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Acquisition of clitics[*]

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1. Introduction

The question of whether symbolic rules or usage conditioned by frequency are implicated in linguistic cognition has been at the heart of language acquisition research for the past two decades (Bybee, 1995, 2006; Hahn et al., 1998; Marcus et al., 1992; Marcus, 1998, 2001; Pinker, 1999, 2001; Plunkett & Marchman, 1993; Rumelhart & McClelland, 1986; Yang, 2002; *inter alia*). Investigation of the path children follow in the acquisition of irregularities in morphology has proven to provide crucial insights into the nature of mental representations for morphemes, in particular whether they implicate absolute rules or are products of learning where frequency effects play a role.

In this paper we bring in acquisition data from Turkish clitics and seek to show that children's acquisition path is shaped by frequency and is better accounted for by usage-based/connectionist models.

Turkish has a set of clitics in the form of copular markers (Tense Aspect Modality (TAM)-II affixes) as in (1) which can pose problems during acquisition due to the presence of similar looking TAM-I affixes as in (2).

(1) TAM-II: Past copula: -(y)DI
              Evidential copula: -(y)mIş
              Conditional copula: -(y)sA

(2) TAM-I: Past tense/ perfective aspect marker: -DI
              Evidential/ perfective aspect marker: -mIş
              Conditional marker: -sA

As both the forms and the functions the copular clitics, i.e. TAM-II affixes and TAM-I affixes serve look alike we conjecture that Turkish-speaking children may consider them to behave the same in early acquisition which would lead to the production of errors. Thus this paper by studying the path the Turkish speaking children pursue in the acquisition of the copular clitics *-(y)DI, -(y)mIş* and also the noncopular clitic *-(y)lA* attempts to find out whether this path indicates application of absolute symbolic rules, rote learning or usage mostly conditioned by frequency.

2. Background

As is well known the clitics in the form of copular markers and TAM-I affixes in Turkish are treated as distinct on several grounds (Göksel, 2001). While TAM-I affixes can only be

attached to verbal predicates as in (3a), but not to nonverbal predicates as in (3b), clitics can be attached both to nonverbal and verbal predicates as in (4a&b).

(3) a. uyu-*du*   's/he slept'   (verbal)
         uyu-*muş*   'apparently s/he's slept'
         uyu-*sa*   'if s/he sleeps'

     b. *kedi-*di,*   *kedi-*miş*   *kedi-*se*   (nonverbal)

(4) a. kedi-*ydi*   'it was a cat'   (nonverbal)
         kedi-*ymiş*   'apparently it is/was a cat'
         kedi-*yse*   'if it's a cat'

     b. uyu-malı-*ydı*   's/he should have slept'   (verbal)
         uyu-sa-*ymış*   'if s/he were to sleep'
         uyu-du-*ysa*   'if s/he has slept'

Clitics and TAM-I affixes also differ from each other with respect to their stress bearing properties. As illustrated below clitics regardless of whether they are attached to nonverbal or verbal predicates as in (5a&b) are unstressable, rather they assign stress to the preceding syllable.

(5) a. kedí-*ydi*   b. *duy*-dú-*ysa*   'if s/he has heard'
         kedí-*ymiş*   duy-malí-*ydı*   's/he should have heard'
         kedí-*yse*   *duy*-sá-*ymış*   'if s/he were to hear'

Unlike TAM-II affixes, TAM-I affixes are stressable as in (6):

(6) uyu-*dú*   's/he slept'
     uyu-*múş*   'apparently s/he's slept'
     uyu-*sá*   'if s/he sleeps'

The only non-copular clitic that this study is concerned with is the clitic *-(y)lA* which also has a free form *ile* conveying comitative, instrumental or conjunctive meaning. The clitic *-ylA* is also an unstressable affix that can be attached to vowel-ending nouns as in (7).

