

**The Likelihood of a Critical/Sensitive Period for the Acquisition of Subjacency with  
Korean and Chinese L2A'ers of English**

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### **Abstract**

*This paper looks at the plausibility of the existence of a critical or sensitive period for the acquisition of Subjacency for adult Korean and Chinese L2A'ers of English. By comparing several studies on WH-island violations and Relative Clause violations, general scores were calculated. It was found that non-native speakers of English overall performance was somewhere between chance and native-like; this meant that the existence of a critical period is unlikely, because adult L2A'ers showed at least some understanding of Subjacency. If there was a critical period for the acquisition of Subjacency, they could not have performed so well.*

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## 1. Introduction

The CRITICAL PERIOD HYPOTHESIS: a well-known and fiercely debated concept within the field of Linguistics. It seems a generally accepted idea that the acquisition of a second language is really difficult, maybe even impossible, after reaching adulthood. However, there are striking examples of people who have successfully mastered a second language, sometimes even at a rather mature age. This study will discuss this concept of the loss of ability to acquire a second language: discussing and comparing several studies can give new insights into the possible existence of this critical period.

The critical period is intricately linked to UNIVERSAL GRAMMAR (UG): the theory that states that every human is born with an innate set of rules, possibilities and restrictions about language. This would enable every newborn to learn every possible language fully and quickly.

The choice was made to focus on one specific universal principle: SUBJACENCY. This is a perfect example of a UG constraint, since it is acquired at a very young age in children's FIRST LANGUAGE (L1), but it cannot be acquired by demonstration. It is a purely syntactic phenomenon, and has nothing to do with a sentence's meaning. The child can merely rely on innate ability to acquire it. A lot of SECOND LANGUAGE ACQUISITION (SLA/L2A) research has been conducted on this subject, so in order to keep this study concise and concrete, the choice was made to discuss studies that used only GRAMMATICALITY JUDGMENT TASKS (GJT). In such studies participants are asked to judge grammatical and ungrammatical sentences.

Furthermore, subjects' native languages were either Korean or Chinese, because these languages lack the Subjacency principle, which means that speakers of Chinese and Korean have not acquired wh-movement restrictions before reaching adulthood. In this chapter, an explanation will also be given about Subjacency violations that have been extensively researched: WH-ISLAND and RELATIVE CLAUSE VIOLATIONS. These constitute multiple

Subjacency violations, which means they are irreparably ungrammatical and incomprehensible.

After the Theoretical Framework section, there will be a discussion of the studies. First, there will be a section concerning studies about WH-island violations, followed by a section on studies concerning Relative Clause Subjacency violations. With the results from these studies, the Hypotheses stated in the following section will be evaluated.

### *1. 1. Hypotheses*

There are two main objectives for this study, as formulated beneath:

SUBJACENCY UNAVAILABLE (SU) Hypothesis: There is a critical/sensitive period for the acquisition of the innate knowledge of Subjacency as a UG principle and probably UG in general, and after that period this knowledge cannot be acquired.

SUBJACENCY AVAILABLE (SA) Hypothesis: The innate knowledge of Subjacency as a UG principle and probably any UG constraint, can be acquired at any age.

The SU-Hypothesis predicts that all participants in the discussed studies will show an inability to understand Subjacency constraints, which would mean there is a definite point after which Subjacency constraints cannot be learned. The SA-Hypothesis predicts that the subjects will perform strongly, and show clear signs of a good understanding of Subjacency constraints. If that is the case, UG is available at any age.

## 2. Theoretical Framework

### *2. 1. The Critical/Sensitive Period*

The basic idea of the Critical Period hypothesis is that, at some point, a person will lose the ability to fully acquire some or all aspects of the grammatical knowledge that is innately produced and a result from UG, and therefore will have greater difficulty acquiring a SECOND LANGUAGE (L2) than a child has acquiring an L1. The strong version of this hypothesis states

that the L2A'er have lost all access to Universal Grammar<sup>1</sup> after a certain point. It is suggested that maturation causes the loss of this ability. There is debate about whether this is a gradual process, which would suggest that the loss of grammar learning ability is due to maturation of the brain, or whether a person loses Universal Grammar after a fixed point: the critical period. Maturation effects without losing the full ability to access UG would indicate that there is a sensitive period for acquiring a second language, a period in which SLA is easier than after it. Either way, it has to do with humans' cognitive ability to process language. It could even be possible that the critical period is only valid for certain structures or factors of language (like phonology, for example). Furthermore, it has been addressed that adult L2A'ers might have access to other cognitive abilities to learn a second language; they might have problem-solving skills, or devices acquired through education that facilitated second language acquisition. A natural disposition for language might also aid some special individual L2A'ers, providing them with a certain abnormal 'talent' to learn a second language better, and quicker than their peers (DeKeyser 2000).

