

# DEGREES OF RESILIENCY IN ACQUISITION OF LANGUAGE\*

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## 1. Introduction

Recent research on the gestural system of homesigners and ‘young’ languages such as Nicaraguan Sign Language (NSL) and Al-Sayyid Bedouin Sign Language (ABSL) has provided evidence of linguistic properties that are reflective of Universal Grammar (UG) such as word order, subject/object, and lexical development (Goldin-Meadow 2005; Coppola 2002; Senghas 1995; Senghas & Coppola, 2001; Sandler, Meier, Padden, & Aronoff 2005). There are large populations of homesigners throughout the world and investigating their linguistic systems provide us with a window into the development of language and the accessibility of UG to these homesigners. In this study, we investigate the linguistic systems of Deaf Brazilian homesigners, late learners of Brazilian Sign Language (LIBRAS- LSB) and native signers of LSB. Former homesigners often become late learners of LSB (or any other given sign language), which means the input has been greatly delayed or impoverished for these signers. Although, these signers do exhibit deficiencies in their grammar, they do learn the signed language, even well past the age of puberty. The questions arise as to which properties of language are always available, regardless of input, and how are these properties acquired?

Research shows the importance of early linguistic input in such situations. Deaf children of Deaf parents who are fluent signers (DCDP) acquire ASL as a native language, in the same manner as hearing children do with their languages (Newport & Meier 1985; Lillo-Martin 1999). Their milestones are passed at approximately the same ages and they go through the same stages as hearing children. What about ‘early’ late learners (i.e. those who learn ASL as a first language between the ages of 4 and 6 years old) and ‘late’ late learners (i.e. those who learn a Sign Language as a first language past the ages of puberty)?

Those who learn ASL as a late first language have difficulty mastering many aspects of the language. Newport (1990, and other works) tested deaf adults, some in their 40s and 50s, who learned ASL at the age of 4 to 6 years old, or after the age of twelve, on a series of complex, morphological production and comprehension tasks. The ‘early’ late learners, as compared to native signers of ASL, showed a significant reduction in accuracy on the tasks,

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\* This study was supported in part by NIH, NIDCD Grant #DC000183. I would like to thank Diane Lillo-Martin and William Snyder for their constructive feedback and guidance in the development of this study. Much appreciation and gratitude goes to Ana-Regina Campellos for assisting with recruiting the participants and the experiments. Most of all, many thanks to the Deaf Brazilian participants who willingly gave up their time to participate in the experiments and provided insight for further research and revision of the experiments.

even though many of them had been using ASL for well over 40 years. Those who acquired ASL later, after the age of twelve, presented even more depressed accuracy. However, they did not exhibit effects of age of acquisition on every test of ASL structure. On a test of basic word order, all three groups performed about the same: over 95% correct. However, when tested on complex ASL morphology, including verb agreement and verbs of motion, there was a correlation of  $-.6$  to  $-.7$  between age of acquisition and test score.

These findings are corroborated by studies by Berk (2003, 2004) and Lillo-Martin & Berk (2003), who investigated the acquisition of verb agreement and word order by two deaf children who were first exposed to ASL as a first language at the age of approximately 6 years old. They showed a significant amount of errors in their usage of verb agreement and, even over time, these errors did not decrease. With respect to word order, the children mastered the basic word order SVO for ASL and were at approximately the same stage as a native Deaf two year old. However, unlike native two-year old Deaf children, they were not able to use derived word orders that ASL allows in appropriate discourse and syntactic contexts<sup>1</sup>.

Boudreault & Mayberry (in press) also found that adults who acquired ASL as a late learner showed a significant decrease in mastery of syntactic categories (simple, negative, agreement, wh-question, relative clause and classifier sentences), which correlated with the age of exposure to ASL. The more pronounced the delay of exposure, the less accurate the signers were. That is, syntactic knowledge of the target language is affected by the length of delay for the acquisition of that language as a first language.

Late first language learners of ASL also show processing limitations much greater than that of native signers (Mayberry & Eichen 1991; Mayberry 1993, 1994; Emmorey et al. 1995; Morford 2003). For example, Emmorey et al (1995) conducted both on-line and off-line tests with native, early, and late learners. In the off-line grammaticality judgment task, all three groups were equally able to detect grammatical errors in verb agreement and temporal aspect. However, only the native signers were sensitive to the verb agreement errors in on-line tasks. Mayberry & Eichen (1991) found that age of acquisition was significantly related to performance on a sentence recall task, concluding that lexical processing is affected by delayed exposure. Mayberry (1993, 1994) also showed that such effects are specifically associated with late first language exposure, as participants who learned ASL at the same age, but as a second language, performed better than the late first language learners.