(7) firçá-*yla*   'with a brush'
     ütǘ-*yle*   'with iron'
     Suná-*yla*   'with Suna'

Unlike the so-called copular clitics, *-(y)lA* does not have a *-lA* counterpart which can serve the functions that *–(y)lA* serves. Nonetheless, the presence of a verb deriving *-lA* affix in Turkish may have a confounding effect in the acquisition of this affix. More precisely, while the verb deriving, stressable *-lA* can be directly attached to vowel-ending words as in (8a), the same phonological environment requires the attachment of the clitic *-(y)lA* as in (7) rendering the examples in (8b) impossible.

(8) a. firça-lá-   'to brush'   b. *firçá-la   'with a brush'
         ütü-lé-   'to iron'   *ütǘ-le   'with iron'

With this background on the distribution and the varying properties of the copular clitics and TAM-affixes, in the next section we will take up the question of what kind of a challenge this particular distribution poses to children during acquisition.

3. The problem

As laid out thoroughly in the earlier section though the clitics differ from the TAM-I affixes both with respect to their categorical and stress bearing properties, hence providing grounds for differentiation on the part of the children, those cues may not be at the service of children early on. Rather phonological constraints, in particular the phonotactic properties of Turkish may be what is cueing the Turkish children with respect to affixation in early acquisition. As the affixes at issue differ from each other with respect to the presence of the palatal glide /j/, a careful look into the phonotactic distribution of /j/ may prove fruitful for obtaining some solid ideas as to the nature of the stimuli the Turkish children are exposed to. An exhaustive consideration of the phonotactic distribution of the glide /j/ as in (9a) reveals that across morpheme boundaries /j/ occurs almost always intervocalically. The examples in (9a&b) where the vowel-ending word *acı* which can be a verb meaning 'to hurt; to feel pity', a noun meaning 'pain; ache' or an adjective meaning 'bitter; painful' in Turkish is chosen to illustrate possible concatenations with verbal and nominal affixes, show that /j/ in fact functions as a buffer sound to break the impermissable vowel-vowel sequence.

(9) a. *verbal affixes*
         acı-y-acak   VERB-Y-FUTURE   'it will hurt'
         acı-y-abil   VERB-Y-ABIL/ POSSIBILITY 'it can/may hurt'
         acı-y-an   VERB-Y-SUBJECT REL.   'the one that hurts'
         acı-y-arak   VERB-Y-GERUND   'having hurt'
         acı-y-ıp   VERB-Y-GERUND   'having hurt'
         acı-y-ınca   VERB-Y-GERUND   'when it hurts'
         acı-y-ayım   VERB-Y-OPTATIVE   'let me feel pity for stg.'
         acı-y-alı   VERB-Y-POSTPOSITION   'since it has hurt'

     b. *nominal affixes*
         acı-y-ı   NOUN-Y- ACC   'the pain'
         acı-y-a   NOUN-Y- DAT   'to the pain'
         acı-y-ış   VERB-Y- DER. MOR. 'feeling pity'

The only instances where /j/ occurs in a non-intervocalic position across a morpheme boundary, are observed with the clitics *-yDI*, *-ymIş*, *-ysA*, *-ylA* and the *-yken* form as listed in (10):

(10) a. acı-ydı   'it was bitter'
         acı-ymış   'apparently it was bitter'
         acı-ysa   'if it is bitter'
         acı-yla   'with bitter (things)

     b. acı-yken   'while it was bitter'

Furthermore when the phonological environments where consonant initial affixes appear at the morpheme boundaries are investigated one interesting property immediately reveals itself whereby consonant-initial affixes are always attached to vowel-ending words without requiring the physical presence of the palatal glide /j/. In fact, there are no instances of consonant initial affixes which cannot be directly attached to vowel-ending words in Turkish. To exemplify the issue under discussion let us take a look at how various consonant initial affixes such as the TAM-I markers *-DI*, *-mIş*, the conditional morpheme -*sA*, or the necessitative *-mAlı*, etc. can be attached to the vowel ending verb *acı-* as in (11a), and nominal affixes to the nominal *acı* in (11b):