## 2. 2. *Subjacency effects: WH-islands and Relative Clause Violations*

Subjacency effects is a well-researched grammatical phenomenon within the field of UG-research. It is concerned with movement. Specifically, the Subjacency principle dictates that wh-phrases cannot move over more than one bounding node. As shown in example 1a, and 1b, this can be either a (1a) COMPLEMENTIZER PHRASE (CP) or a (1b) DETERMINER PHRASE (DP):

- (1) a. [What did Frank say [that Judy would like to read?] CP]CP (Bley-Vroman et al., 1988, p. 11)
- b. [[The boy]DP kicked [the ball] DP]

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<sup>1</sup>Universal Grammar is a theory devised by Chomsky. It states that humans are born with an innate set of grammatical rules and restrictions, which helps them acquire language.

Subjacency is assumed to be a part of Universal Grammar, which means that any child is born with the innate ability to acquire rules about movement in any language which has wh-movement. A child born in an English-speaking community needs some prior knowledge of movement in the target language. Bley-Vroman, Felix, and Ioup (1988) point out that the child may acquire knowledge about the acceptability of wh-movement in sentences through POSITIVE EVIDENCE<sup>2</sup>. However, positive evidence does not present the child with any knowledge about unacceptable forms of wh-movement; there is no way the child can deduce ungrammaticality from environmental speech input alone. It is therefore likely that knowledge about ungrammatical forms of Subjacency is already pre-programmed in the child's Universal Grammar. The fact that Subjacency is a universal principle means that it is helpful in the research of whether adults have access to UG or not. If an adult L2A'er is able to acquire Subjacency rules for their target language even though their native language lacks Subjacency, this is probably caused by UG. If an adult cannot acquire these rules, UG access is unlikely.

The two Subjacency violations that will be discussed in this study are WH-island violations and Relative Clause violations. A WH-island occurs when a wh-word is moved over more than one bounding node, because another complementizer (a word which indicates a new clause) is in its place (Chomsky, 1986). In other words, it is a wh-word that has no place to land. A Relative Clause violation occurs when a wh-word is extracted from a relative clause over three bounding nodes; a multiple violation of Subjacency. Examples of sentences with these violations are given in 2a and 2b.

- (2) a. WH-island: \*Who did the Senator ask the President where he would send t?  
(Schachter, 1990, p. 107)

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<sup>2</sup>The amount of correct speech the child encounters in her environment, and from which she derives the correct forms of her target language.

b. Relative Clause: \*Who should the policeman who found get a reward? (Johnson and Newport, 1989, p. 232)

For this study the choice was made to use studies that used either Chinese or Korean subjects, or both. The reason for this is that these languages have no wh-movement, and therefore have nothing for the Subjacency principle to apply to. It is generally accepted that Korean has absolutely no Subjacency rules, but there is some debate about Chinese. In the case of Chinese, there is a very subtle, and restrictive occurrence of wh-movement.

Chinese does have topicalisation (wh-words can be moved to sentence-initial position), but there is no movement in other wh-sentence structures (Schachter, 1990). Even though Chinese has a very subtle occurrence of wh-movement, it will be assumed that it completely lacks Subjacency, and therefore Chinese will be useful subjects in testing UG access at a mature age. Bley-Vroman et al. explain why Korean is so useful for testing Subjacency in second language acquisition: wh-phrases simply do not move, so all sentences where wh-movement would be applied to in English are all grammatical in Korean, as shown in examples 3a, 3b, and 3c<sup>3</sup>:

- (3) a. John-i-nugu-ril ize manet-sumnika?  
 b. John who yesterday met Q (question)  
 c. Who did John meet yesterday?

This means that for Korean L2A'ers, Subjacency is a completely new restriction to learn, and therefore their performance is a good measurement of the presence of Universal Grammar, if they cannot acquire Subjacency, they are likely to not have access to UG.

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<sup>3</sup>All three examples were derived from Bley-Vroman et al. (1988, p. 5).



### 3. Discussion of the Material

#### *3. 1: Studies on WH-island Violations*

Five studies looked at subjects' performance on wh-island violations. Since wh-islands give rise to a form of multiple Subjacency violation in native speaker intuitions, the following prediction for this section can be made:

**WEAK WH-ISLAND PERFORMANCE (WWP) Hypothesis:** *All Korean and/or Chinese subjects will perform significantly worse at recognising wh-islands than NATIVE SPEAKERS (NS) of English, and their performance will be at chance-level, supporting the idea that they have no access to UG.*

#### *3. 1. 1: Bley-Vroman, Felix & Ioup (1987)*

In their study, Bley-Vroman et al. (1988) aimed to discover whether mature L2A'ers of English showed any sign of help from UG by studying L2A'ers knowledge of English Subjacency. The expectation is that all non-English subjects will perform significantly worse than native speakers of English.

*Subjects:* 92 native speakers of Korean were tested, who were at that time living in the United States, and ages ranged from 21 to 38. They all had a reasonably advanced level of English, and used English in their environments for communication. Proficiency was essential, because this would ensure that the subjects were not merely guessing. Korean was chosen because it does not have the Subjacency principle, which means the subjects have no prior knowledge of the phenomenon, and therefore, if they successfully recognise Subjacency, UG access is very likely. There was also a control group of 34 L1'ers of English (Bley-Vroman et al., 1988).

