

Do young learners pick up on relative clause constructions in referential communication? A
training study

Ayşe Sarılar & Aylin C. Küntay

Department of Psychology, Koç University

Relative clauses are subordinate constructions that modify a noun phrase in the main clause. Serving as devices of nominal expansion, relative clauses involve semantic expansions of the simple noun phrase and syntactic embedding within a main clause. Consequently, utterances with relative clauses are often viewed as indicators of complexity in child language development on account of both their functional and morphosyntactic characteristics. Because of such inherent complexity, relative clauses are not good candidates for appearing in very early child language. In fact, corpus studies conclude that full-fledged relative clauses are scarce in both child-directed speech and early child speech (Diessel & Tomasello, 2000; Slobin, 1982) However, the situations which prompt the use of relative clauses might not frequently arise in naturalistic studies. The question is whether young children can employ relative clauses when a strong need for nominal expansion is experimentally set up (Hamburger & Crain, 1982). In this study we report the first set of observations from a training experiment with young Turkish learners.

Why do we turn to Turkish to study the development of the use of relative clauses? Most language development studies on relative clauses involve English or other head-initial languages such as German (Diessel & Tomasello, 2000) or Hebrew (Arnon, 2009). Slobin (1982) pioneered the study and the discussion on the acquisition of relative clauses in Turkish, a head-final language. Turkish features prenominal relative clauses with complex morphosyntactic processes and divergence from its canonical SOV word order in relativization constructions.¹ Slobin carried out a comprehension study by Turkish preschoolers, who were asked to act out relative clauses embedded in main sentences with verbs in optative endings such as in 1.

(1) *ineğ-i düşür-en kuş zebra-yı okşa-sın*
cow-ACC drop-SR bird zebra-ACC pat-OPT²

¹ Adjectives precede nouns in Turkish, thus it is fitting that relativized verbs come before nouns in relative clauses. However, this pattern is at odds with the verb-final structure of simple transitive sentences.

² ABL = ablative; ACC = accusative; GEN = genitive; LOC = locative; POSS = possessive; OPT = optative; OR = object relativizer; PROG = progressive; REL = relativizer *-ki*; SR = subject relativizer; ISR = 1st person singular.

‘Let the bird that knocks down the cow pat the zebra.’

Turkish 4-year-olds, although they were given three animals to manipulate, often enacted such sentences in oversight of the relative clauses, often resorting to a simple transitive, canonical word order strategy (SOV). Example 2, for example, was acted out as the lhama biting the wolf, in disregard of the embedded relative clause.

(2) *lama zürafa-yı it-en kurt-u ısır-sın*
lhama giraffe-ACC push-SR wolf-ACC bite-OPT

‘Let the lhama bite the wolf that pushed the giraffe’.

These results revealed the difficulties that Turkish learners had with the processing of relative clauses. However, it is also evident that the setup in Slobin’s study (1982) did not bring about any referential indeterminacy when the information encoded in relative clauses were not utilized, and thus did not strongly prompt for the use of the relativized information.

Comparing Turkish children to English, French, and Russian learners, Slobin found later mastery and less frequent usage of the relative clause construction by Turkish children; his conclusion was that “the mastery of relative clauses in Turkish must take place later than 4;8– the oldest age in our sample” (Slobin, 1986, p. 277). Slobin’s qualitative analysis of constructions with similar functions discovered many equivalents of relative clauses, which often were strategies of avoidance of the full relative clause. For example, children preferred to use weakly coordinated pairs of simple sentences that are valid paraphrases of a potential relative clause construction such as in Example 3:

(3) *Hani sarı kedi var ya... o-nu isti-yor-um*
HANİ yellow cat exists YA³ that-ACC want-PROG-1SG

‘You know there is the yellow car.... I want that’

Slobin proposed that these equivalent strategies show that Turkish children figure out the pragmatic functions of relative clauses early on, but they have problems with their morphosyntactic forms until late in preschool years.

Our study is one among a recent set of research attempts exploring new ways to elicit relative clauses from young children. Most of these studies address the subject-object asymmetry, a phenomenon already pointed out by Slobin (1986). There are now many studies that converge in the finding that object relative clauses appear harder to produce and comprehend by Turkish children (Yumrutaş, 2009; Özge, Marinis & Zeyrek, 2010). In the current study, we just focus on the easier type, i.e., subject relative clauses, and determine if

³ HANİYA is a discourse marker serving to remind the listener of the propositional content embedded.

we can motivate very young Turkish learners, with a mean age of 36 months, to use them productively in a pragmatically appropriate task.