(11) a. acı-dı VERB-PAST/PERF 'it has hurt'
   acı-mış VERB-EVID. 'apparently it has hurt'
   acı-sa   VERB-COND. 'if it were to hurt'
   acı-malı VERB-NEC. 'it must hurt'
   acı-ma/k VERB-INF. 'to hurt'
   acı-dığı VERB-COMP. 'that it is hurting'
   acı-rken VERB-GER. 'while it is hurting'
   acı-sın VERB-OPT. 'let it hurt'

  b. acı-dan NOUN-ABL. 'of pain'
   acı-sı   NOUN-POSS. 'his/her pain'
   acı-lar NOUN-PL. 'pains'
   acı-lı   NOUN-ADJ. DER. 'painful'
   acı-sız NOUN-ADJ. DER. 'painless'
   acı-dır NOUN-ASSER/PROB. 'It is painful/ bitter'

With this background on the phonotactic distribution of the palatal glide /j/ we predict that during acquisition, Turkish speaking children encountering forms as in (12) may find it quite intriguing that the same phonological environment, i.e., a vowel-ending word requires a glide in (a) where *eski* is an adjective meaning 'old' but not in (b) where *eski-* functions as a verb meaning 'to become old'.

(12) a. eski-ydi 'it was old' b. eski-di 'it has become old'
   eski-ymiş 'app. it was old' eski-miş 'app. it has become old'
   eski-yse 'if it is old'   eski-se 'if it becomes old'

The clitic *-ylA* may pose less of a challenge as the function of the clitic is totally different from that of the verb deriving form *-lA*. Nonetheless if in early acquisition phonotactic regularities override functional properties children may also deem examples such as (13) to present a certain irregularity.

(13) fırça-yla 'with brush' vs. fırça-la 'to brush'
   ütü-lé- 'to iron' vs. *ütú-le 'with iron'

The distribution of the clitics, more precisely the presence of a glide in a phonological environment which does not normally require a glide may pose a challenge to Turkish-speaking children, hence may give rise to errors during acquisition. In particular struck by

the oddity of forms where a /j/ occurs in an environment which does not conform with the phonotactic regularities of Turkish may force children to follow the regular pattern hence children may tend to consider the forms bearing clitics as functioning irregularly. With these preliminary pieces of the puzzle intact in what follows we turn to the predictions of this study.

4. Predictions

If Turkish children dissociate among affixes with respect to whether they are attached to verbal or non verbal stems early in acquisition, i.e., TAM-I affixes are attached to verbs but clitics are attached to nonverbal roots and roots which already bear a TAM-I affix, an errorful acquisition path is less likely. Nonetheless we conjecture that Turkish speaking children cannot have an errorless path in the acquisition of the clitics *-yDI*, *-ymIş*, *-ysA* and *-ylA* given the fact that these is a certain irregularity that the distribution of clitics displays which appears to be in conflict with what TAM-I affixes display. In what follows we lay out the hypotheses that the issue at hand appear to bring about.

i. In early acquisition if children do not dissociate between affixes with respect to what category they are attached to, but pay attention to the phonological environment that the affix is expected to be compatible with, we expect children to produce errorful forms.

ii. In the event that during acquisition children evaluate and respect phonological/ phonotactic regularities/ requirements more than and prior to categorical requirements, i.e., phonological requirements override categorical requirements, errors as in (14) are likely to occur.

(14) a. *kırmızı-dı *for* kırmızı-ydı 'it was red'
  b. *akıllı-mış *for* akıllı-ymış 'apparently s/he is clever'
  c. *kedi-se *for* kedi-yse 'if it is a cat'
  d. *ayı-la *for* ayı-yla 'with a bear'

iii. Furthermore, if children are not aware of the categorical distinction and choose to attach the TAM-I affixes *-DI*, *-mIş* and *-sA* by default based on the frequency of the occcurence of these forms, a topic which we will venture into momentarily, we expect stress to fall on the affix, yielding errorful forms such as (15).