What is known so far is that delayed linguistic input affects language acquisition in particular ways, but additional research on the range of these effects is sorely needed. The discrepancies found in previous studies between aspects of language which are more or less affected by delayed input leads to the question, which properties of language are what Goldin-Meadow (2005) calls 'resilient', and which are 'fragile'? Goldin-Meadow (2005) suggests that 'resilient' properties are those that all languages have and these properties will appear in the gestural system of homesigners. 'Fragile' properties are those that have to be learned. In

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<sup>1</sup> These contexts include topicalization in which the object is fronted and negation.

this paper, I extend the definition of ‘resiliency’ as a component of Universal Grammar (UG). That is, there are degrees of resiliency that correspond to components of UG; principles and parameters.

The most fragile properties are those which require linguistic input at a very early age in order to develop. Native learners display these properties, but late learners do not. Less fragile properties are learned by late learners once their exposure to language has begun. The most resilient properties are found even in extreme cases of stimulus poverty, as in Goldin-Meadow’s extended studies of young homesigners, deaf children who generate their own gestural linguistic system in the absence of accessible conventional language (Goldin-Meadow & Feldman 1977, and many other articles, summarized in Goldin-Meadow 2003, 2005).

Previous research on homesigners (Goldin-Meadow 2003, Coppola 2002) indicates that certain properties of language appear without input – we take these to be fully accessible properties of UG. ‘David’, a young homesigner studied by Goldin-Meadow, presented evidence of ‘resilient’ properties, i.e. lexicon, word order, and recursion, among others. Other young homesigners show similar properties, even across cultures as distinct as American and Chinese (e.g., Goldin-Meadow & Mylander 1998, Goldin-Meadow & Saltzman 2000, Phillips et al. 2001). Moreover, there are deaf people who are never exposed to a language, or experience exposure at a very late age, in their 40s and 50s. These people have also developed a linguistic system on their own that is language-like, but yet, falls short of a full language (Morford 1996, Coppola 2002).

Recent studies of the language that emerges after homesigners come together to form a linguistic community indicates that within a relatively short period, such a gestural-based system develops into a full-fledged language (Senghas 1995; Senghas & Coppola, 2001; Sandler, Meier, Padden, & Aronoff 2005). However, this requires a community of users and early linguistic input. Even after many years of homesigning, adult homesigners show only some of the properties of language (Coppola 2002). – that is, what Goldin-Meadow (2005) would say are the most resilient ones.

This study investigates these issues with a look at recursion via Noun-Noun compounds and structural dependency via  $\bar{A}$ -movement (topicalization) in language, ranging from those expected to be resilient to somewhat resilient, examining the ability of homesigners, late learners of LSB and native signers of LSB to produce or comprehend these structures.

## **2. Theoretical Background**

A central concept in the generative framework is Universal Grammar, which is ‘the system of principles, conditions, and rules that are elements or properties of all human languages ... the essence of human languages’ (Chomsky 1975). Universal Grammar is a theory of knowledge. The internal structure of the mind goes hand in hand with the problem of how knowledge is acquired. The theory of UG contains the premise that the child knows a

set of principles that apply to all languages, and parameters that vary within a set of constraints from one language to another, i.e. these principles and parameters are part of the language acquisition device that is present in the human mind (Chomsky 1981; Hyams, 1986; Roeper & Williams, 1987; Chomsky & Lasnik 1993). Using the terminology of Goldin-Meadow (2005) of ‘resiliency’, I suggest that principles are ‘resilient’ properties of language and particular settings of parameters are less resilient. The most ‘fragile’ properties of language would be language-particular, idiosyncratic properties. Resilient properties are innately specified whereas fragile properties are language-specific and must be learned.

In the ‘parameter-setting’ model of language acquisition, the principles and parameters guide the acquisition of language, preventing the learner from arriving at a grammar that deviates from possible adult grammars. Errors are expected to be of limited types, and crucially, do not violate the universal constraints.