Subject Relative Clauses and Naming Function in Turkish

As Turkish is a head-final language, relative clauses precede the nominals they modify. Although the normative word order in simple transitive clauses is SOV, relative clauses require the verb (i.e., the action) to be preceding the head noun, as the verb now serves as a participle. There are two kinds of relativization constructions in Turkish: subject relative clauses and non-subject relative clauses (Hankamer & Knecht, 1976; Çağrı, 2009; Underhill, 1972). Subject relative clauses are used when the modified noun is the subject of the relativized clause as in (4a) *muz yi-yen adam*, banana eat-SR man, ‘the man that is eating a/the banana’ whereas in non-subject relative clauses the relativized element is a non-subject (4b) *adam-in ye-diğ-i muz*, man-GEN eat-OR-POSS banana, ‘the banana that is eaten by the man’ Although non-subject relative clauses such as in 4b carry complex agreement morphology involving the subject and the verb, subject relative clauses exemplified by 4a merely require the participle suffix *-(y)AN* added to the predicate as a relativizer of the subject position. Most previous accounts that studied the morphosyntax of relative clauses in Turkish (e.g., Çağrı, Hankamer & Knecht, 1976; Kornfilt, 1984; Özsoy, 1994; Underhill, 1972) treat subject relative clauses as less complex and structurally less embedded than object relative clauses. In the acquisition literature, there is also substantial amount of evidence indicating that object relative clauses (Hermon, et al., 2010; Slobin, 1986; Özge, Marinis, & Zeyrek, 2009; Yumrutaş, 2009) are morphosyntactically challenging for preschool children to produce.

For this study, we focus on the relatively simple subject relative clauses to determine when and how young children learn to produce informative utterances that distinguish between two competing pictures. By considering only the relatively simple and the most frequently encountered relative clause construction with a subject relativized rather than an object, we aim to determine whether young children can be trained to grasp the function of relative clauses in order to use them productively themselves.

Our experimental method invokes the simplest function of relative clauses as discussed by Dasinger and Toupin (1994), i.e., naming. In monologic narratives gathered from five different languages including Turkish (i.e., the frog story, Berman & Slobin, 1994), identification of a referent was found to be the earliest and most frequently used function

among the four general discourse functions of relative clauses.⁴ As Dasinger and Toupin (1994) assert, it is clear that the naming function of relative clauses is cognitively and pragmatically simple. In our task, children had to request a missing sticker in their version of a book in comparison to the experimenter's version (E1) from a board hung up and behind another experimenter (E2). By placing children in contexts where unique identification through verbal means is the best available strategy, and having that strategy modeled by an adult experimenter in a training phase, we demonstrate that children as young as 3 can produce (or at least attempt to produce) subject relative clauses.

Method

Participants

15 monolingual three-year-old children (mean age: 36 months 25 days, 9 males, 6 females) and 10 monolingual four-year-old children (mean age: 52 months 24 days, 5 males, 5 females) participated in the relevant "relative clause training" condition of a larger study. Younger children at the ages of 2 to 3 were recruited from a database of volunteers at the Koç University Language and Communication Development Lab. The 4-year-old children were recruited from nursery schools in Istanbul. The children's parents had attained at least high school level education.

The children were tested at the university laboratory or in a quiet place in their preschools. Two research assistants who were trained in the experimental procedure played the role of confederate and helped the experimenter by responding to children's requests for missing stickers.

Materials

Five picture books about the adventures of a family (e.g., *The Bumbles Go to the Zoo*, *The Bumbles Stay at Home*) created by Matthews et al. (2007) were used in the current study, substituting a Turkish family name, i.e. *Mutlu* (e.g., *Mutlu Ailesi Hayvanat Bahçesine Gidiyor*). In each book, there are six different pictures showing different family members (dad, mother, girl, boy) performing simple actions (e.g., eating, sleeping). Half of these pictures are about intransitive actions (e.g., the dad dancing) while the rest are about transitive actions (e.g., the girl eating cake). In each picture, the subject performing the action is animate. However, the patients in the transitive scenes are sometimes animate (e.g., human or animal) and at other times inanimate.

