word Order and Length, $F(3, 84) = 10.94$, $p < .0005$, children imitated long, ungrammatical word order sentences very poorly. There was also a significant 3-way interaction among Word Order, Length, and Age, $F(6, 84) = 3.87$, $p < .005$.

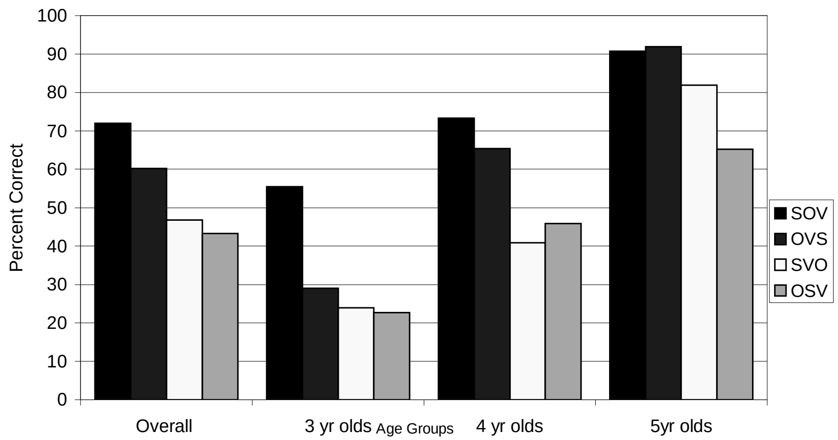

Figure 1. Children's imitation of word order types without overt case-marking

The youngest children did poorly on all but the short SOV sentences; children in the middle age group did very well on short SOV sentences (85% correct) and reasonably well (60% correct or better) on short OVS and OSV sentences and long SOV sentences; and the oldest children did well (85% correct or better) on all of the short sentences and the long grammatical sentences, and less well on the long ungrammatical sentences (69% for SOV and 44% correct for OSV).

T-tests were conducted for each age group to see whether there was a statistically significant difference in performance for the two grammatical constructions (SOV and OVS). The SOV-OVS difference was only significant for 3-year-olds, $t(10) = 3.14$, $p = .011$. *T*-tests also revealed that difference between the two ungrammatical constructions (OSV and SVO) was only significant for the five-year-olds, $t(8) = 2.35$, $p = .047$. Five-year olds' greater ease with SVO sentences might reflect the preferred status of the SVO construction over the OVS construction when constituents are case-marked (Kural, 1992).

4 Experiment II

4.1 Subjects

Nine five-year-old children (mean age 5;4) and 24 Turkish-speaking adults participated in Experiment II.

4.2 Procedure

Grammaticality judgments were obtained from the children using a puppet game technique. In this procedure, the experimenter manipulated a dog puppet and told the child that this dog puppet was "just learning how to talk" and, therefore, "sometimes makes mistakes." The child was asked to help teach the dog to talk by deciding if what the dog puppet said sounded good or bad. If it sounded good to her, she should give the dog a bone. If it sounded bad, she should give the dog a rock (see Stromswold, 1990). Adults rated the grammaticality of these sentences on a scale from 1 (bad) to 5 (good).

4.3 Stimuli

See Experiment I.

4.4 Results

A 2 (Length) x 4 (SOV, OVS, OSV, SVO) ANOVA of the five-year-olds' data revealed a significant main effect of Word Order ($F(3, 24) = 4.46$, $p = .014$). As shown in Figure 2, five-year-olds did better on SOV and OVS sentences than on SVO or OSV sentences. *T*-tests revealed no significant difference between the two grammatical word orders (SOV and OVS) or between the two ungrammatical word orders (SVO and OSV), both p's $>.10$.

A 2 (Length) x 4 (SOV, OVS, OSV, SVO) ANOVA of the adults' data revealed a significant main effect of Word Order ($F(3, 54) = 63.93$, $p<.0005$. As shown in Figure 3, adults generally exhibited the same preferences as the children. However, unlike the children, adults had a significant preference for SOV over OVS word orders, $t(23) = 4.48$, *p*<.0005, This may reflect the rarity of non case-marked OVS sentences in Turkish. In addition, adults had a significant preference for SVO over OSV word orders, $t(23) = 4.41$, $p < .0005$.

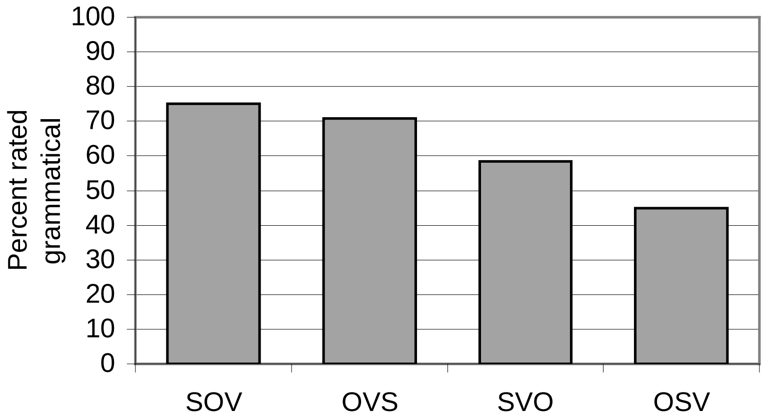

Figure 2. Five-year-old children's grammaticality judgments of word order types without overt case-marking.

