

THE L1 OPTIMAL CONTINUOUS USE SPEAKER (LOCUS): METHODOLOGY
AND CURRENT PRACTICES IN PHONOLOGY

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ABSTRACT OF THE THESIS

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AND CURRENT PRACTICES IN PHONOLOGY

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In this thesis, I address the concept of the “native speaker” for the purpose of experimentation in the framework of Generative linguists. Based on the Chomsky (1965) theoretical idea of the “ideal speaker-hearer,” I propose a set of criteria that can be used to screen for a speaker with minimal Performance confounds, to be an optimal research subject. This optimal speaker, or the “L1 Optimal Continuous Use Speaker (LOCUS),” has (1) a single phonological module, P, where (2) P has been learned during the critical period and (3) P has been continuously used.

After identifying the optimal subject, I use the journal *Phonology* to compare the LOCUS to current usage of ‘native speaker’ in phonological research. I found that only 10% of primary research included evidence for assertions involving native speakers by providing information regarding whether or not the speakers were monolingual, had learned the L1 in the critical period, and/or had continuous use of the L1. In other words, although the LOCUS is the optimal speaker-hearer, current research either does not make use of this optimal speaker, or perhaps does not adequately report the LOCUS status of subjects. Additionally, some current fieldwork textbooks recommend selecting speakers based on availability and convenience to the researcher rather than basing selections on appropriate candidate criteria. The aim of this thesis is to first propose a set of characteristics that can be used universally as a diagnostic tool to screen for

native speakers, and then draw attention to the ways in which current research lacks uniform methodology when recording speaker information.

DEDICATION

To my parents, Nancy and Eric Fremed, who provided unlimited encouragement and support.

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1. Introduction^{*}

Chomsky (1965:ch.1) identifies the ideal research subject for Generative theories of linguistics:

(1) *Chomsky's Ideal Speaker-Listener*

“Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogenous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors (random or characteristic) in applying his knowledge of the language in actual performance... Only under [this] idealization ... is performance a direct reflection of competence” (Chomsky 1965:3-4).

However, as Chomsky observes, such an ideal speaker-hearer does not – and *cannot* – exist. Humans have inherent memory limitations, can be distracted, and make errors.

Current understanding of the Generative Phonological Module (PhM) emphasizes just how far from reality the ideal speaker-hearer is. The output of the PhM is transformed into a phonetic representation, which is then converted into articulator movements, which motivate articulators to move (for an overview, see de Lacy 2009). Humans have inherent and potential limitations at each of these stages. For example, there are inherent limitations in articulators that prevent them from moving quickly, in some cases meaning they cannot meet phonetically-

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specified targets. Individuals may have impaired cognitive systems or articulators, obscuring their phonetic and phonological intent.

Even though the ideal speaker-hearer does not exist, it is still necessary to find the *optimal* speaker-hearer: an individual whose PhM module is *minimally* obscured by Performance factors – in other words, a person who matches the ideal as much as real-world factors allow. Chomsky (1965:4) identifies the goal for the linguist as “determin[ing] from the data of performance the underlying system of rules that has been mastered by the speaker-hearer and that he puts to use in actual performance.” An effective way to eliminate many irrelevant Performance factors is to minimize them in the speaker.

So, who is the optimal speaker-hearer? The first part of this thesis (section 2) argues that core properties of the optimal speaker-hearer are: (1) a single phonological module P, where (2) P has been learned during the critical period and (3) P has been continuously used. I will call this speaker the ‘LOCUS’, for ‘L1 Optimal Continuous Use Speaker’.

The best way to ensure that a subject has no other modules affecting the PhM is to find a speaker who has no other phonological modules – i.e. a monolingual monodialectal speaker. Ideally, the speaker will also have a single speech style, though such a requirement may be impractical.

In the earlier years of life, brain plasticity is optimal and one is most receptive to learning language and achieving fluency (Penfield and Roberts 1959). It is still debated whether or not one can become truly fluent in a language learned after the Critical Period (Lenneberg 1976). However, to take a conservative approach it follows that the LOCUS must have learned his/her L1 before puberty in the critical period.

A language learned before puberty and then lost in adulthood is not useful for generative linguists because without continuous use, there is a risk of language attrition. Most often, language attrition occurs in an L2 environment when the speaker abandons all use and knowledge of his/her first learned language (Gurel 2004). Even though the speaker only uses one language, namely his/her second-learned language, he/she still has more than one phonological module. “L1 attrition should not be perceived as a total loss of L1 knowledge but rather as a convergence or shift towards an L2” (Gurel 2004:54). Therefore, LOCUS has one L1 that has been used continuously and consistently.