*Methods:* subjects were requested to fill out a form with their demographic information, after which they had to consider the grammaticality of 32 test sentences: 17 ungrammatical and 15 grammatical, the latter being used as a control to make sure subjects

really understand the tested syntactical structures. Three sentences were ungrammatical WH-islands, an example is figure 4:

(4) \*What does Mary want to know whether John has already sold  $\emptyset$ ? (Bley-Vroman et al., 1988, p. 8)

Interestingly, Bley-Vroman et al. focussed on subjects' intuition, and did not even mention grammaticality to their subjects. They hoped to elicit an intuitive and pure judgment, to prevent any misunderstanding of the task, the possible responses were *possible*, *impossible* and *not sure* (decided to be an incorrect response, since it was almost never chosen). This removed the factor of uncertainty for participants, giving them the opportunity to give a response which they were sure about (Bley-Vroman et al., 1988).

*Results:* The NON-NATIVE SPEAKERS (NNS) often correctly detected the ungrammaticality of sentences with wh-island violations. For the three sentences, they correctly responded with 87%, 85% and 88% (18), calculated for this study as 86,7% on average, against 74%, 97% and 100% of native speakers of English . These are, obviously, high scores and only slightly below native speakers' performance (90%). However, if UG was helping, the non-native speakers of English had to correctly judge grammatical contrast pairs: rejecting ungrammaticality, and accepting grammatical sentences, which tested the same syntactic form. Only 47% and 68% of non-native speakers correctly judged the contrast pair regarding WH-islands, against 91% sand 94% of NS's. However, NNS's judgement was far above chance (25%) (Bley-Vroman et al., 1988). The average score of NNS's, though, might be below NS's performance, but nonetheless their scores are scattered, which means that numerous subjects did perform like natives (with scores of almost a 100 percent).

*Discussion:* Bley-Vroman et al. were surprised to find that their subjects performed better than expected. Even though both Koreans and Chinese scored below the native speakers of English, they correctly judged ungrammaticality a lot of the time. Their performance on contrast pairs was a lot worse, but since they still scored far above chance, their answers were not merely random. Something must be triggered that helps the subjects grasp wh-violations, but the fact that their scores are far from perfect means that full access to UG is unlikely (Bley-Vroman et al., 1988). It might be possible that the subjects have lost some UG: there are maturational processes at work, but these are gradual. However, individual variation might shed another light on the results. Even though the overall performance was below that of natives and above chance, this is only a mean of a widely scattered range of scores. Numerous NNS's performed like NS's. This gives rise to the possibility that some subjects have lost access to Universal Grammar, and some have not. Apparently, there are some individuals who escape the fate of a decreasing language aptitude. In the case of Bley-Vroman et al.'s study, it might be that the distribution of individuals with remaining UG access and individuals with no UG access is rather even, resulting in an average performance in between chance and native-like.

### 3. 1. 2: Schachter (1990)

Schachter (1990) wanted to determine whether adults could access Universal Grammar for the acquisition of Subjacency. Instead of using only native Korean or Chinese subjects, who are supposed not to have the Subjacency principle in their native languages, she studied native speakers of Dutch as well, because Dutch has Subjacency. If the Dutch performed better than other subjects, this could be a result of transfer (structural constraints from their L1) from their native language (Schachter, 1990).

Besides the WWP-Hypothesis, a second prediction is made about this study:

FACILITATION BY TRANSFER Hypothesis: *Dutch native speakers will perform similar to native*

*speakers of English and much better than Koreans and Chinese. Transfer from their native language explains this.*

*Subjects:* There were 18 Dutch natives, 21 Indonesian speakers, 20 Chinese native speakers (mean age 21) and 20 Korean native speakers (mean age 21.8). All subjects were proficient speakers and had received some education about linguistics. All subjects started learning English at >11. Some data about their age of exposure, the period of residency in an English-speaking country and demographic information was collected. The use of Dutch natives has a specific function; if they show a good understanding of Subjacency, where the other subjects do not, a likely explanation would be that knowledge of the L1 was transferred to the acquisition of L2 (Schachter, 1990). Therefore, comparing the performance of this group will help determine whether UG is not accessible any more: the Dutch did acquire the target structure at a young age and use this knowledge, but for the adult Koreans and Chinese it might be too late to learn an entirely new grammatical principle. Bley-Vroman et al. (1988) and Johnson and Newport (1989) only tested native speakers of languages without Subjacency, but had no control group of L2A'ers of English with knowledge of Subjacency in their L1. Schachter can compare the results between these L2A'ers and therefore come to more precise conclusions about UG access.