⁴ These four general discourse functions were naming referents, situating new referents, situating old referents, and reidentifying old referents.

Similarly to the experimental procedure of the Matthews et al.'s study (2007), two versions of each of the five picture books were prepared. The experimenter's version of the picture book included an extra picture of a character engaged in some activity on all the pages. The child's version was missing that extra picture. (See Appendix A for example pages for the experimenter's and the child's versions in the *Mutlu Ailesi Çiftlikte* 'Mutlu Family on Farmland' book).

A board was fixed high on the wall behind E2 to display the array of stickers to the child. The description of the target stickers in the five picture books are presented in Appendix B.

E1 and the child sat in front of a child-sized table. A large box barrier placed on the table ensured that E2 at the opposite side of the room could not see the child's and E1's books.

Procedure

Snap Game

Before the beginning of the experiment, a snap game was played as a warm-up task with the child in order to make sure that the child can understand the term 'the same'. E1 and the child sat at the child-sized table. E1 placed six pairs of identical cards on the table in an arbitrary configuration. Then E1 selected one of the cards and asked the child which among the remainder is the same as the card she picked. Once the child matched all six pairs of cards, E1 terminated the game.

Introduction and pre-test

After the snap game, E2 moved to the opposite side of the room from where E1 and the child were sitting. In explaining the pre-test to the child, E1 showed the two versions of the picture book (i.e. the experimenter's version and the child's version) to the child and asked the child if he/she could name all the characters in the picture book to make sure that the child could produce the words for the characters in the picture book. The child was told that one of the picture books belongs to E1 and the other belongs to the child. It was further explained that E1's book was completed in the morning, however, some of the pictures in the child's book were missing. E1 informed the child that he/she can make his/her book the same as E1's book by asking for the relevant sticker from E2. Then the child was informed about the large box barrier that prevented E2 to see the picture books in front of E1 and the child. Finally, E2 encouraged the child to come and ask for the sticker needed.

The sticker board behind E2 was fixed high on the wall in order to make identification by pointing impossible for the child. If the child could uniquely identify the character or

simply name the character, E2 gave the right sticker to the child. However, if the child only pointed to the sticker or simply said ‘that one’, E2 handed over to the child specifically the incorrect sticker that has the same person as the target but doing a different action. If the child did not accept the incorrect sticker, in this case E2 selected the right sticker and gave it to the child. If the child accepted the non-target sticker and returned to the table, E1 informed the child that the sticker he/she brought is the wrong one, pointing out the right sticker in her book. Occasionally, the child would request a wrong sticker. In this case, E2 gave the wrong sticker to the child and E1 informed the child that his/hers was the wrong one when compared to her own version. Once the child was done requesting the six stickers and completed his/her picture book, the pre-test was terminated.

Training session

Children were exposed to a training session with E1 immediately after the pre-test.⁵ In the training session, children completed two different picture books, namely, *Mutlu Ailesi Tatile Çıkıyor* ‘The Mutlu Family Goes on Holiday’ and *Mutlu Ailesi Parti Yapıyor* ‘The Mutlu Family Has a Party’.

At the beginning of each training session, the child and E1 sat together at the table. E1 placed a sheet of paper with 14 stickers in front of the child and herself on the table. Among the stickers on the sheet, there was one sticker matching the target sticker, one sticker that matches the character but not the action performed and one sticker that matches the action but not the character who was performing it. For each target sticker, a different sheet of paper was used with a different set of stickers on it. E1 explained that the task for the child was to select the right stickers making his/her book the same as E1’s book and then explain to E1 which sticker he/she selected.

In the ‘relative clause feedback’ condition, after the child selected the right sticker, e.g., ‘*the girl eating cake*’ among the non-target stickers (e.g., the mum eating cake, the girl singing) on the table, E1 asked the child ‘Which sticker did you select?’ Once the child verbally described the sticker he/she chose, E1 informed the child that the sticker was correct by saying ‘Yeah, you selected the girl eating cake. This sticker makes our first pages the same’.

However, if the child refused to describe verbally the character on the sticker in each condition, E1 did not insist for a verbalization and went on to provide the feedback. In each

⁵ The children were randomly assigned to one of the three between-subject feedback conditions namely ‘relative clause feedback condition’, ‘demonstrative-noun phrase feedback condition’, and ‘general feedback condition’. This paper involves data only from the relative clause condition.

trial, E1 repeated the relative clause construction twice; the first time after the child selected the right sticker (and sometimes talked about it), and the second time during the placement of the right sticker onto the page (See Appendix C for a layout of the experimental procedures in the training session).