The identification of the core properties of the LOCUS is an essential first step in reaching the goal of this thesis: to determine the role of the LOCUS in PhM research. If the LOCUS is essential in minimizing performance factors to determine competence, we might expect that PhM research carefully controls for the properties of experimental and fieldwork subjects. Section 3 examines the extent of such controls in PhM research reported in the journal *Phonology*. It concludes that in the majority of cases, it is not evident that experimental and fieldwork subjects are LOCUSes.

The implication of this finding is that a significant number of empirical claims about the PhM are questionable. If controllable Performance factors have not been eliminated as potential confounds, it is unclear whether data reported reflects Performance, or Competence.

2. The Optimal Speaker-Hearer

The point of identifying a LOCUS is to get the best access to Competence mechanisms as possible. In other words, the goal is to find a person whose PhM is subject to the least extra-modular interference.

This chapter starts with the argument that the optimal speaker-hearer has a single PhM (section 2.1), followed by discussion of the continuous use requirement (section 2.2), and finally the Critical Period requirement (section 2.3).

It is important to emphasize that the three properties discussed here are not the *only* properties an optimal speaker-hearer should have. The optimal speaker-hearer should also not have chronic or acute impairments: i.e. no PhM aphasia, no damage to articulators and hearing, and an unimpaired memory. Fully identifying all of the properties of the optimal speaker-hearer is not possible here for practical reasons, so this thesis focuses on properties that are specific to the phonological module – i.e. how many PhMs the speaker-hearer has, its ‘fluency’ (continuous use), and its L1 status.

A theme of this chapter is its conservative outlook. In many cases, it is unclear how *much* influence a particular feature has on an individual’s PhM. For example, if a person was a monolingual most of their life, and only learned an L2 in their late adulthood, what is the chance that the L2 could interfere with their L1? One might suspect very little, but there is no definitive research on this question (section 2.1). Consequently, it is safest at this stage to take an extremely conservative stance: if there is the *potential* that a factor *might* interfere with a subject’s L1, then it is best to exclude the subject.

2.1 Monolingualism

An individual can have several PhMs: one for each language he/her speaks, one for each dialect, and potentially one for each speech style. Even within the same speech style, free variation, or different pronunciations of the same word in the same phonetic environment, has been argued to be “an effect of the alternation of procedures belonging to different phonological systems, and this alternation is an effect of the uneven control that speakers have over those systems” (Guitart 1997:515).

With several different PhMs, there is the possibility of inter-modular interference. Such interference is most obvious in second languages (L2), where the PhM of first languages (L1s) can interfere with the L2 PhM in profound ways (e.g. Archibald 1998). There is even the chance of L2 interference with L1s, and for cross-L1 interference (see below). In addition, if a speaker speaks several languages/dialects/speech styles, there is the chance that the speaker will switch from one to another in the course of an utterance (e.g. for speech styles – Labov 2001). The result is that an utterance may not reflect the competence of a particular PhM, but rather pool the effects of several PhMs.

One approach is to attempt to experimentally control for code-switching and style-switching (Wolfram 2011). For example, one approach is to use younger bilinguals, who tend to switch less frequently than older bilinguals; this age difference is true for code-switching both within spontaneous speech and when prompted to switch in controlled experiments -- Weissberger et al. (2012). An example from the journal *Phonology* is found in Broselow, Chen, and Huffman (1998:52), who reported that:

“Subjects were directed to speak as they would in an informal conversation with a friend, and experimenters monitored carefully to ensure that the appropriate colloquial forms were used.”

However, the use of such controls are rare (see section 3.2). In any case, as mentioned above speakers often code- and style-shift unconsciously and automatically, so such controls may have limited effect.

So, in keeping with the ‘conservative’ approach mentioned above, the most effective way to control for inter-PhM interference is to make sure that the subject has as few PhMs as possible, ideally one. An obvious consequence is that the optimal subject cannot be bilingual.

2.1.1 Bilinguals

Given the extent of interference of L1 PhMs on L2 PhMs, it is clearly unjustified to elicit data from a subject’s L2 PhM and assume that the output reflects a single PhM’s competence mechanisms (Archibald 1998). However, what about true bilinguals? If a subject has two L1 PhMs, then can data be elicited from just one of them, without any interference from the other?

Methodological issues about eliciting data from bilinguals are addressed in Grosjean (1998). Grosjean observes that a ‘bilingual’ is not truly “two monolinguals in one person”: they do not have “equal and perfect fluency in each of their languages” (Grosjean 1985, 1989). The consequence is that “bilinguals are rarely equally fluent in all language skills in all their languages.” (Grosjean 1998:132). In addition, some bilinguals’ L1s may be less well developed (sometimes called ‘semilingualism’) (Grosjean 1998:133).