*Methods:* The subjects were given a written grammaticality judgment test consisting of 66 randomised sentences, containing a wh-movement test (9 grammatical sentences), and four sets of six ungrammatical sentences. Six of these were wh-island violations, for example in figure 5:

(5) \*Who did the Senator ask the President where he would send t?<sup>4</sup> (Schachter, 1990, p. 107)

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<sup>4</sup> Schachter did not include an appendix with all the test sentences, but her study was extensive and well-presented. Therefore it is assumed that her research is usable.

The subjects were asked to respond with “clearly grammatical”, “probably grammatical”, “probably not grammatical”, or “clearly not grammatical”. Uncertainty of the subject was taken into account, but the first and second options were both considered being a judgment of grammaticality, and the third and fourth as a judgment of ungrammaticality. (Schachter, 1990). This is a more definite set of optional answers than what Bley-Vroman used for example. They gave their participants an extra possible response, which removed the factor of uncertainty.

*Results:* At first it was made clear that factors like the amount of exposure and age of onset (the age at which a person started their SLA) were not important for the results. Strikingly, Schachter discovered that the L1 was an important factor in subjects’ overall performance on the wh-movement tests. She found that Dutch native speakers performed almost as well as English native speakers, with a mean correctness of 5,8 out of 6 questions and a standard deviation\* of .55, which is a small number and therefore means they performed well (in comparison, NS’s of English had a mean of 5.6 and an S.D. of .60). Koreans and Chinese performed significantly worse: the first with a mean of 4.6 and an S. D. of 1.04, the latter with a mean of 4.4 and an S. D. of 1.14. Interestingly, Schachter later on discusses the Koreans’ performances. They did not do well on Subjacency violations, answering out of six sentences “approximately 3 correct” (Schachter, 1990, p. 117), which according to Schachter means they are guessing. Koreans performed poorly on the wh-island violations test, with a mean of 2.6 and an S. D. of 1.4, against Dutch subjects’ mean of 5.3 and standard deviation of 1.2 (Schachter, 1990). This supports the idea that their L1’s complete lack of Subjacency meant they could not grasp this principle in English.

*Discussion:* Schachter found that both Koreans and Chinese performed significantly worse than native speakers of English. Furthermore, the Koreans performed scored especially poorly on the test. Their scores were certainly at chance-level (Schachter, 1990). This is in

contrast to the findings of Bley-Vroman et al. (1988), Li (1998) and Schwartz, Hyun Ma, and Kim (2008), who all found that though Chinese and Koreans performed worse than native speakers of English, they performed better than chance, and therefore showed some understanding of the Subjacency principle. This study claims that adult L2A'er UG access is unlikely (Schachter, 1990). However, it might be that individual variation is still significant here. Perhaps the subjects in this study were individuals who did go through a critical period; even though, some of them did perform well, which means there were a few subjects who fully understood the Subjacency phenomenon.

As predicted by the FT-Hypothesis the Dutch performed well, scoring like the native speakers of English. It seemed that the fact that Dutch natives know about Subjacency from their L1 must be true, since the speakers of languages without Subjacency performed so poorly. Since all subjects were similar in age and educational background, the only explanation could be found in language background. Therefore, according to Schachter, L1 transfer was the crucial factor in successful SLA of English in the case of the Dutch, not access to UG (Schachter, 1990).

### *3. 1. 3: Li (1998)*

*Subjects:* There were 180 Chinese subjects who studied English as an L2 in China, and a small group of 16 Chinese studying in the United States, along with a control group of 25 native speakers of English. Li (1998) can compare L2A'ers who are living in an English speaking country (using English for communication) with L2A'ers whose contact with English is mostly in an instructive environment (Li 1998). Age of the participants was not mentioned.

*Methods:* Participants in China were informed about the tests a couple of weeks in advance, and were asked to take a CELT (Comprehensive English Language Test) to determine their proficiency in English. All groups were given a written grammaticality

judgment task without a time limit and answered questions about age, age of onset, language background and amount of use. The grammaticality judgment task consisted of 34 ungrammatical sentences, of which 6 concerned wh-island violations. There were 6 grammatical control questions. An example of a wh-island sentence is figure 6:

(6) \*What might your friend ask [where I hid \_ last month]?<sup>5</sup> (Li, 1998, p. 100)

Participants were also asked to read a story with sentences that contained long-distance wh-movement (for example, an object gap). If subjects refused to fill in the gaps in correct sentences, then they should have knowledge of Subjacency (Li, 1998).

*Results:* the Native speakers in this study performed quite well overall, and on WH-island violations as well (89.33%). As expected, the Chinese group living in China performed a lot worse (52.14%) (Li, 1998). Still, Li is right to say that this performance is still quite above chance. He compares his findings to Bley-Vroman et al. (1988), who found similar results, and therefore felt that the absence of guessing meant that some access to UG must have been available. Besides, Li used a large subject group (n=180) so the fact the results are so similar is more evidence of UG-access. Also striking was the second Chinese group, who were living in the United States and received a lot of education. They performed quite well on Subjacency violation recognition, with a mean correctness of 4.20 out of 6 compared to natives' 5.36. It was worse than natives, but far better than chance (Li, 1998). Li states that these results have nothing to do with age, but it is "language proficiency that counts" (Li, 1998, p. 100). This brings in the argument that motivation and language aptitude might contribute greatly to SLA, and maturation is therefore not always decisive.