Occasionally, the children selected the wrong sticker. In this case, E1 pointed out to the children that only the correct sticker could make their books similar and provided feedback as described above. After two different picture books with 6 pictures in each were completed (i.e., 12 feedback trials in total), the training session was terminated.

Post-test

At this point, the children were moved to the post-test phase of the study in order to assess whether their rates of use of relative clause constructions would change from those in the pre-test. The procedures applied in the post-test were the same as the pre-test. In the post-test, children completed two different picture books, namely, *Mutlu Ailesi Çiftlikte* ‘The Mutlu Family on Farmland’ and *Mutlu Ailesi Evde* ‘The Mutlu Family Stays at Home’, with 12 trials in total. Once the child was through requesting the 12 stickers from E2, the post-test was terminated.

Transcription and Coding

All of the sessions were videotaped. All of the verbal responses were transcribed and the pointing gestures of the children were noted by the first author and another native speaker of Turkish. They were all then checked by the second author.

Results and Discussion

We first calculated the number of target constructions (i.e., -(y)An relative clauses) uttered by the children in the pre-test phase before the training and in the post-test phase after the training. The children had 6 opportunities to provide relative clauses in the pre-test phase and 12 opportunities in the post-test phase. The number of relative clauses observed in the pre-test phase were multiplied by two to equalize the number of trials in the pre-test and the post-test. Table 1 provides the means and standard deviations of -(y)An relative clauses produced by our children in both of the age groups.

Table 1. Mean number of relative clauses produced by 3- and 4-year-olds in the pre-test and post-test phases

Age	Pre-test	Post-test
3-year-olds	2,4 (SD = 2,8)	4,6 (SD = 3,9)
4-year-olds	2,4 (SD = 4,3)	4,7 (SD = 4,4)

The pre-test scores and the post-test scores are correlated (Pearson correlation coefficient = 0.54, $p = 0.006$). Thus, the children who start with relatively high rates production of relative clauses end up with higher proportion of relative clause responses in the post-test phase. This suggests that children with a higher awareness of the task's requirements and/or the functions of relative clauses at the beginning of the study had higher proportions of relative clause usage after the training in the post-test phase.

The comparison of the pre-test with the post-test results shows that the children's production rates of relative clauses increase when they are modeled with the construction type. A repeated measures analysis of variance with age as a between-subjects variable and the pre-test/post-test conditions as a within-subject variable indicated a significant effect of training ($F = 9.21$, $df = 1$, $p = 0.006$) and no significant interaction of age with the effect of training. In other words, both of the age groups, 3-year-olds and 4-year-olds, appear to have equally benefitted from the relative clause training condition. It is important that the pictures to be described in the post-test phase do not overlap with the pictures included in the pre-test and the training phase; thus, any production of the relative clause construction in the post-test phase is creative, i.e., not an imitation of what was heard in the training phase.

Although children as young as 3 productively use relative clause constructions in this task, a qualitative analysis of their productions reveal difficulties in the formation of the fully specified relative clause construction. First of all, in many utterances there were problems with the head of the relative clause; there were many headless relative clauses (67% of the total) or misplacements of the heads.⁶ Example 2 demonstrates a headless relative clause.

(5) *köpeği yıka-yan* (Der, Girl, 32;12⁷)
'dog-ACC wash-SR

Target: **köpeği yıkayan anne** (the mom washing the dog)

Example 3 and 4 are two examples of misplacement of the head noun. Both are rendered by the positioning of the head in the sentence-initial position.

(6) *abi resmi, ağla-yan şey* (Cosk, Boy, 35;04)
Big-brother picture cry-SR thing

Target: **ağlayan (erkek) çocuk** (boy crying)

'a picture of a big boy, crying thing'

⁶ Headless relative clauses are not appropriate as referring expressions because there is a distractor sticker with a different character doing the same action as the target sticker.

⁷ The information in parentheses provides identificational information for the extracted data. The first item is an abbreviation for the child's id, the second item is the sex of the child, and the third item is the age of the child in months and days.