For PhM research, the variation in fluency can create problems. When eliciting speech or grammaticality judgments from an individual, the source of the speech/judgments may not be the desired PhM. If the speech/judgments depend on an area in which the PhM is not fluent, the speaker might call on other cognitive resources, and so the speech/judgments may not reflect the competence mechanisms of a single PhM.

Grosjean (1998:133-4) provides an example from Cutler et al. (1992), who studied speech segmentation by bilingual speakers of English and French. Native speakers accepted each subject as a native speaker in both languages. However, the speakers did not perform the same as monolinguals: "... neither for the English nor for the French words did the bilingual group as a whole produce results analogous to those produced by either monolingual group in the previous studies." (Cutler et al. 1998:392). Grosjean (1998:134) concludes that "bilinguals are speakers-hearers in their own right who will often not give the same kinds of results as monolinguals."

There may be cognitive processing differences between bilinguals and monolinguals, too, with bilinguals necessarily having interaction between their different languages' linguistic modules. Bilinguals' different languages share neuro-anatomical representations, at least in part (Kim et al. 1997, Klein et al. 1999). For lexical access, the Inhibitory Control Model (Green 1998) holds that every word in the lexicon is tagged with a specific language. When a monolingual speaker views a visual stimulus, only one lexical representation comes to mind in response to that particular stimulus. However, when a bilingual sees that same stimulus, two lexical items are conjured, each with a different language tag, to represent the one physical stimulus. The speaker must make an unconscious decision in order to select the appropriate word for the relevant language environment thereby inhibiting the irrelevant lexical item. Linck et al.

(2012) used picture-naming tasks and the Simon test to prove that “better inhibitory control predicts smaller switch costs, but only when switching into the L1” (Linck et al. 2012:658). The exact implications of this difference in cognitive processing between bilinguals and monolinguals for Generative research are unclear. However, taking a conservative approach, the fact that there *is* a difference in lexical access and for bilinguals there seems to be some interaction between different linguistic modules, limiting attention to monolinguals minimizes whatever effects these processes might have.

An additional potential problem is ‘semilingualism’, in which a speaker exhibits “less than native-like skills in both languages” (Grosjean 1998:133). Semilingualism is most prevalent in children of immigrants, who are often exposed to different languages at home and in school; the lack of language continuity can result in “detrimental cognitive and academic consequences” (Jones et. al 1986: 28). Semilingual children are not necessarily easily identified. They may not be language deficient, but rather have undeveloped linguistic competence. While fluency, vocabulary, and pronunciation may not be affected, deeper cognitive abilities that involve language like thinking and planning – and perhaps grammaticality judgments – may be compromised (Cummins 1978). Because semilingualism does not always manifest itself in obvious observable ways, a conservative approach is to exclude all potentially semi-lingual subjects.

Grosjean (1998) identifies a number of other methodological challenges in working with bilinguals. However, the larger issue is that there is no universally agreed upon definition of ‘bilingual’. Lim et al (2008) defines bilingual as “anyone who can communicate in two languages by speaking, writing, listening, or reading regardless of whether proficiency is native-like” (Lim et. al 2008:389). Dunn and Foxtree (2009) point out that bilingualism is often defined

in various ways. One definition is a subject with an L1, the “languages that are spoken at home, taught in schools, printed and heard in the national media, and used in daily commercial interactions, such as banking or shopping,” and an L2 that is “language that people learn deliberately, in school or for some future potential use” (Dunn and Foxtree 2009:273). But there are ways, laboratory tests, to determine bilingual dominance. Fluency tests, reaction time speed tests, calculating the percentage of amount each language is used, the age of acquisition, and comfort level in the language may be used to determine dominance (Dunn and Foxtree 2009). One can argue that if it can be determined which language is dominant, data can be elicited in the dominant language and the subject can be used for research. However, Golato (2002) says that the tests are not reliable.

(2) *Reliability of bilingualism tests*

“Previous studies have established a bilingual’s dominant language through various forms of self-rating, or through categorical responses to a single question. However, as they were based upon various introspective assessments, it was argued that such language dominance measures failed to offer objective answers to questions concerning their relation to language perception and production abilities” (Golato 2002:24).

Because the methodology of the practices surrounding bilingualism is not universally agreed upon, the safest course of action is to rule out all bilinguals as candidates for the LOCUS.

2.1.2 L2 interference on L1s and code-switching

The monolingualism requirement may seem unnecessarily strict because it excludes speakers who have a single L1 but multiple L2s. However, there are factors that suggest such speakers present methodological difficulties.