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<sup>5</sup> Li has not included all the test sentences he used for his study, but he gives numerous examples and his study appears well-researched, therefore the assumption will be made that his findings are uncompromised.

*Discussion:* Even though both Chinese subject groups performed worse than native speakers of English, both subject groups performed better than chance, and the second subject group of Chinese living in the United States performed reasonably well. This counters the idea that the Chinese have no available knowledge of Subjacency and are unable to learn it. However, there is still individual variation. Again, the overall performance was between native-like and chance, but the results were scattered. Individual variation might explain why some China group-individuals performed as well as the Canada group-individuals, or even better. Some of them have gone through a critical period, and some have not. Therefore, age, residency and education might not be decisive factors in language learning, but individual variation.

### 3. 1. 4: Schwartz, Hyun Ma, Kim (2008)

Schwartz et al. conducted a study to test Johnson & Newport's (1989) claims that mature learners of a second language are likely to not have access to UG.

*Subjects:* A total of 33 subjects were tested, of which n=7 Korean adult L2A'ers of English (mean age 29,4), along with some child L2'ers, and some control subjects (adult and young native speakers of English). Koreans were used to replicate Johnson and Newport's subject group (Schwartz et al., 2008).

*Methods:* A combination of a grammaticality judgment test and an elicited production test was used. There were 72 test sentences, grammatical and ungrammatical, and subjects were asked to judge them as either 'ok' or 'strange'. The elicited production element lies in the subjects' optional response of 'better', which gave them an opportunity to correct a sentence they judged to be incorrect (Schwartz et al., 2008). Among the tested sentences were four ungrammatical wh-islands, for example figure7:



(7) \*What did Pooh ask Piglet where Daddy put?<sup>6</sup> (Schwartz et al., 2008, p. 1)

*Results:* In general, they found that the adult L2A'ers showed some sensitivity to island violations (average correctness of 80% against native speakers of English score of 98%) (Schwartz et al., 2008), but it is not known what specific sentence types were used in their calculations, so these are hard to evaluate. Schwartz et al. claim that these results counteract Johnson and Newport's claim that adult L2A'ers have no access to UG (Schwartz et al., 2008).

*Discussion:* Like Bley-Vroman et al. (1988), and Li (1998), Schwartz et al. found that their subjects performed worse than the native speakers of English, but they still scored above chance. Schwartz et al. refute Johnson and Newport's claims that mature L2A'ers of English have no access to, but they believe that there must be some UG access (Schwartz et al., 2008).

### 3. 2: *Studies on Relative Clause Violations*

Five studies have tested relative clause violations. These are, like wh-islands, a form of strong Subjacency violations. The following prediction is made about this section's studies:

WEAK RELATIVE CLAUSE PERFORMANCE (WRCP) Hypothesis: *Because movement from a relative clause is a form of multiple Subjacency violation, the Chinese and/or Korean subjects will perform poorly on judging ungrammaticality, and their performances will be like chance, suggesting they do not have any access to UG.*

#### 3. 2. 1: *Bley-Vroman, Felix and Ioup (1988).*

Bley-Vroman et al.(1988) studied relative clause violations as well; therefore these findings will be taken into account in this section.

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<sup>6</sup> This study was very comprehensive and only included the most important and general results. The study was originally presented at a conference, and the source only summarises its contents. Their findings are therefore taken into account, but only for the general findings and will not receive much attention.

*Methods:* This study also tested Korean and Chinese subjects on their judgment of relative clause violations. A grammaticality judgment test of 32 sentences of which 3 were relative clause violations tested this. An example of such a sentence is given in figure 8:

(8) \*What did the police arrest the men who were carrying  $\emptyset$ ? (Bley-Vroman et al., 1988, p. 8)

*Results:* The Chinese and Korean subjects performed rather well on judging relative clauses, scoring for the three sentences 90%, 71% and 92%, respectively, with an average of 84,3%. Native speakers of English had a perfect score for all three sentences. The score for the second sentence is remarkably lower than the other two scores: Bley-Vroman et al. point out that this might have to do with length of the sentence, and the fact that there is a second embedded wh-word included in it, increasing its difficulty. The results of the contrast pairs were the following: 58% and 78% for the non-native speakers, against 97% and 91% for the native speakers (Bley-Vroman et al., 1988).