Given the theory of UG, what can be expected for cases of late learners of LSB or homesigners as compared with native signers of LSB? We expect to see certain lexical differences, as lexical information obviously must be learned. Properties such as the types of movement allowed and which syntactic structures are present in the language are language-specific properties of LSB, including the settings of parameters, and must be set on the basis of linguistic evidence. It can be expected that both late learners of LSB and homesigners will lack the LSB-specific aspects of these properties. However, since universal principles, such as consistency of word order, recursion, and structural dependency, by hypothesis do not have to be learned, they are expected to be present in all linguistic systems. That is, we expect to see a limited set of errors with respect to these components.

This discussion has focused on linguistic competence. However, it is well-known that actual linguistic performance is affected not only by competence but also by factors such as processing efficiency, memory limitations, etc. Previous research with late learners has demonstrated performance effects which may overlap with competence effects. Thus, in this study we will examine posited resilient properties keeping in mind the possibility that greater processing difficulty in late learners of LSB and homesigners would affect their performance more than that of native signers of LSB.

## **2.1 Some Components of UG (Resilient Properties)**

Central components of UG include recursion and structural dependency. Recursivity is reflected in the set of phrase structure rules (Chomsky 1976), understood in Minimalist terms as repeated applications of the process Merge. PS rules can apply over and over through recursivity, because the rules can apply to their own output. More precisely, recursion occurs with components of the same syntactic category. For instance, a PS rule that introduces embedded sentences can introduce another embedded sentence inside the first, as in ‘Bob believes that Mary thinks that Jim will dance with Sue’. Recursion is not limited to sentences only. It may also manifest itself in the form of Noun-Noun compounds, since each Noun of the compound can itself be composed of a Noun-Noun compound. Thus ‘dog house’ (which is

a lexical compound) can be a member of the recursive compound ‘dog house door’(which is a novel compound). All languages are postulated to operate on the basis of recursivity because a mechanism for expanding a sentence must be in place (Chomsky 1976, Hauser, Chomsky Fitch 2002).

One well-known argument for UG comes from the poverty of the stimulus with respect to structural dependency. In order to form a yes/no question corresponding to the declarative in (1a), a simple, structure-independent rule would suffice, i.e., ‘move the first auxiliary to the front’ of the sentence, as shown in (1b).

- (1) a. The man is tall.  
b. Is the man tall?

Other data, however, such as (2), show that the structure-independent rule does not suffice, and the more complex structure-dependent rule is needed, i.e., move the auxiliary that is in the main clause to the front of the sentence.

- (2) a. The boy who is singing is my father.  
b. \*Is the boy who singing is my father?

There are certain kinds of knowledge about grammar that are not expressly demonstrated in the input for the learner. That is, ‘negative’ data (ungrammatical sentences) are not presented to the child as a form of input. Thus, the child receives input about the grammaticality of (1), but not about the ungrammaticality of (2b). On the assumption that input such as (2a) would rarely be provided, the structure-independent rule might be tempting. (See papers in the special issue of *The Linguistic Review* 19.1-2, 2002, for discussion of this issue).

Crain & Nakayama (1987) tested this issue by having children between the ages of 3 to 5 years old, “Ask Jabba if the man who is beating a donkey is mean”. If children follow a structure-independent rule, they should sometimes produce questions such as ‘Is the man who beating a donkey is mean’. They made errors of other kinds, but not once in this study did they make this kind of error. The findings of this study provide support for UG, in particular that structure dependence is available to learners from a very young age.

## **2.2 Linguistic Background**

### **2.1.1 Noun-Noun Compounds**

This experiment examines recursion and structural dependency, central components of UG. We investigate recursion by the use of Noun-Noun compounds, which involve a morphological operation in which the Noun-Noun compound has the properties of a ‘single, complex word’ (Snyder 1995, 2001). In order to ensure that the participants are productively using recursive compounding, the study elicits novel, productive N-N compounds. For example, *cat lady* can be used to refer to someone who loves cats or someone who looks like