The term ‘L2’ has been used with a variety of definitions. For present purposes, an L2 is a language that has either not been learned during the critical period (see section 2.3) or has been learned non-fluently. An example of the former is foreign languages taught in high school classes. The latter case is most clearly seen in an unbalanced bilingual, one who learns two languages with unequal proficiency (Lim et al. 2008). Such would be the case of a child with Spanish speaking grandparents and English speaking friends and immediate family: the child speaks Spanish fluently, but is more proficient in English. Finding a “balanced bilingual,” or a speaker equally proficient in two or more languages is rare (Daller et Al. 2011). In most cases, one’s dominant language is the one needed most in every facet of daily life. The dominant language is most often defined as the language used the most frequently, the language acquired first, and the language that is spoken in the speaker’s environment (Dunn and Fox Tree 2009). The speakers’ environment is defined as his/her “domain of language use” and includes work and/or school, home, and social situations (Lim et al. 2008).

However, merely identifying a speaker as having one dominant language does not necessarily imply inter-modular interference. It is hard to predict whether the L1 will affect a speaker’s other native L1, the L1 will affect the L2, or the L2 will affect the L1, both, or neither. Some believe that because an L2 is taught in the L1 language, there is inevitable interference: “bilingual development is characterized by unidirectional processes (L1→L2) and by transfer of elements of the linguistic system (sounds, structure, lexis)” (Djigunovic 2010: 306). This may be

the reason why late bilinguals speak his/her L2 with the accent of his/her L1. Similarly, Daller et al. (2011) implies a necessary interference by defining bilingual as one “who uses two or more languages in different domains for different purposes in daily life and will therefore develop one more and one less dominant language in each of the different domains” (Daller et al. 2011:217).

Consider a speaker who speaks only in Spanish to his/her monolingual Spanish-speaking parents, and speaks only English in his/her English-speaking school. The fact that one will necessarily have one dominant and one less dominant language with the ability to switch languages based on domain suggests some controlled interaction between the two modules. In contrast, some believe that inter-module interference is not inevitable, and that the degree of interference can vary based on how well a speaker knows his/her second language. (Flege et al. 2002). Interference may or may not be predictable and interference can vary by the type of bilingual. A study done on English/French bilinguals by Favreau and Segalowitz (1982, 1983) showed that balanced bilinguals are less likely to show interlingual interference than dominant language bilinguals.

More evidence for L1/L2 interference comes from code switching, or “the random alternation of two languages both between and within sentences” (Poplack 1980:581). Code-switching patterns depend on how fluent speakers are in their two languages, and the type of mixing depends on language dominance. In balanced bilinguals, code-switching adheres to an “equivalence constraint,” and occurs when there is no syntactic difference between the L1 and the L2 (Poplack 1980:581). Switching occurs more frequently when speaking to fellow bilinguals of the same kind, and furthermore, balanced bilinguals show more code-switching than L1 dominant bilinguals (Poplack 1980). Speakers, whether monolingual or bilingual, change the way they speak or the language they speak based on the situation. But, “the ideal

bilingual switches from one language to another according to appropriate changes in the speech situation...but not in an unchanged speech situation, and certainly not within a single sentence” (Weinreich 1953:73). This means that bilinguals ideally should have the ability to control when they use each of their languages.

Code-switching presents methodological issues. In some cases it may be impossible for the researcher to be aware that a subject is code-switching (e.g. if the researcher does not know the subject’s languages, or if the differences are subtle). Asking the subject to avoid code-switching may not be guaranteed to work, particularly if the subject’s code-switching is automatic and at least in part unconscious.

An example of such concerns is reported by Chelliah and de Reuse (2011). In a research scenario, they report: “when listening to Lamkang speakers, I [Chelliah] hear them freely code switch and code mix between Lamkang, Manipuri, Hindi, and English” (Chelliah and de Reuse 2011:178). If the researcher does not know some of the subject’s languages, it might be impossible to detect such switching.

However, the observations above most naturally seem to apply to bilinguals. What about speakers who have learned an L2 very late in life (i.e. after the critical period)? Do late-learned L2’s affect L1s? Context matters: if a speaker has learned an L2 late in life, but is living in an environment where L2 is spoken exclusively, there may be affects on the L1 (see section 2.2). However, what of the case where a speaker has a late-learned L2 and is living in a predominantly L1 environment?