*Discussion:* In contrast to the expectations, the Chinese and Koreans did very well on judging relative clause violations. Their scores were often native-like, with only one exception. This exception is possibly a result of length and the presence of another embedded wh-word, which increased the sentence's difficulty (Bley-Vroman et al., 1988). These subjects clearly showed a good understanding of Subjacency, which was only slightly below English natives' command. It is possible that participants did so well, even better than subjects in most other studies discussed here, because Bley-Vroman et al. devised their test to remove the factor of uncertainty, giving the participants an opportunity to give responses they were absolutely certain of, instead of forcing them to give a definite answer they were unsure about (Bley-Vroman et al., 1988). However, more research where uncertainty is considered has to be done to determine whether a factor like that can influence participants' performance.

Clearly, from the results of Bley-Vroman et al. it seems that the Chinese and Koreans had good understanding of relative clause violations, and therefore UG access, for the tested individuals, seems likely.

### 3. 2. 2: Schachter (1990)

Schachter (1990) studied Relative Clause violations as well. As mentioned, she used Chinese and Korean subjects, as well as Dutch subjects (Schachter, 1990).

*Methods:* Schachter used a written grammaticality judgment test in her study. There were sets of six ungrammatical sentences, with one set of relative clause violations, an example is figure 9:

(9) \*What did Susan visited the store that had *t* in stock? (Schachter, 1990, p. 107)

*Results:* There was only specific data on Relative Clause violations for Koreans. The general performance of the Dutch, Koreans and Chinese is discussed in the WH-island violations section. The Koreans had a mean correctness of 3.4 on Relative Clause violations, with a standard deviation of 1.4. The Dutch (who were used as a control group) had mean of 5.8 with a standard deviation of 1.2 (Schachter, 1990). According to Schachter, this meant that Koreans' performance was therefore only slightly better than chance (3 out of 6).

*Discussion:* Schachter found that the Korean subjects performed far worse than the control group, and their performance was like chance. This would support the idea that Korean L2A'ers of English are unlikely to have access to UG and therefore cannot acquire the Subjacency principle. However, it is indicated in a footnote that the mean scores are a bit simplistic, and that individual subjects' scores ranged widely (Schachter, 1990). This is a significant remark, because it brings up the importance of individual variation. The fact that there was no consistency in performance could indicate that there were some individuals who

did have high scores; people who possibly did not go through the critical period. It might be that Schachter's study just had very few subjects with remaining UG access, lowering the overall average performance. The fact that the results varied wildly, strengthens the possibility that there are individuals that do not go through a critical/sensitive period.

### *3. 2. 3: Johnson & Newport (1991)*

The study of Johnson & Newport (1989) could be considered as one of the most important, most replicated and most influential studies in the field of maturational effects in SLA. Their claims that adult L2A'ers were unlikely to have access to UG received criticism, as well as their methodology (like Schachter's response to Johnson and Newport, for example). In response, and to further investigate new findings and ideas, they conducted a new study in 1991, this time focussing solely on Subjacency (Johnson and Newport, 1991).

*Subjects:* There were 23 Chinese subjects who were L2A'ers of English living in the United States. The mean age of this group was 32. They had all had some training of English from the age of >13, but were not immersed in English until <17. Johnson and Newport (1991) emphasise that their subjects were considered to be at the end state of their acquisition of English. It was made sure that the subjects were all proficient enough in English to understand the kind of questions in the test. There was also a group of 11 native speakers of English (undergraduate students) serving as a control group (Johnson and Newport, 1991).

*Methods:* The subjects were all given a grammaticality judgment test. The test sentences were tape-recorded, with 6-9 seconds in between. In this gap, subjects could response with either "no" for ungrammatical, or "yes" for grammatical sentences (Johnson and Newport, 1991). Johnson and Newport's methods are disputable; orally presented tasks are much harder than written tasks. Subjects were implicitly told to ignore a who/whom distinction in sentences. The examiner was supposed not to look at the subjects, in order not to give them any clues about the sentences. The grammaticality judgment test consisted of

180 sentences, testing three sentence structures. There were 36 sentences for the relative clause structure, consisting of controls, declaratives and no subject-auxiliary inversion (which will not be taken into account) and 12 relative clause wh-movement violations (Johnson and Newport, 1991), for example in figure 10:

(10) \*Who should the policeman who found get a reward?<sup>7</sup> (Johnson and Newport, 1991, p. 232)

“Twelve simple grammatical [...] sentences” were included (Johnson and Newport, 1991, p. 232): if the subjects failed to correctly judge these, their English would be considered not proficient enough and their results would not be taken into account. Otherwise these sentences were merely fillers and were not included in the results (Johnson and Newport, 1991).

*Results:* Out of 36 sentences, native speakers of English scored an average of 35 correct judgments. Chinese subjects, however, scored an average of 22 out of 36 correct. They scored relatively high on relative clause violations though, with an average of 29 out of 36 correct. Only on this structure did the Chinese subjects score significantly above chance. Even though the subjects did perform better than chance, Johnson & Newport insist that the discrepancy between the control group and the Chinese group entails that the Chinese show a lingering and weak maintaining of the Subjacency principle, but have a willingness to accept ungrammaticality and reject grammaticality (Johnson and Newport, 1991).