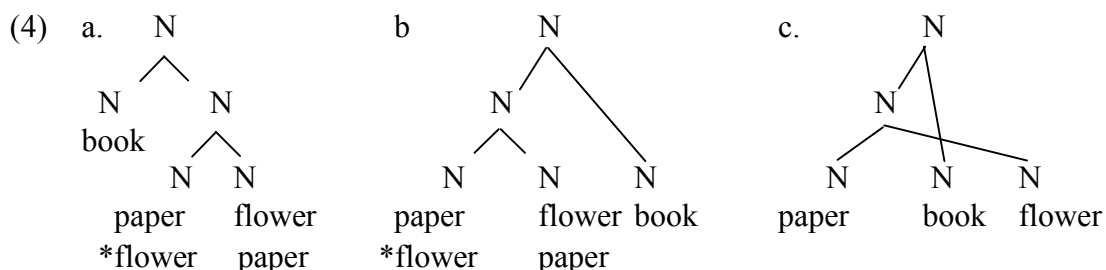
a cat or someone who is an expert on cats, etc. That is, this compound does not have a fixed meaning as a lexical compound would, such as *toothbrush*, *lighthouse*, or *chalkboard*.

In ASL, there is a difference in word order between lexical and novel compounds (Wood 2004). Lexical compounds are in a strict order of modifier noun + head noun, whereas novel compounds can be in either order. That is, a lexical compound such as DOG HOUSE must remain fixed in order. If the order is reversed as in HOUSE DOG, the meaning changes to that of ‘a dog that stays in the house’. However, a novel compound such as ELEPHANT BOOK (with the meaning ‘book about elephants or a book that is in the shape of an elephant’) can likewise be signed as BOOK ELEPHANT with the same meaning.

With respect to recursive noun-noun compounds such as PAPER FLOWER BOOK (‘a book with/about flowers made of paper’), there is a combination of both required fixed word order for the embedded elements (PAPER FLOWER) and reversible word order for this constituent and the head BOOK. It is possible to have either PAPER FLOWER + BOOK or BOOK + PAPER FLOWER with the same meaning both ways. However, PAPER FLOWER is a constituent and it is ungrammatical to change the ordering for these two nouns as shown in (3a, b) below. Furthermore, it is also ungrammatical to interrupt the constituent PAPER FLOWER with the noun BOOK, as in (3 c,d).

- (3) a. \*FLOWER PAPER BOOK  
 b. \*BOOK FLOWER PAPER  
 c. \*PAPER BOOK FLOWER  
 d. \*FLOWER BOOK PAPER

Thus, there is a clear structural dependency in the formation of recursive compounds. One can see this from the structures given in (4) below. The N-N compound that is the modifier of the head noun in the recursive compound can be ordered either prenominally or postnominally. However, one cannot vary the order inside the deeper compound or insert a noun inside it.



In this study, we attempt to elicit novel recursive noun-noun compounds with homesigners and late learners of LSB. LSB allows NNC, with a more strict (than ASL) ordering. That is, the order must be Head + Modifier. We look at the order of the recursive N-N compounds signed by each signer to determine whether structural dependency is being manifested.

### 2.1.2 Topicalization

In this study, we look at how SVO becomes O, SV in LSB, namely through topicalization, a common mechanism in LSB (and other sign languages) for prominently displacing ‘old information’ to the front of the sentence (Liddell 1980, Aarons 1994, Braze 2004, Lillo-Martin & Quadros-Müller 2007). That is, syntactic movement of the constituent undergoes topicalization. We focus on topicalization in LSB, which is marked by a distinctive non-manual cue, as a “slight backward head tilt and a brow raise” (Quadros-Müller 2007; Liddell 1980). Several examples of topicalization in LSB are given in (5 a-c).

- (5) a.  $\frac{\quad}{\quad}t$   
CHASE CAT, BOB  
‘As for chasing the cat, Bob did.’
- b.  $\frac{\quad}{\quad}t$   
CAT, BOB CHASE  
‘As for the cat, Bob chased (it).’
- c.  $\frac{\quad}{\quad}t$   
BOB, CHASE CAT  
‘As for Bob, (he) chased the cat.’

In this study, we focus on the topicalization with regard to object topicalization. It is more difficult to determine from the word order alone which constituent is being topicalized. One is required to know the rules for using non-manuals and  $\bar{A}$ -movement in LSB in order to set the parameter for topicalization.

### 3. Hypotheses

In this proposal, we take an investigative look into the ‘resilient properties’ of UG by testing native signers, late learners, and homesigners. There are certain components that we hypothesize to be resilient, in concurrence with Goldin-Meadow (2005) and Coppola (2002). These should show up even in homesigners and late learners. The candidates for the most resilient properties are structure-dependence, recursion, and consistency of word order. In this study, we hypothesize that evidence of structure-dependence and recursion (i.e. production of novel, recursive NNCs) will be produced in all three groups.