For such a speaker, code-switching might be highly unlikely. Similarly, it might be very unlikely that the L2’s PhM will influence the L1’s. One possible effect is the development of subphonologies (perhaps a type of code-switching) in the L1. For example, it might be the case

that a speaker with an English L1 who has learned French might be more likely to pronounce perceived ‘French’ words like *genre* and *garage* as [ʒonʁə] and [gəʁaʒ]; word-initial and word-final [ʒ] is not found in ‘native’ English words. Such an effect, however, is potentially slight and not likely to pervade the phonology of the L1.

Requiring the subject to be monolingual avoids the problems outlined above. There can be no code-switching, and no interference from other L1 or L2 PhMs. Also, the monolingual speaker will be fully fluent in his/her L1 in all contexts, unlike bilingual speakers. The one type of exception may be a subject who has only one L1, and has learned an L2 after the critical period, and lives in an L1-speaking environment.

2.1.3 Dialect-switching and style-shifting

Even a monolingual speaker may have several PhMs. For example, a speaker may have command of several different dialects, whether L1 (i.e. learning during the Critical Period) or not. The optimal monolingual, then, would be a person who speaks only one dialect, or at least who has only one L1 dialect.

Even a mono-dialectal speaker is likely to have several different PhMs for different speech styles (Labov 1972, Trudgill 1999). For example, a speaker might have a formal mode of speech and an informal mode. The different speech styles can be quite phonologically different. For example, in Sāmoan, there are two common speech styles – *Tautala Leaga* and *Tautala Lelei* (Mosel & Hovdhaugen 1992:22ff). The *Tautala Lelei* style has the oral and nasal stops [p t ʔ m

n ŋ]; [k] is restricted to loanwords. In *Tautala Leaga*, the stops are [p k ʔ m ŋ].

In principle, it is possible that there are some monolingual, monodialectal speakers with one L1 speech style, and therefore just one L1 PhM. However, in practice there might be no choice: subjects will have more than one speech style. In such a case, it is crucial to set up procedures to ensure consistency of speech style in speech output and grammaticality judgments (Labov 2001, Wolfram 2011). For example, if speech style is not controlled for a Samoan speaker, the output might contain the stops [p t k], which do not reflect the Competence mechanisms of either speech style individually.

2.1.4 The LOCUS vs. the Ideal speaker-hearer

For Generative phonology, the ideal speaker-hearer would have one PhM – i.e. be monolingual, monodialectal, and have one speech style. Such a speaker is ideal because their speech can only be generated by a single PhM, and so other PhMs are eliminated as sources of influence.

It is unlikely that such a person exists: while monolingual speakers – and perhaps monodialectal speakers – exist, it is possible that every speaker has more than one speech style (Labov 1984:29). Even so, limiting speakers to monolingual and monodialectal speakers will address part of the problem. Experiments and field elicitation must still be controlled for speech style.

2.2 Continuous Use

Speakers who are exposed to a second language and do not have continuous use of their first language are at risk of language ‘attrition’ – “the decline of any language (L1 or L2), skill or portion thereof in a healthy individual speaker” (Ecke 2004:322). The most common language attrition is the loss of L1 in an L2 environment. This is often the case with children who immigrate to a new country and must learn a new language. In learning the new L2, the L1 is forgotten or altered with the influence of the L2. Consequently, if the speaker is asked to produce L1 speech or grammaticality judgments, the speaker is either unable to do so, or their L1 output might be influenced by their L2.

A conservative approach to elicitation is to assume that any speaker who has not used their L1 continuously, or is in an entirely L2 environment, has suffered L1 attrition. Therefore, the LOCUS has learned his or her L1 in childhood and has used it continuously.

2.2.1 Case Study: Mbabaram

The phenomenon of L1 attrition is most easily illustrated with a case study: Dixon (1991)’s description of Albert Bennett, an adult male Mbabaram speaker.

When first approached in 1964, Bennett was 60 years old and living in Edmonton, near Cairns, Australia. He had been living in an L2 environment, and Bennett had not used or spoken his L1 for 20 years.

At Dixon’s first contact, he reports that Bennett “yielded just 28 words”, implying that the small number was due to lack of use: “in a language Bennett had not used or heard spoken

since his mother died, a score or more years before.” Apparently due to lack of use, Bennett’s L1 had attrited so severely that he could only produce a small vocabulary.

Five months later, Dixon returned to find that Bennett could now produce around 200 words and “just a little grammatical data.” The older Bennett got and the more he thought about his childhood, the more words he was able to produce: “As he grew older and thought back more to his youth, Bennett’s competence in the language improved” (Dixon 1991:353).