(15) a. *kırmızı-*dí*
  b. *akıllı-*míş*

iv. On the other hand, if children pay attention mostly to the phonotactic regularities whereby a vowel-ending word can be directly followed by a consonant initial affix in Turkish, children are expected to attach the clitic by dropping the glide as the phonological requirements are already satisfied. Furthermore as such affixation will not distort the stress pattern; the potential errors can be in the form of the examples as in (16).

(16) a. *kırmızí-dı* b. *akıllí-mış*

v. Additionally if children are completely puzzled with this process, errors such as (17) where TAM-I requiring forms, i.e., verbal roots are attached the clitics, may also occur.

(17) a. *izle-ymiş   for *izle-miş*   'apparently s/he has watched'

b. *oyna-ydı   for *oyna-dı*   's/he has played'

c. *uyu-ysa   for *uyu-sa*   'if s/he sleeps'

The upshot of all these predictions is that during acquisition Turkish children may produce overregularization errors as in (18a) where vowel-ending nominal roots are attached the clitics with the palatal glide /j/ dropped or irregularization errors as in (18b) where vowel-ending verbal roots are attached the TAM-I affixes as if they require the presence of the palatal glide /j/.

(18) a. *kırmızı-dı   *akıllı-mış
        red-CL   clever-CL
        *kedi-se   *ayı-la
        cat-CL   bear-CL

b. **izle-ymiş,*   **oyna-ydı, *uyu-ysa*

With these predictions in mind, in the next section we lay out the procedure of this study.

5. Procedure

5.1 Participants
The participants of this study were 16 children from two different age groups and 5 adults constituting the control group. The age range and mean age of all the participants are given in Table 1. The children were recruited and tested at Boğaziçi University Day Care Center. Control group consisted of undergraduate students in Boğaziçi University.

Table 1. Participants

Age group	Age range	Mean age
G1 (n=10)	3;06-4;04	3;8
G2 (n=6)	4;06-5;01	4;7
Adults	20>	

5.2 Materials and method
The stimuli used in this experiment consisted of pictures to elicit –yDI, -ymIş and -ylA forms that are attached to adjectives and/or nouns and the –DI form which is attached to verbs. Though –ysA form was also attempted to be elicited, as children resisted to produce this particular clitic, it has been excluded from the study. Some examples to all the forms tested are given below.

i.-yDI   (21 items)
        kısa 'short', mavi 'blue', dondurma 'icecream', dolu 'full', mutlu 'happy', etc.

ii.-ymIş (8 items)
        kurbağa 'frog', uçurtma 'kite', elma 'apple', sarı 'yellow', ayı 'bear', etc.
iii.-ylA (11 items)
        fare 'mouse', ütü 'iron', kova 'bucket', gemi 'sheep', olta 'fishing rod', etc.
iv.-DI (9 items)
        esne- 'yawn', izle- 'watch', oyna- 'play', oku- 'read', uyu- 'sleep', etc.

Elicitation of forms bearing clitics was rendered possible by use of story completion and elicited production tasks. In the story completion task children were presented with pictures on a power point and the experimenter initiated story telling where the use of *-ymIş* form is required. After the short warm-up period where the child is introduced the set up of the story the experimener asks the child to assist her in completing the sentences. The underlined items in parantheses are the items which are attempted to be retrieved.

(19) Bir zamanlar çok güzel bir orman varmış. Bu ormanda küçük bir kız yaşarmış. Kızın en korktuğu hayvan *köpek-miş* ama en sevdiği hayvan *(kedi-ymiş)*.
    'Once upon a time there was a beautiful forest. In this forest a little girl used to live. The animal she was scared the most *was a dog*, but the one she liked the most *was a cat*.'