*Discussion:* Interestingly, the Chinese subjects scored at chance-level for every structure except relative clause violations. This is unexpected, because relative clauses are a form of multiple Subjacency violations. It did not become clear why subjects did much better at judging relative clauses. Possibly, this is something that is similar to some structural form

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<sup>7</sup> Even though Johnson and Newport’s study was very extensive, they lack an appendix with all their test sentences in it. Their study has some other issues as well. It is assumed that their study is usable and uncompromised, because it is well-presented and a very important study in the research on the critical period.

in their own language, but there is no evidence for this (Johnson and Newport, 1991). This might just be a random finding, since there are a couple of problems with Johnson and Newport's test: firstly, they gave their subjects explicit instructions about who/whom distinctions: this might have caused their subjects to pay extra care to this distinction and less to grammaticality judgment. Aside from this, an orally presented grammaticality judgment task may cause the participant to lose their concentration, or to simply not have enough time to come up with a definite answer, enticing a guessing response. All in all, the fact that their subjects performed above chance at some structures could indicate that have some UG access.

### 3. 2. 4: White & Juffs (1998)

White and Juffs tested whether native speakers of Chinese, who were highly proficient in English, showed any signs of having lost UG. In their study, they compared two kinds of L2A'ers: subjects who were living in their native country and learning a second language there, and L2A'ers who were living in a country where their target language is spoken. A second prediction is made about this study, because this comparison might be significant.

*FACILITATION BY IMMERSION Hypothesis: Because the Chinese group living in Canada receives more English input and uses it more than the Chinese group living in China, it is likely that these subjects will do better at judging ungrammaticality than the others.*

*Subjects:* There were two subject groups of native speakers of Chinese. The first group (n=16) consisted of L2A'ers of English living in China (mean age 22.8), who had all received extensive English training, they were either teachers of English, or were trained in English (115-116). All participants in this group started learning English at an age >16. There was a second subjects group (n=16) of native speakers of Chinese living in Canada (mean age 32,3), with an average stay of 4.1 years. They made heavy use of English for communicative purposes (116). Both subject groups had received university education (White and Juffs, 1998).

*Methods:* The participants were asked to take a grammaticality judgment test. The test was administered on a computer, and subjects had to press a green button for grammaticality and a red button for ungrammaticality, as quickly as possible. Their reaction time was also measured. The grammaticality judgment task consisted of 60 questions about wh-movement, with an equal distribution of grammatical and ungrammatical sentences. The sentences were all about the same length, and prior to testing it was made sure that native speakers performed very well on the test sentences (White and Juffs, 1998). Six sentences were ungrammatical relative clause violations, for example in figure 11:

(11) \*Which article did you criticize the man who wrote \_? <sup>8</sup> (White and Juffs, 1998, p. 117)

Grammatical sentences were included to see whether the Chinese have Subjacency in their grammars, because if they do not they were not expected to correctly judge wh-restrictions (White and Juffs, 1998).

*Results:* Both China groups did rather well at judging ungrammatical sentences. The mean score of the native speakers of English on relative clause violations was 5.947 out of 6 (White and Juffs, 1998), which is close to perfect judgment. Interestingly, the Chinese subjects residing in China did better at judging relative clause violations than the Chinese living in Canada. The first group had a mean score of 5.312, where the Canadian Chinese had a mean of 5.062. White and Juffs state that the latter score was unexpectedly significantly lower than the natives' performance. It should be mentioned that both subjects groups' reaction time was significantly slower than the native speakers of English (White and Juffs, 1998), which could indicate that the Chinese do understand wh-movement, but still have difficulty with judging constraints.

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<sup>8</sup> White and Juffs only give examples of their test sentences, but their study is assumed to be usable and based on fact.

*Discussion:* All Chinese subjects did rather well at judging ungrammaticality. Their scores were not significantly below English native speakers, suggesting they had some command of Subjacency restrictions. They were significantly slower than the control group, indicating that their understanding of wh-restrictions was not perfect, but their scores were still far above chance.

In contrast to what was predicted, the Chinese subjects living in Canada were worse at judging relative clause violations than Chinese living in China. It is possible that they received better education, or that they were simply more motivated to study English. It can be said that immersion may not be that important, but the willingness to learn and a certain competence may be far more important.

The fact that the Chinese in Canada did worse is a striking one; it is possible that this is a result from individual variation. The possibility that some of the subjects had gone through a critical period and others not is strengthened by the fact that performance did not seem to correlate with immersion and use. Varying individual maturation might be the most significant factor.

### 3. 2. 5: *Lakshmanan, Kim, McCreary, Park, Suen, and Lee (2009)*

Lakshmanan et al. (2009) wanted to test whether Korean and Chinese would perform poorly on judging ungrammaticality in Subjacency violations. They compared multiple and weak forms of Subjacency, in order to see if performance on multiple violations would be worse than on weak violations.