- (7) *şu çocuk bin-en traktör** (Özt, Boy, 39;06)
That child ride-SR tractor
Target: **traktör süren çocuk** (boy driving the tractor)
'that boy ride-AN tractor'

As seen in Example 7, there could be reversal of arguments even in semantically nonreversible relations such as the one between the boy and the tractor. Such reversal errors are frequently encountered in the identification of stickers with transitive relations between the elements of the picture. Another one is demonstrated by Example 8.

- (8) *köpek yakala-yan baba* (Nis; Girl; 38;04)
dog catch-SR father
Target: **babayı kovalayan köpek** (the dog chasing the dad)
'dad catching the dog'

Our analysis of the effect of training considered only -(y)An relative clauses, not the alternative constructions that were observed to be uniquely identificational of the right sticker. For now, we will just note the presence of such productions such as converbs as in Example 9, simple transitive sentences as in Example 10, and use of object relativizer participle -DIK as in Example 11, and locative relativizers such as in Example 12:

- (9) *anne yat-arken* (Ard; boy; 55;18)
Mom lie.down-CONVERB
Target: **uyuyan anne** (the mother sleeping)
'mom as she is sleeping'
- (10) *eşek bir adam-ı kovalı-yor* (Egb; boy; 50;29)
Donkey a man-ACC chase-PROG
Target: **babayı kovalayan eşek** (the donkey chasing the father)
'the donkey is chasing a man'
- (11) *ben şu kuzu, kuzu şeyden atladığını isti-yor-um** (Ard; boy; 55;18)
I that lamb lamb thing-ABL jump-OR-ACC want-PROG-1SG
Target: **çitten atlayan kuzu** (the lamb jumping over the fence)
'I want that lamb--- being jumped over the thing''
- (12) *çamurdaki kız*
Mud-LOC-REL girl
Target: **ağlayan çocuk** (the boy crying)
'the girls that's in mud'

Another observation was that most of the relative clauses produced described intransitive actions, not the transitives. Relative avoidance of transitive relative clauses was demonstrated in previous research (Diessel & Tomasello, 2000; Hamburger & Crain, 1982). We noticed here that usage of intransitive subject relatives led to less errors and more fluency than transitive subject relatives (Diessel & Tomasello, 2005). As seen in Examples 7 and 8, reversal errors in transitives were common. This can be explained by a tendency to have the actor as the first element of the sentence (“NVN-schema”, Yumrutaş, 2009; Slobin and Bever, 1982) or using a strict analogy to the simple non-embedded sentence (Diessel & Tomasello, 2005).

We obtained very early usage of relative clauses from young Turkish learners compared to what was suggested in the previous literature, which is, that the process of construction production appears to pose learning impediments in this head-final language. Ekmekçi (2000) found that 4-year-old children have difficulty in imitating subject relative clauses. Slobin (1986) suggested that the mastery of the construction continues after 5. We believe, although adult-like usage is beyond the means of these very young children, some 3-year-olds can produce them perfectly in a pragmatically appropriate task, and especially when the construction format is modeled. Yet, it is true that, as Henson et al. (2010) report for their own data, we encountered many head placement errors and reversals of the grammatical roles of the agent and the patient arguments.

Conclusions

Most of the previous acquisition studies about relative clauses highlighted the challenging nature of these linguistic constructions. Our results concur with the literature. However, we also demonstrated that very young Turkish learners, younger than the children of most previous studies and learning a language where relative clause constructions are purported to be hard, can sometimes produce these complex linguistic constructions with accuracy. The question is what specific factors led our children to use relative clauses productively.

We propose that the training we provided primed the children with a particular type of construction. In adult psycholinguistics literature, structural priming (Bock, 1986), which is a tendency to repeat previously heard structures (Bock, 1986; Branigan, Pickering & Cleland, 2000), is a robust phenomenon and has been proposed as a form of implicit learning (Bock & Griffin, 2000). Although there is a growing body of evidence that syntactic priming influences subsequent constructions in adult language, data for children are still lacking. Our work