Moreover, there may be certain aspects of UG that require input from a full-fledged language. In this regard, the late learners of LSB, who presumably started out as homesigners but later learned LSB around the ages of 14 years old and older, should perform better than chance. However, the homesigners are not expected to show competence in these areas. One candidate for this type of structure is topicalization. UG allows for ‘movement’ as a general mechanism, but the particular aspects of syntactic movement are contingent on the language

(Chomsky 1995). The language may or may not allow a certain syntactic operation of  $\bar{A}$ -movement, such as topicalization.

As noted earlier, topicalization in LSB involves movement of ‘old information’ to the front of the sentence (Liddell 1980). In Goldin-Meadow’s (2005) study of ‘David’, a child homesigner, she found no preference for new information or old information in the sentence-initial position. Following her proposal that the absence of a language property indicates ‘fragility’ (i.e. the property is not accessible from UG), it is hypothesized that topicalization requires input from a full-fledged language for a signer to perform above chance. We hypothesize that topicalization in LSB is also dependent on early linguistic input, but not necessarily before the critical period ends. Homesigners are hypothesized not to display competence in this area. Along with Goldin-Meadow (2005), we conclude that the ‘absence of a language property in the gestural system suggests that the property is fragile (i.e. requires input from a full linguistic system)’.

Recall our discussion earlier of ‘Simon’ and his parents, Newport (1999) found that Simon’s parents (who had learned ASL in their late teens) consistently misinterpreted sentences with topicalized objects and verb phrases, but not subjects. Simon, however, showed perfect mastery of topicalization in ASL, despite the fact that he had impoverished input with respect to topicalization from his parents. Thus, we hypothesize that topicalization is a ‘less resilient’ property of LSB and that the late learners of LSB may or may not acquire this successfully.

#### **4. Experiment 1: Noun-Noun Compounds**

The goal of this experiment is to test whether each participant is able to produce at least three novel three-sign NNC.

##### **4.1. Participants**

Fourteen Deaf Brazilian adults were recruited (23-53 years old), through a Deaf Brazilian local who also assisted in the experiment. Five were native signers of LSB, six were late learners of LSB, and three were homesigners. Assistance with recruitment was provided by Ana-Regina Campellos who works extensively with the Deaf community in primarily the southern region of Brazil, but has worked in many other regions of Brazil with the Deaf population there. Ana-Regina is a near-native Deaf signer of Brazilian sign language and a member of the Deaf Brazilian community. She also served as a consultant and co-experimenter in this project with respect to data collection and transcription.

##### **4.2. Procedure and Materials**

The subject was shown a series of different items, all of which have been designed to elicit a recursive Noun-Noun compound (NNC). (This method was successfully used to elicit Noun-Noun compounds from young Deaf children by Wood 2004.) Initially, we ascertain



each subject's sign for the lexical items involved (e.g. SOFA, BLANKET, etc...)<sup>2</sup>. For training, we show the subject three items that have two characteristics, and show the subject how to express the particular item as a N-N compound. First, we sign the characteristics separately and then combine them together in a N-N compound, as shown below in (6)<sup>3</sup>.

(6) Practice Items:

- a. A blanket for the sofa                      BLANKET-SOFA  
 b. A table for the computer                    TABLE-COMPUTER

Then, we commence with elicited production of recursive noun-noun compounds, using the same method that we used for the training items. A total of 10 test items were given to each subject. Examples of test items are shown below in (7). A list of the test items is presented in Part A of the Appendix.

- (7) a. A picture frame with a pig on front                      FRAME-PIG-PICTURE  
 b. A necklace with a pen with a frog on its cap                FROG NECKLACE PEN

### 4.3. Results

One late learner (L5) and one homesigner (H1) produced two 3-sign NNCs. All other signers produced at least three 3-sign NNCs, passing the criteria for production of recursive NNCs. An illustration of the results appears in Figure 1.