The fact that Bennett improved over time suggests that his L1 access was not fluent for at least the first few times Dixon came to elicit data. His competence improved over time, although not permanently. Occasionally Bennett would produce a word one year, and then be unable to recognize the same word a year later. Dixon acknowledges the fact that continuous use is crucial: he warns “it must be remembered that he had not spoken the language for many decades” (Dixon 1991:353), and suggests that he may have published the original speech data prematurely for it may have not been accurate in reflecting native speaker intuitions.

The Mbabaram case shows the importance of continuous use of an L1. Even though Mbabaram was Bennett’s L1, this fact alone was not enough to ensure that he was an optimal speaker-hearer. Dixon’s comments indicate that Bennett’s L1 had suffered attrition – his inability to recall parts of the language, and his inconsistency. In such a case, it is difficult to know what cognitive resources Bennett was calling upon in rendering words and grammaticality judgments. It is possible that his L1 modules rejuvenated (as Dixon implied), but it is also possible that his apparent improvements were actually an illusion, with the gaps in his L1 filled in by his L2 PhMs.

2.2.2 *What is attrition?*

When an L1 is lost in an L2 environment, it is not always a complete loss of the first language, but rather a blending of the two. Existing research on language attrition does not present a unanimous definition of attrition. The term is used to refer to a range of phenomena from complete loss of language to a slight change in a language.

Ben-Rafael (2002) attempts to define attrition in terms of L1 lost in an L2 environment; attrition is not necessarily a complete loss of use of the language, but it may just be a “loss of L1 spontaneity and of the formation of a gap between active and passive command of the mother tongue” (Ben-Rafael 2002: 165). Evidence for this approach comes from a subsequent study done with L1 French speakers who moved to Israel and learned Hebrew as an L2. The language effect was that of a resulting “interlanguage,” or an “in-between language,” called Franbreu. The hybrid language was a mix of Hebrew and French, and “as they acquire Hebrew as an L2 and use it fluently in their daily lives, their French changes under Hebrew influence” (Ben-Rafael 2002:166). This case of language mixing is not quite attrition, but not quite L1/L2 influence. It is described as a “sociolinguistic phenomenon...that takes place speech situations. In different contexts speakers may variously deviate from standard forms and use L2 elements in various ways” (Ben-Rafael 2002:166).

Pavlenko (2000) proposes a ‘Crosslinguistic Influence’ framework to distinguish between different types of L1 L2 interaction. The first of the five processes is borrowing, or adding typically lexical elements of L2 to the L1. Lexical borrowing can be a sign of L1 attrition when “an exact L1 equivalent exists but is no longer available to the speaker in either production or comprehension” (Pavlenko 2002:50). The second process is restructuring, or incorporating L2 elements, usually semantic or syntactic, into the L1. This type of attrition measured using

grammaticality judgments. Those who exhibit qualities of attrition are more likely to judge grammatical syntactic structures as ungrammatical. The third type is convergence, or creation of a new language system that is a midpoint between the L1 and L2. This is most probably the case with Franbreu, the mixed language. The fourth process is shift, or the adoption of L1 structures into a dominantly used L2. This is often realized in the phonology, where speakers use L2 mannerisms in L1 speech. The fifth and final process is attrition, in which the ability to produce and perceive L1 is lost due to L2 influence. Pavlenko (2002) distinguishes attrition from the other types of language influence in that attrition is permanent loss of a previously available language. An important point to consider is that “the L2 user would no longer be perceived as a native speaker of his or her L1” (2002:54). Once there is attrition, native speaker status is surrendered.

For Generative phonology, all kinds of attrition create problems for the recovery of PhM competence. Attrition may involve the increasing influence of an L2 PhM on an L1 PhM, so that L2 PhM processes override L1 PhM processes in generating L1 outputs. In such a case, L1 outputs do not reflect the workings of a single competence mechanism, but rather a mixture of two different systems.

2.2.3 The “van Els Taxonomy”

According to the van Els taxonomy, there are four types of language attrition, summarized in Figure 1 (Köpke and Schmid 2002:9).

Language lost	Linguistic Environment	
	L1	L2
L1	Dialect loss	L1 attrition
L2	L2 attrition	Language reversion (in the elderly)

Figure 1. The van Els taxonomy of language loss (Köpke and Schmid 2002:9)

In Generative terms, dialect loss, L1 and L2 attrition are very similar. They all involve loss – or loss of access – to linguistic modules. In L1 attrition, a person loses access to the L1 modules through lack of use.

The term ‘L1 attrition’ is not as fine-grained in the taxonomy as Generative linguists need: it describes both language loss and a type of dialect loss. If a speaker of an L1 moves into another language environment, the L1 attrition is ‘language loss’. If a speaker of an L1 moves into another dialect environment, the L1 attrition is ‘dialect loss’. In contrast, if a speaker has native command of two dialects – D1 and D2 – and moves into an area where D2 is not spoken, then attrition of D2 is also ‘dialect loss’.