*Subjects:* There were two groups, a control group of native speakers of English (n=5) with a mean age of 24, and a group of Chinese and Korean L2A'ers of English living in the United States (n=11) with a mean age of 27, and an average residency of 3 years. The average age of onset was 13. All subjects were graduate or undergraduate students at university level (Lakshmanan et al., 2009).



*Methods:* Before taking the tests, information about participants' language background and demography was collected. Participants were then tested through an offline grammaticality judgment task. The grammaticality judgment test consisted of 15 sentences, with 5 sentences per tested grammatical structure, which means that 5 sentences tested relative clause violations (Lakshmanan et al., 1998). An example of such a sentence would be figure 12:

(12) \*Which bank did Bob see the thief that robbed -----? (Lakshmanan et al., 2009, p. 138)

Participants were asked to rate sentences by using a point rate scale with 4 options:

“1=incorrect, 2=somewhat incorrect, 3=somewhat correct, 4=correct” (Lakshmanan et al., 2009, p. 138). This distribution gave the participant some room for insecurity, instead of having to choose a definite answer.

*Results:* Both the native speakers of English and the L2A'ers of English scored quite well at the acceptance of grammatical sentences. The control group rated with an average of 3.52: this number indicating how high they rated the sentence, 4 being totally correct, 1 being totally incorrect. The control group therefore correctly judged most sentences, and the Koreans and Chinese did as well, with an average of 3.31. This is below the control group, but not significantly. The Koreans and Chinese did worse in judging strong violations (relative clauses): they rated these sentences with an average of 2.2, where the native speakers of English gave an average rating of 1.12 (Lakshmanan et al., 2009). The tested group was not guessing, but still performed significantly worse than native English speakers.

*Discussion:* The Chinese and Korean subjects performed as expected on relative clause violations: they did better than chance, but significantly worse than native speakers of English. This means that the L2A'ers had difficulty with the Subjacency principle, even

though they showed some understanding of it. This is in line with findings like that of Johnson and Newport (1989) and White and Juffs (1998). Lakshmanan et al. showed that their subjects still showed signs of some understanding of the Subjacency principle even though they were mature, so total inaccessibility to UG seems unlikely.

Possibly, individual variation caused the performance to be somewhere in between native-like and guessing. It might be that there was a reasonable amount of people who did not go through a critical period and because of this understood Subjacency constraints, resulting in an overall average performance that was higher than chance.

#### 4. Conclusions

From the studies' results in the WH-island section, non-native English speaking subjects' general performance at correctly recognising WH-island violations was estimated to be somewhere around 67,3%. Their general performance at correctly judging relative clause violations is calculated to be at somewhere around 73,3%. The overall non-native speakers' performance on the judgment of the tested Subjacency violations was calculated at about 70% correctness. In comparison, the overall performance of the control groups (mostly native speakers of English, was calculated at somewhere around 94,1%. It is important to emphasise that this is an indication of the mean of the results, but it should be sufficiently indicative. It will be assumed these calculations can satisfactorily answer the hypotheses.

The overall results do not point to the existence of a critical period for the acquisition of Subjacency. If a definite loss of access to Universal Grammar had occurred, the participants would have performed below, equal to, or slightly above chance, meaning they were merely guessing. The results, however, indicate that the participants performed far above chance, their average correctness being around 70%, quite above even 50% chance when judgment was a binary yes/no, and far above chance when chance was 25% with four possible

answers. The overall score of native speakers of English was 94%, so non-native speakers scored somewhere between native-like and chance. This would suggest they have some help from UG. If they had full access, though, they would have performed at native-level.

Overall performance is, however, not fully representative of performance. What has to be considered is the fact that some subjects performed like native speakers, where others did not. Scores varied wildly. There were a lot of individuals who performed poorly. It is possible that these individuals do go through a critical/sensitive period. The minority escaped this fate and showed full UG access. The fact that subjects did not perform consistently is a strong indication that maturational effects vary per individual. Most people lose UG at some points, a minority of lucky individuals has remaining access to UG. The difference in the results between the discussed studies might be a direct result from this individual variation. Their results could be determined by the number of subjects that were unaffected by maturational effects. For example, the fact that Schachter's (1990) subjects performed worse than those of Bley-Vroman et al. (1988), could be a consequence of individual variation. It might be that the lucky individuals escape the critical period because they postpone maturational effects by being bilingual. In some sense, they reboot their UG when it is needed to fully acquire another language at a young age. These people might prolong their access to UG, because it was needed longer than with monolinguals. When it was needed again for SLA, it had not disappeared. Bilingualism might be the key to escaping the critical period, but this claim has to be more extensively researched.

The SA-Hypothesis applies best to the overall average findings. The fact that subjects' average performance was above chance suggests the absence of a critical period. However, individual performance was not consistent. There were numerous people who performed poorly and some native-like performers, suggesting that there is a critical/sensitive period, but this is not a universal law. Rather, it differs from person to person. Some lucky individuals

might have some aptitude (possibly bilingualism) that makes them immune to a critical/sensitive period.

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