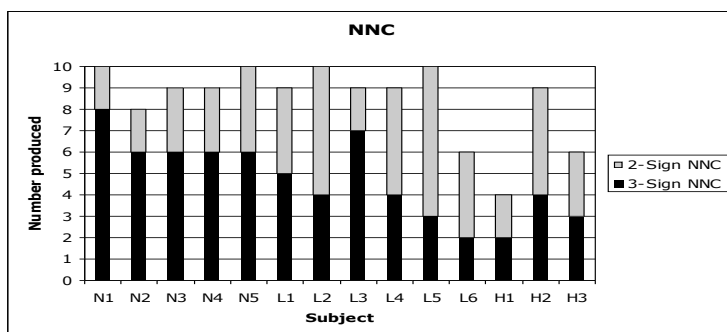


FIGURE 1 Total number of 2-Sign and 3-Sign NNC produced for Native Signers and Late Learners of LSB, and Homesigners

Native signers and late learners produced more 3-sign NNCs than HS. An average of 6.4 NNCs were produced by NS. Some of the late learners were less consistent, with L1 producing five NNCs, and L2 and L4 producing four NNCs, L3 produced the most with seven NNCs. L5 produced three NNCs and L6 produced two NNCs. Two of the homesigners produced three or more NNCs. H2 produced four NNCs and H3 produced three NNCs.

<sup>2</sup> With native and late learners of LSB, we used LSB signs for the objects in the test items. However, with homesigners, we asked them for their own gesture/sign for the item.

<sup>3</sup> Recall from the earlier discussion that the ordering for NNC in LSB is Head + Modifier.

The results from Experiment show that most of the signers can produce a novel, recursive NNC, producing at least three 3-sign NNCs.

## 5. Experiment 2: Topicalization

The goal of this experiment is to test whether the participants are able to correctly comprehend instances of topicalization, when signed to the individual.

### 5.1. Participants

Fourteen Deaf Brazilian adults were recruited (23-53 years old), as discussed in Experiment 1. Five were native signers of LSB, six were late learners of LSB, and three were home-signers. They all also participated in the previous experiment discussed in this paper.

### 5.2. Procedure and Materials

Each native signer and late learner was shown a picture with some activity and the experimenter signs one sentence. The signer has to determine whether the signed sentence is ‘correctly’ or ‘incorrectly’ matching the picture. An example of the task given to the native signer and late learner of LSB is presented in (8). The correct response to this item is ‘correct’.

(8) Picture A: A cat is chasing a mouse.

\_\_\_\_\_t  
Experimenter: MOUSE, CAT CHASE

‘As for the mouse, the cat is chasing (it).’

Due to the homesigners’ difficulty with answering test questions as ‘correct’ or ‘incorrect, we revised the experimental stimuli slightly. Instead of showing one picture, each subject was shown a set of two pictures that were in contrast to each other, which can be seen in the Appendix. The experimenter signs one sentence and asks the subject to choose which picture matches the signed sentence. An example of the task that was given to the homesigners is presented in (9). The correct response to this item is to select picture A.

(9) Picture A: A cat is chasing a mouse

Picture B: A mouse is chasing a cat.

\_\_\_\_\_t  
Experimenter: MOUSE, CAT CHASE

A training session was administered initially with each subject by asking them questions such as “She’s a boy, right?” and pointing to the female co-experimenter. Once the subject understands the procedure and that it’s permissible to correct the experimenter, we proceed

with the experimental task. A total of sixteen test items was administered with each subject. The test items were divided into eight SVO sentences and eight OSV sentences, with four 'incorrect' and four 'correct' in each group. A list of the test items is provided in Part B of the Appendix.

#### 5.4. Results

Using an exact binomial, one-tailed test for individual differences, the analysis revealed a significance for all native signers and all (but two) late learners of LSB. Each native signer performed significantly above chance ( $p < .002$ ). Four late learners performed significantly above chance ( $p < .05$ ). Two late learners did not perform significantly above chance (L5-  $p = .105$ ; L6-  $p = .40$ ). None of the homesigners performed significantly above chance (H1-  $p = .23$ ; H2-  $p = .40$ ; H3-  $p = .40$ ). An illustration of the results appears in Figure 2.