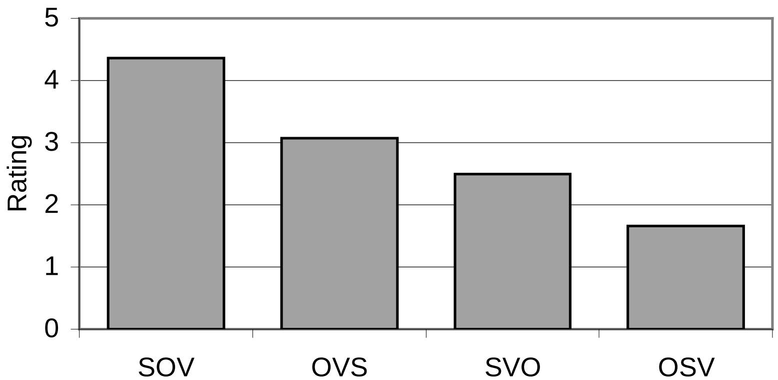

Figure 3. Adult grammaticality ratings of word order types without overt case-marking.

5 Discussion/Conclusion

5.1 Acquisitional Implications

The results of our study indicate that the three-year old children treat the SOV word order as being the primary word order in Turkish even though the input they receive is quite varied with respect to word order. For example, only 48% of the word orders in child directed speech are SOV (Slobin & Bever, 1982), and a fair proportion of child-directed utterances have neither a verb or a noun in the sentence initial and final positions[5] (Küntay & Slobin, 1996). Consistent with Otsu's (1994) results for Japanese and Slobin and Bever's (1982) results for case-marked word orders in Turkish, these acquisitional data indicate that even when children are exposed to linguistic input which indicates they are learning a free word order language, they are initially predisposed to treat one of these orders as being <u>the</u> word order for their language.

The four- and five-year old children treat non-casemarked OVS and SOV sentences similarly, even though OVS sentences are rare in Turkish and, in our study, received a lower preference rating by adults (see Figure 3). This suggests that, by four years of age, children know what to do in the absence of overt structural case and they use phrase structure hierarchy to determine grammaticality. Our results are consistent with Otsu's (1994) findings in Japanese. Otsu (1994) argues that Japanese's children's knowledge of case-marker drop indicates that their grammar consists of hierarchically organized phrase structures.

Case-marked OVS sentences occur less often in adult speech than subject initial (SOV and SVO) sentences (Slobin & Bever, 1982). The frequency distribution of case-marked word orders cannot provide children with a cue for non-casemarked word orders because the frequency distribution of word orders are different for case-marked and non-casemarked constructions. Additionally contrary to the distribution observed in adults' speech, case-marked OVS sentences occur more frequently than case-marked SVO sentences in children's speech. This suggests that children prefer head-final constructions, even when objects are case-marked, compared to adults who exhibit a preference for subject-initial sentences.

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[5] In our corpora, a large percentage of the mother's speech starts with an adverbial phrase.

5.2 Linguistic Implications

Our results are consistent with Kornfilt's (1994) theory which argues that both adult and child grammars of Turkish are configurational. She offers two possible explanations for the grammaticality of non-casemarked SOV and OVS sentences. One possibility is that abstract syntactic case must be assigned under government and adjacency according to X-bar theory. Another possibility, which is based on Baker's (1988) Incorporation Theory, is that heads of non case-marked NPs are incorporated into the verb (Kornfilt, 1992).

Our results also provide support to linguistic theories which argue that Turkish has an underlying word order, and that the apparent free word order of Turkish is the result of scrambling. Although clause-bound scrambling has been a hotly debated issue in linguistic circles (see, Bayer & Kornfilt, 1994; Mahajan 1994; Webelhuth, 1992). Kural (1992) argues that due to focus constraints, clause-bound scrambling is the result of A'-movement in Turkish. If Kural's hypothesis is correct, our results are consistent with the Strong Continuity Hypothesis for children's language development (Poeppel & Wexler, 1993; Pinker, 1984). The results of these imitation and judgment studies are consistent with our results, we have obtained in an act-out task for SOV and OVS actives, simple passives and genitive active and passives (Stromswold & Batman-Ratyosyan, 1999).