L1 loss in an L2 environment is a “nonpathological attrition”, or language attrition “not due to brain damage or aphasia” (Keijzer 2004:389). If the L1 is lost, the speaker is effectively of no use in experiments or elicitation for that L1. Although the speaker may be able to use his or her L2 with native-like proficiency, it does not meet the requirement of critical period acquisition (see section 2.3). This type of attrition is of the most interest to Generative linguists (Altenberg and Vago 2002:105).

The third type of attrition is L2 loss in an L1 environment. This type usually occurs in adult “migrants who have never received formal instruction in their L2” (Köpke and Schmid 2002:8). L2 attrition is of interest to Generative phonologists who study the PhM competence

mechanisms of L2s. However, as most research focuses on L1s, it will not be discussed further here.

The fourth and final type is L2 loss in L2 environment, or language reversion. This type of attrition is most common in the elderly, and is not usually studied with language attrition because it is often too hard to distinguish from the natural changes in language processes that occur with senescence.

For subjects in phonological elicitation and experiments, loss of L1 in an L2 environment is the most frequently encountered, particularly for endangered languages (e.g. see section 2.2.1). Such loss results from not using the L1 frequently enough. Exactly how infrequent use relates to L1 attrition is unknown (Köpke and Schmid 2002), so it is not possible to define ‘continuous use’ precisely. A very conservative approach would be to insist that speakers use their L1 as their overwhelmingly primary mode of communication – i.e. that they live in an L1 linguistic environment (which, specifically, would be an environment where the majority of people spoke the same dialect and language as the speaker in a variety of functions). At the very least, it is clear that attention must be paid to the continuity of use of subjects’ L1s in PhM research.

2.2.4. Models of attrition

The restriction on subjects above is suggested because it is not currently possible to take a more fine-grained approach. If the process of attrition was well understood, it would be possible to test to see whether a speaker’s L1 had undergone attrition – this would be a more sensitive approach than broadly ruling out every speaker who does not live in an L1 environment.

However, L1 attrition has not received a great deal of theoretical attention (Köpke & Schmid 2002:2-6), and there are a variety of competing theories.

For example, Roman Jakobson's Regression Hypothesis suggests that "the process according to which a language is forgotten will be the reversal of the process by which it has been learned" (Keijzer 2004:389). Language is lost in the same linear way in which it is acquired. Therefore, language features that are acquired latest are the features that will be lost first (Keijzer 2007). For the PhM, the Regression Hypothesis predicts that more marked phonological structures will be lost first.

A competing theory is the Activation Threshold Hypothesis, which claims that more frequently used lexical items will be retained more than less frequently used ones (Köpke 2002). So, if a language is not used frequently enough, it is more likely to undergo attrition. In bilinguals, when one language is active, the other language is inhibited, and the activation threshold of the inhibited language is raised. In the case of the bilingual, "language attrition occurs as a result of long-term absence of stimulation of one of the languages" (Jamshidiha and Marefat 2006:22).

Language attrition may be an issue of memory loss: i.e. language attrition occurs when individuals have forgotten an aspect or aspects of a language (Ecke 2004). Language can be forgotten unintentionally, as a memory malfunction or language decaying, or intentionally, as is the case with language suppression.

Memory is a three-step process. In the first step, encoding, new information is acquired. In the next step, storage, the information is integrated and a permanent representation is formed. Finally, in the retrieval stage, information is accessed when it is needed. Forgetting can result from failure of any of these three steps. In the case of language attrition, the encoding stage must

be functional, because one can only forget something that has been acquired at one point. It is agreed upon that language will attrite due to unsuitable storage of linguistic structures (Ecke 2004).

The biggest causes of language suppression are social and psychological factors. For example, a child who immigrates to a place where his or her L1 is not spoken, he or she may suppress the native language in an attempt to assimilate into the new culture. Additionally, one may consciously suppress or unconsciously repress a language that is associated with a traumatic experience (Ecke 2004). As an example, imagine a Holocaust survivor who spoke Polish as a child, and upon moving to America only spoke in English as an effort to disassociate from the past.

Language decay occurs when linguistic structures are used infrequently or not at all. Evidence for this phenomenon comes from studies of elderly immigrants who have not used their L1 in many years, and “have reported similar deficits in lexical production” (Ecke 2004:331).

So, without a more complete understanding of the stages of L1 attrition, and how to detect it, a conservative approach to selecting experimental/elicitation subjects that avoids all possibility of attrition is safest.