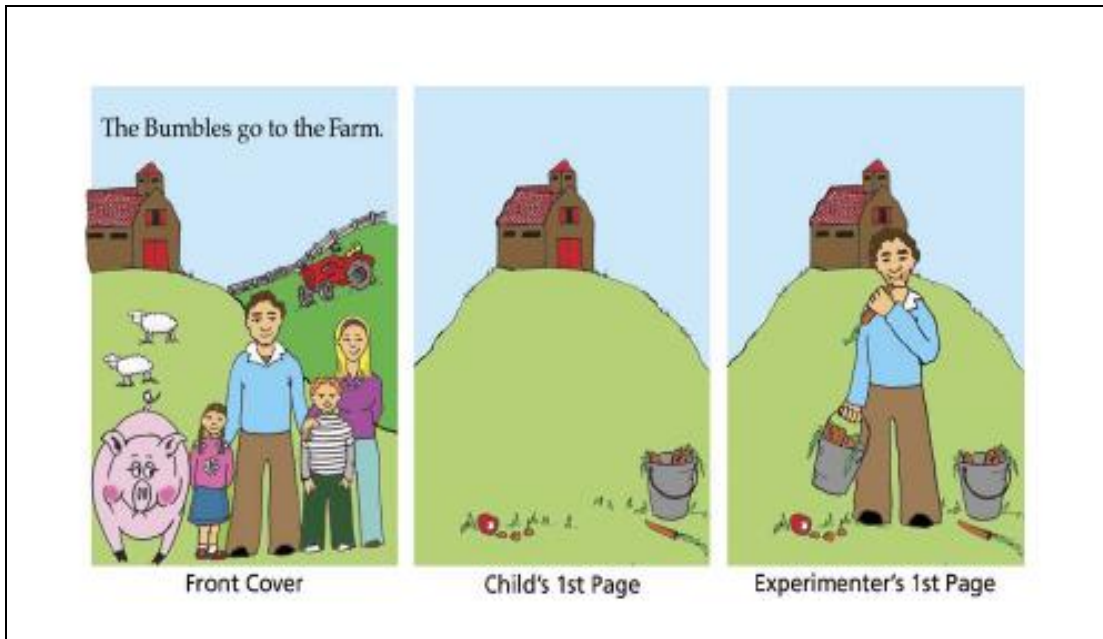
reveals that very young children can be syntactically primed to produce more relative clauses than they would otherwise through being modeled with relative clauses. Of course, it is still not clear whether it is the structural aspects of the construction or bringing its function of referential disambiguation to the fore during training that led to increased use of relative clauses. It is true that children used identificational structures not in the form of relative clauses in the post-test more than they did in the pre-test in addition to increasing their rate of relative clause usage. More analyses need to be carried out in relation to the other conditions of training to answer this question. It is also true that the form and the function of a construction are not really separable in constructionist approaches to grammar (Goldberg, 2003). Thus, if children are using relative clause constructions productively, this means that they have learned the needed pairings of form and semantic/discourse function.

Although we observe productive usage, we also find that relative clauses are hard to produce. Most relative clause attempts attested in these young children's productions are not fully specified instances. In other words, they do not present any of the characteristics that make most of the previous linguistic analyses conclude that relative clauses are difficult to learn structures. Except for a couple of examples, none display "correct connection... of a restricting clause connected to a head which has its own function in the main clause" (Hermon, Kornfilt, & Öztürk, 2010). In fact, many of the productions do not have an explicit head noun. Yet, our overall results agree with those of Hermon et al. (2010) that various pieces of syntax and morphology needed for producing subject relative clauses are within the repertoire of very young children. When the production of relative clauses is encouraged by a pragmatically apt task and modeled by an adult in similar contexts, 3-year-olds can employ bits and pieces of these constructions.

In research on language use of children, it is a challenge to pull off a balance between experimental control and ecological validity. Completion of a sticker book by adequately describing the missing sticker is certainly more engaging for children than most referential communication tasks, where referential success is not realistically motivated. However we still had to include several trials to achieve experimental rigor, and the kind of training we provided is indisputably different from what happens in interactive dialogues between children and caregivers.