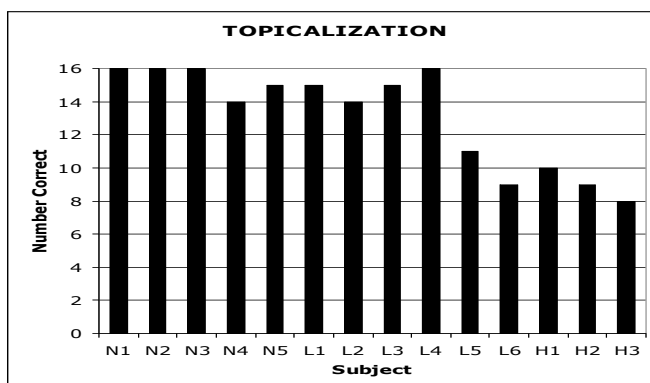


Figure 2 Total of correctly matched pictures with test item for Native Signers and Late learners of LSB, and Homesigners

There was a significant difference between groups by one-way ANOVA ( $F(2,9) = 54.67, p < .001$ ), which is illustrated in Figure 3. Post-hoc Tukey tests reveal that the HS were significantly different than the other two groups, but there was no significant difference between the LS and the NS (NS vs LS nonsignificant; NS vs HS,  $p < .01$ , LS vs HS,  $p < .05$ ). A concern was raised about the large variance in the late learners group, due to L5 and L6. A follow-up analysis with a single-sample t-test, using the mean score of the native signers (15.4 correct) as the baseline, was performed. The homesigners' performance was significantly below the baseline (two-tailed  $p = .008$ ). The late learners' performance was not significantly different from the baseline (two-tailed  $p = .123$  NS).

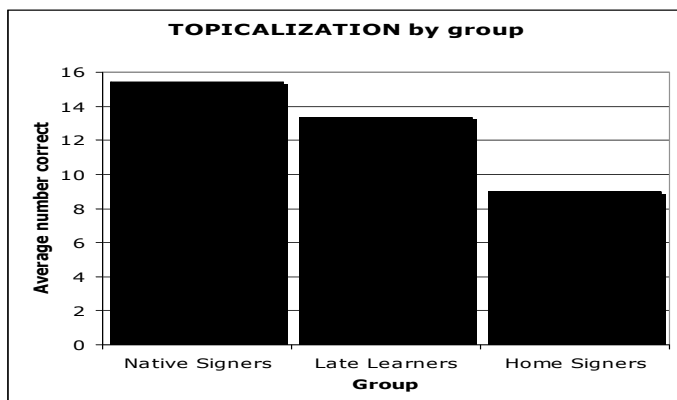


Figure 3 Mean correct by Group

Experiment 2 shows that native signers and late learners of LSB were clearly able to comprehend all or most instances of topicalization in the tasks. Homesigners were not able to comprehend the topicalized sentences and performed by chance on the tasks. They also did not significantly perform below chance on either SVO or topicalized sentences.

## 6. Discussion and Conclusion

The purpose of this study was to determine whether homesigners, very late learners of LSB and native signers of LSB were able to produce at least three novel, recursive NNCs and comprehend instances of topicalization. We predicted that all three groups would be able to produce at least three novel, recursive NNCs. Although this prediction was not fully borne out, we still believe that evidence of recursion is still apparent in their system due to the fact that all three groups were able to robustly produce two-sign NNCs. One thing that has to be kept in mind while we interpret the results for the NNC is that not all languages allow NNC (Snyder 1995, 2001). For instance, French does not allow novel, recursive NNC, but it does allow lexical compounding. Also, French does allow special instances of novel, recursive NNC with respect to borrowing from other languages. It may be possible that these two signers (L5 and H1) may be using the French strategy in their grammar.

There are other possible reasons for the inability to create more than two 3-sign NNC. One may be short-term memory and another may be processing limitations. As discussed earlier in this paper, processing limitations have been observed in late learners of ASL (Mayberry & Eichen 1991; Mayberry 1993, 1994; Emmorey et al. 1995; Morford 2003) in ways that second language learners of ASL do not exhibit (Mayberry 1993, 1994). We suggest that recursion as a mechanism is available even to these signers, as well as to the other signers. If this is correct, then recursion can only be assumed to be provided via UG, since there is no other input providing them with the means for recursion. Also, whatever the requirement for acquiring NNC is, it apparently can be acquired by the homesigners.