The elicited production task was designed to elicit the *-yDI*, *-ylA*, *-DI* and *-mIş* forms whereby children were shown pictures of children or objects and were prompted to compare the current state of an entity or a human with its former state as in (20).

(20) Bak bu kız şimdi 6 yaşında ve saçları uzun. Ama küçükken saçları_____
    (kısa*ydı*)
    'Look at this girl. Now she is 6 years old and her hair is long. But when she was little her hair _____ (*was short*)

6. Results and discussion
We have observed that the Turkish speaking children in the two age groups tested do not follow an errorless path in the acquisition of clitics, rather they make errors with all the clitics tested. As Table 2 below illustrates the overall error rates with respect to *-ydI* and *-ymIş* usage are almost the same, i.e., 28% of the forms requiring the clitic *-ydI* are produced as *–DI* (e.g. *kırmızı-dı) and 29% of the forms requiring *-ymIş* are produced as *-mIş* (e.g. *ayı-mış). In contrast to *-ydI* and *-ymIş* errors which follow a similar path in being erred in about equal percentages, the *-ylA* errors are few in number.

Table 2. Overall error rates in the use of the clitics
-yDI, -ymIş and -ylA (e.g. *kırmızı-dı, *ayı-mış, *deve-le)

Error rate (%)	-ydI	-ymIş	-ylA
	28%	29%	11%

Prior to addressing the question of why children err less with *-ylA* forms compared to *-yDI* and *-ymIş* forms, let us take an indepth look at the *-yDI* and *-ymIş* errors. As illustrated in Table 3 below younger children appear to produce significantly more erroneous forms

such as **ayı-dı* or **ayı-mış* compared to older children, thus a developmental path reveals itself where errors with clitics level off with age.

Table 3. Error rates in the use of the clitic

–yDI and –ymIş (e.g. *mutlu-du;*mutlu-muş)

Error rates (%)	G1	G2
-ydI	38.5%	13%
-ymIş	37%	15%
-ylA	16.5%	1.5%

Let us first address the issue of why Turkish children make more errors with the clitics -*yDI* and *-ymIş* compared to the clitic *-ylA*. We argue that the fact that the clitics *-yDI* and *-ymIş* have TAM-I counterparts *-DI* and *-mIş* which are attached to both vowel-ending and consonant-ending words as in (21) has a significant role in the error rates observed. We conjecture that frequency effects play a role, i.e., Turkish children hear the forms *-DI* and *-mIş* more than *-yDI* and *-ymIş*.

(21) <u>vowel-ending</u>   <u>consonant-ending</u>
    oku-*du*   don-*du*
    oku-*muş*   don-*muş*

Furthermore when the clitics are attached to consonant-ending words they also surface in the form of *-DI* and *-mIş*, hence increasing the frequency of the occurrence of *-DI* and *-mIş* forms.

(22) okul-*du*   'it was a school'
    okul-*muş*   'apparently it was a school'

Thus frequency effects and no phonological need for the use of /j/ yield errors with the clitics *-yDI* and *-ymIş*. Furthermore, not surprisingly, children appear to err with *-yDI* and *-ymIş* forms in pretty much the same way as the forms behave the same in having TAM-I counterparts and a similar phonological distribution.

As for why there are less errors with the clitic *-ylA* compared to the clitics *-yDI* and *-ymIş,* we have two observations. The low error rates may be correlated with the frequency of the occurrence of the verb deriving *-lA* which may be less than that of the TAM-I affixes *-DI* and *-mIş*. Furthermore children may have a tendency to dissociate between the clitic *-ylA* and the verb deriving *-lA* more quickly.

In contrast to the errors children made with the TAM-II affixes *-yDI* and *-ymIş,* no errors were encountered in the use of the TAM-I affixes or in stress patterns of the cliticized forms. More precisely, children did not make irregularization errors such as *esne-ydi, *izle-ymiş, *oyna-ysa with verbs that can only be attached *-DI* and *-mIş*, furthermore no errors such as **kırmızı-dí, *akıllı-míş, *fırça-lá-* where children distorted the stress bearing properties of the affixes or roots were observed either.