APPENDIX A

Example pages from the child's and experimenter's picture books



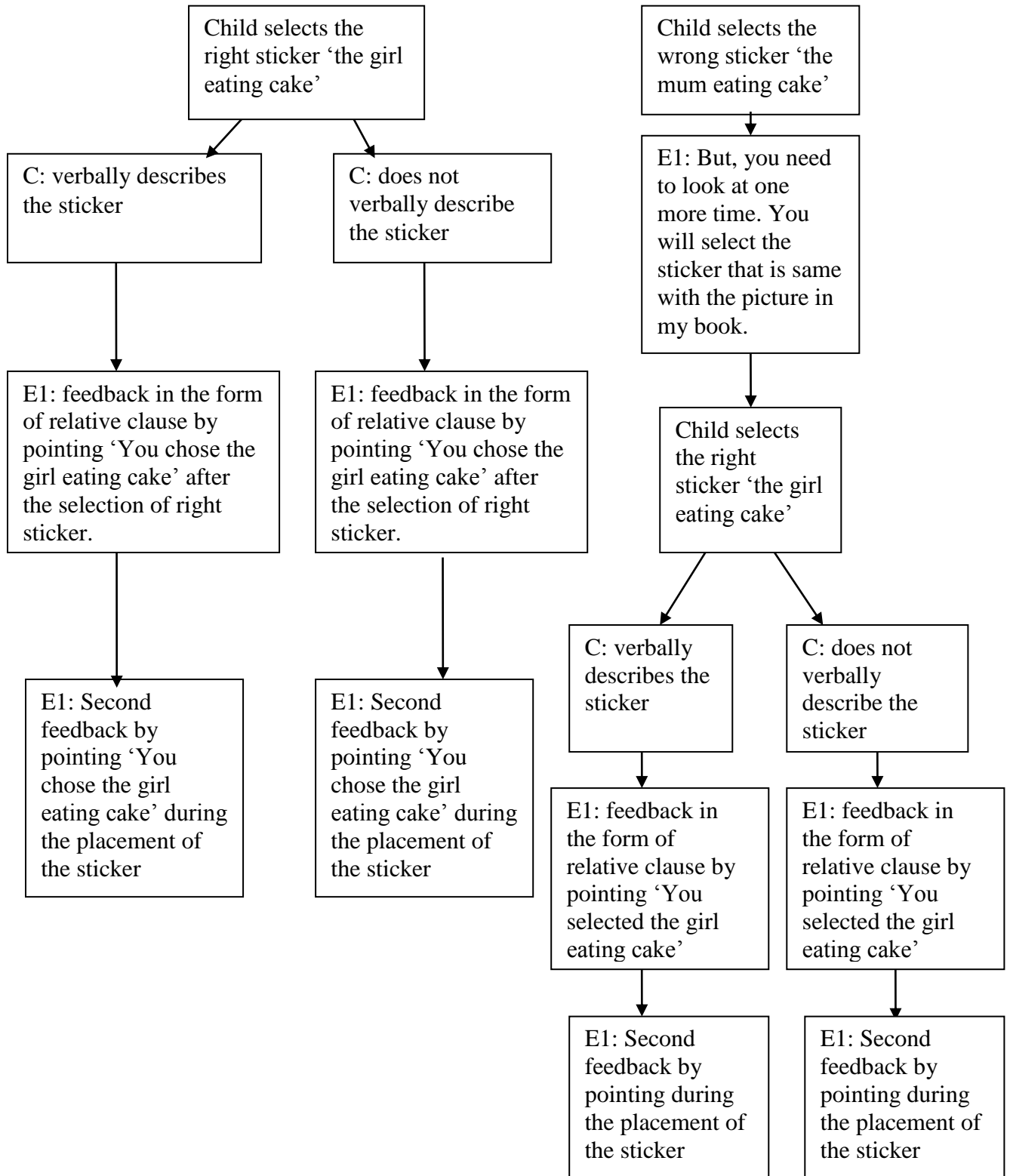
APPENDIX B

Target stickers in the five picture books

Picture Books	Target Stickers
The Mutlus Have a Party	Dad dancing, girl eating cake, clown crying, boy stroking dog, mum singing, dog chasing clown
The Mutlus Go to the Zoo	Dad drawing, girl feeding monkey, boy crying, mum eating bananas, elephant sleeping, giraffe licking mum
The Mutlus are on Farmland	Sheep jumping, dad eating carrots, girl crying, mum sleeping, dog chasing dad, boy driving tractor
The Mutlus Go on Holiday	Dad eating ice-cream, boy riding donkey, mum reading, dog sleeping, girl swimming, donkey chasing dad.
The Mutlus Stay at Home	Dad reading, mum washing dog, girl drawing, cat sleeping, boy eating, dog licking mum.

APPENDIX C

Experimenter 1's script for the target sticker 'the girl eating cake' in the relative clause feedback training condition



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