Being that the premise of this paper is there are ‘degrees of resiliency’ in the acquisition of language, we expected to see results with the topicalization experiment that would correspond with the degree of input received by the signer, especially with regard to the very

late learner of LSB. The results from the topicalization experiment support the hypothesis that topicalization is ‘less resilient’. Almost all of the native signers and very late learners of LSB performed significantly above chance in their comprehension of topicalization. However, two very late learners did not, L5 and L6. The participant L5 was a late learner of LSB, having learned LSB when she was approximately 21 years old. At the time of the testing, she was 29 years old. She has had very limited contact with the Deaf LSB community. This obviously affects the consistency and continuity of LSB input for L5. We suggest that she had not had the requisite input in order to set the parameter value for topicalization in LSB. In contrast, L1, who started learning LSB at the age of 18 years and was 29 years old at the time of testing, performed significantly above chance. L1 had extensive contact with the Deaf LSB community, being very involved in activities and events, and maintained close relationships with other Deaf members of the LSB community. Clearly, L1 had enough input from LSB, which allowed him to set the parameter for topicalization for LSB.

The other participant who performed by chance with topicalization was L6, who was a previous homesigner. She had only been learning LSB for less than a year and half at the time of testing. Her lexical production was dominantly LSB, but her results with NNCs and topicalization pattern more with the homesigners than with the other very late learners (who were not previous homesigners). It seems clear that topicalization must be learned with a certain amount of linguistic input, hence topicalization is ‘less resilient’. That is, properties of language that are ‘less resilient’ will evince a variability in the degree of resiliency, requiring sufficient input in order to set the parameter. This relates to parameters that are set very early, such as Head-Complement order which seem to require a minimal amount of input in order to be set (Wexler 1998) and other parameters such as NNC in ASL (Wood 2004) and Japanese (Miyoshi 1999; Sugisaki & Isobe 2000) which require more input and are set later.

Future research is needed in order to confirm the validity of these claims. More research with other homesigners in other cultures will provide a deeper look cross-linguistically. Also, next on the list is a study for ‘fragile’ properties of language, i.e. verb agreement. As noted earlier, verb agreement is very sensitive to errors by late language learners even when they have been using ASL for forty years or more. In contrast to topicalization, it would seem that verb agreement has to be acquired before a certain age in order to be set properly. Thus, the range of ‘resiliency’ needs to be fully explored in order to understand its role within UG.

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## APPENDIX

### A. Test items used for Experiment 1

<u>Test items</u>	<u>Possible LSB Noun-Noun Compounds</u>
1.) (pig picture frame)	PICTURE FRAME PIG
2.) (fish keychain holder)	HOLDER HOOK FISH
3.) (cd case looks like bear)	BEAR CD CASE
4.) (cat food bag)	BAG CAT FOOD
5.) (dog keychain)	KEY CHAIN DOG
6.) (silver bracelet box)	BOX BRACELET SILVER
7.) (catdog puppet)	PUPPET CAT DOG
8.) (dog photo book)	BOOK PICTURE DOG
9.) (frog necklace pen)	PEN NECKLACE FROG
10.)(toy car star box)	BOX STAR TOY CAR

### B. Test items used in Experiment 2

SVO items:

<u>Picture of activity</u>	<u>Signed test items</u>
1) Picture of mouse chasing cat:	CAT CHASE MOUSE (W)
2) Picture of cat licking dog:	CAT LICK DOG (R)
3) Picture of girl kissing boy:	BOY KISS GIRL (W)
4) Picture of cat biting dog:	DOG BITE CAT (W)
5) Picture of little frog hugging bear:	FROG HUG BEAR (R)
6) Picture of boy kissing girl:	BOY KISS GIRL (R)
7) Picture of girl giving book to boy:	GIRL GIVE BOY BOOK (R)
8) Picture of elephant scaring the mouse:	MOUSE SCARE ELEPHANT (W)

Topic (OSV) items:

9) Picture of dog biting cat:	CAT, DOG BITE (R)
10) Picture of cat chasing mouse:	MOUSE, CAT CHASE (R)
11) Picture of boy tapping dog on shoulder:	DOG, BOY TAP-ON-SHOULDER (R)
12) Picture of monkey giving ball to boy:	BALL, BOY GIVE MONKEY (W)
13) Picture of cat licking dog:	CAT, DOG LICK (W)
14) Picture of horse kicking sheep:	SHEEP, HORSE KICK (R)
15) Picture of boy kissing girl:	GIRL, BOY KISS (R)
16) Picture of mouse scaring elephant:	ELEPHANT, MOUSE SCARE (W)