Turning to a discussion of what these preliminary findings bring to mind about the theoretical discussions on the issue, two important points reveal themselves. First if rote

learning was at work children would not err at all. The data reveals that children do not display rote learning rather quided by the phonotactic rules/ phonological regularities of Turkish they apply rules. Furthermore the formulated rules appear to have been shaped by the frequency of occurrence, hence supporting usage based accounts.

7. Conclusion

We have predicted that the presence of two sets of affixes, i.e., TAM-I and TAM-II affixes which are similar both in phonological and functional terms would challenge Turkish speaking children during acquisition yielding errors where contexts requiring clitics are attached the TAM-I affixes, rendering an overregularization process or contexts requiring TAM-I affixes may be affixed with TAM-II affixes rendering an irregularizaion process possible. As the results of this study incidate Turkish children do not exhibit an error free path in the acquisition of these forms which would only be possible if children were to dissociate between affixes with respect to their categorical properties. An erroneous path in the acquisition of these forms suggests that children tend to respect phonotactic constraints/ phonological requirements and pay attention to regularities prior to a distinction based on categories is carried out. In particular the findings of this study clearly indicate that in affixation phonological requirements/ phonotactic constraints appear to override categorical requirements.

As a final note, this study is the first acquisition study on Turkish where children's sensitivity to phonological requirements has been studied in the context of the acquisition of clitics. Needless to say further studies on the issue would provide us with more conclusive results with respect to how phonological regularities cue children in their acquisition journey.

Notes

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Comprehension of subject and object relative clauses in monolingual Turkish children[*]

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1. Introduction

Previous research on the acquisition of relative clauses (RCs) has shown that in many languages RCs are relatively late acquired and in English subject RCs are easier to comprehend and produce than object RCs (e.g., Diessel & Tomasello, 2005 and references therein). In English, this asymmetry has been mostly attributed to the fact that subject RCs follow but object RCs violate the canonical word-order of English. To date, it is unclear whether or not the same picture emerges in Turkish, a typologically different language with an SOV word-order and overt case marking because the findings of previous studies do not seem to converge.

Slobin's (1982) study was the first to investigate the acquisition of RCs in 3-to-4 year old Turkish speaking children. This study was based on a child-parent language corpus elicited from Turkish and American families. Analysis of the frequency of RCs in the two groups showed that American parents and children used RCs more frequently than their Turkish counterparts (96 vs. 49 RCs in American and Turkish children, respectively; 40 vs. 22 RCs in American and Turkish parents, respectively). From the RCs used by Turkish speakers, only 12% were object RCs, and the remaining 88% were subject RCs. This asymmetry between subject and object RCs was in line with the studies on English RCs. To further examine RCs in Turkish children, he also collected experimental data using an act-out task with 4-year-old children. This showed that Turkish children had difficulties comprehending RCs and focused mainly on the canonical SOV sentence structure to act out the sentences.

Ekmekçi (1990) investigated further the acquisition of RCs in 3-to-6 year-old Turkish children using an imitation and a production task. In the imitation task, children were asked to repeat after the experimenter subject and object RCs along with simple sentences with adjectives. This showed a developmental effect; there was a significant correlation between age and success level. In addition, there were differences between the three sentence types; on average, the performance in simple sentences was the highest in all groups and success rate in object RCs was higher than it was in subject RCs at the age of 3, 4, and 5. At the age of 6, the children performed equally well in all sentence types. However, the opposite pattern was observed in the production task as children performed better in subject than in object RCs. Ekmekçi suggested that better performance in object RCs in the imitation task could be due to the similarity in articulation between the past tense morpheme and the object relativizing particle. Alternatively, this dissociation could also be due to inconsistencies in the variable formation. In the examples provided in Ekmekçi's paper,