Appendix

1) Siyah karınca-lar yem topla -dı -lar. SOV
Black ant -Pl food gather-Past-3rd Pl
The black ants gathered food.
The black ants were engaged in food gathering.

2) Mektup yaz -dı sarışın kız. OVS
Letter write-Past blond girl.
The blond girl wrote a letter/letters.

3) El neşeli yolcu -lar salla -dı -lar. OSV
Hand happy passenger-Pl wave-Past-3rd Pl.
The happy passengers waved (their) hands.

4) Tembel kapıcı boya -dı duvar. SVO
Lazy janitor paint-Past wall/walls.
The lazy janitor/doorman painted a wall/walls.

5) Diş fırçala-dı uslu çocuk. OVS
Tooth brush-Past well-behaved boy.
The well-behaved boy brushed (his) teeth.

6) Yemek ara -dı -lar benekli köpek-ler. OVS
Food search-Past-3rd Pl spotted dog -3rd Pl
The spotted dogs searched for food.

7) Hasta çocuk ilaç yut -tu. SOV
Sick child medication swallow-Past
The sick child swallowed some medication.

8) Şans-lı adam kazan-dı ödül. SVO
Lucky man win -Past prize
The lucky man won a prize/prizes.

9) Kitap oku -du -lar çalışkan öğrenci-ler. OVS
Book read-Past-3rd Pl hard-working student-Pl.
The hard-working students read a book/books.

10) Bebek genç kız bak-tı. OSV
Baby young girl look-Past.
The young girl looked after a baby/babies.

11) Çöpçü-ler topla -dı -lar çöp. SVO
Garbage-man-Pl gather -Past -3rd Pl garbage.
The garbage-men cleaned-up some garbage.

12) Telaşlı berber saç tara -dı. SOV
Hurried barber hair brush-Past.
The hurried barber brushed some hair.

13) Küçük kız -lar oyna -dı -lar saklambaç. SVO
Little girl-Pl play -Past-3rd Pl hide-and-seek.
The little girls played hide-and-seek.

14) Gözlük tak -tı güzel sunucu. OVS
Glass put -Past pretty announcer.
The pretty announcer put on (her) glasses.

15) Kum boşalt-tı -lar genç işçi-ler. OVS
Sand empty-Past-3rd Pl young worker-Pl.
The young workers emptied out some sand.

16) Taş esmer kız at -tı. OSV
Stone brunette girl throw-Past.
The brunette girl threw a stone/stones.

17) Usta balıkçı -lar balık avla -dı -lar. SOV
Master fisherman-Pl fish hunt-Past-3rd Pl
The master fisherman caught some fish.

18) Kelebek yaramaz kız -lar yakala-dı -lar. OSV
Butterfly naughty girl-Pl catch -Past-3rd Pl
The naughty girls caught a butterfly/butterflies.

19) Yuva anne kuş kur-du. OSV
Nest mother bird build-Past
The mother birds built a nest/nests.

20) Köylü kadın -lar yoğur-du-lar hamur. SVO
Peasant woman-Pl knead-Past-3rd Pl dough
The peasant women kneaded some dough.

21) Bahçe şişman bahçivan sula -dı. OSV
Garden fat gardener water-Past
The fat gardener watered (the) garden.

22) Yavru kediler fare kovala-dı -lar. SOV
Young cat -Pl mouse chase -Past-3rd Pl
The kittens chased a mouse/mice.

23) Simit al-dı aç adam. OVS
Simit take-Past hungry man
The hungry man bought a *simit* (a food item similar to a bagel).

24) Yorgun anne bulaşik yıka-dı. SOV
Tired mother dish wash-Past
The tired mother washed some dishes.

25) Su çizme-li itfaiyeci sık -tı. OSV
Water boot-with fireman spray-Past
The booted fireman sprayed some water.

26) Cam haşarı oğlan-lar kır -dı -lar. OSV
Glass mischievous boy -Pl break-Past-3rd Pl
The mischievous boys broke some glass.

27) Sabır-sız şoför çal -dı korna. SVO
Impatient driver ring-Past horn
The impatient driver honked (his) horn.

28) Düşüncesiz çocuk-lar çiçek kopar-dı -lar. SOV
Thoughtless child -Pl flower pick-Past-3rd Pl
The thoughtless children picked a flower/flowers.

29) Yeşil ördek yumurta yumurt-la -dı. SOV
Green duck egg egg -DerSuf-Past
The green duck laid an egg/eggs.

30) Yakışıklı adam kullan-dı araba. SVO
Handsom man use -Past car
The handsom man drove a car/cars.

31) İhtiyar manav-lar sat -tı -lar meyve. SVO
Old green grocer-Pl sell-Past-3rd Pl fruit
The old green grocers sold a fruit/fruits.

32) Banka soy-du -lar maskeli hırsız-lar. OVS
Bank rob-Past-Pl masked thief -Pl
The masked thieves robbed a bank/banks.

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