2.2.5 Age and Attrition

Age may be the most crucial predictor for attrition. Although there is no agreed upon exact age at which a child is most at risk for attrition, overall, “the younger the child is when the language of her environment changes, the faster and deeper she will attrite” (Köpke and Schmid 2002:10).

The age-sensitivity of attrition may be due to the fact that young children are less likely than adults to pass the critical threshold of language acquisition. The critical threshold is a point in the language acquisition process when the language becomes permanent (see section 2.3 for further discussion). Once the child has passed this threshold, they are somewhat immune to language attrition when they change their language environment (Ecke 2004). If the child changes his or her language environment before passing this threshold, the language is “not yet stabilized” (Köpke and Schmid 2002) and therefore more subjected to permanent loss.

Research is currently inconclusive as to whether or not the loss is totally permanent. On the one hand, studies have been done to show that within children in an L2 environment, L1 can be lost to the extent that “psycho and neurolinguistic methods can detect no trace of it anymore” (Köpke and Schmid 2002:10). On the other hand, even if there is no perceivable trace of the L1, the Maturation Hypothesis states that “L1 may leave long-lasting traces in the neural circuits involved in language processing, and thereby prevent total L1 loss” (Ventureyra and Pallier 2002:108). Speakers who exhibit L1 language attrition in an L2 environment are more likely to lose use of lexical, semantic, and syntactic structures while holding on to phonology and sound patterns of the L1 (Ventureyra and Pallier 2002). Furthermore, early bilinguals are less likely to lose their first language than late bilinguals (Jamshidiha 2006). The fact that age is so crucial in determining the likelihood of attrition may have to do with the stabilization of language that occurs only within the critical period.

In addition to age, life-altering events may contribute to the likelihood of language attrition. As mentioned before, traumatic experiences can cause one to disassociate with everything surrounding the trauma, including the language. Similarly, when a family moves to a new country where a different language is spoken, the family may abandon the L1 in an effort to

assimilate into the new culture. Parents may speak only the new L2 to children in an effort to support the language that is spoken in school (Ecke 2004).

The implication for elicitation is that a subject who has learned the L1 and left for an L2 environment before the critical threshold is most prone to L1 attrition is not likely to be an optimal subject for Generative research purposes.

2.2.6 LOCUS and the ideal

To summarize the results of the preceding sections, the optimal speaker-hearer is monolingual and monodialectal, and has had no language attrition. It is possible to minimize attrition for subjects by ensuring that the subject only speaks one language, at least as an L1, and the subject has continuously used their L1 while living in a predominantly L1 language environment.

If the subject is monolingual, it may seem unnecessary to insist on continuous use. However, in highly geographically mobile societies such as the U.S., it is quite possible that a speaker has moved outside his/her native dialect area. This is particularly the case for some of the most desirable experimental subjects, college students, many of whom leave home and end up in a highly linguistically heterogeneous environment. So, the speaker's L1 may attrite – 'dialect loss.'

In cases where monolingual speakers are not available, continuous use is even more crucial. At the very least, the subject should have learned the L1 and passed the critical threshold before moving to an L2 environment.

2.3 L1 and the Critical Period

To ensure fluency and proficiency, the optimal speaker-hearer must have learned his/her L1 in the Critical Period (Penfield and Roberts 1959:238, Lenneberg 1967). Lenneberg (1967)'s Critical Period Hypothesis states, "primary language acquisition must occur during a critical period which ends at about the age of puberty with the establishment of cerebral lateralization of function." Language must be learned at a young age in order to achieve a full state of 'fluency', including the ability to produce fluent speech and grammaticality judgments (Lenneberg 1967:175). Although the notion of a critical period is debated, the high level of plasticity that only exists in prepubescent children creates an ideal neurological environment for acquiring language.

For phonological research, data must be elicited from a PhM that was established during the critical period (unless – of course – the research specifically focuses on second languages). Post-Critical Period ('L2') PhMs do not behave like Critical Period ('L1') PhMs. In terms of speech production, L2 PhMs can draw on L1 PhM computations and representations, with the result that L2 speech may be a mixture of several different PhMs and/or their influences (Archibald 1993, 1998, 2000).

2.3.1 Arguments for the Critical Period

The proposal that adults and older children have less success in acquiring a new language is not controversial (e.g. Flege, Yeni-Komshian & Liu 1999, Stevens 1999). However, the claim that

there is specific period when language learning can most effectively happen, as opposed to a gradual decline in multiple factors relating to acquisition, is contested (e.g. Epstein et al. 1996, Hakuta 2001).

2.3.1.1 Physiological reasons: Brain plasticity

Support for the Critical Period Hypothesis comes from Penfield and Roberts' (1959) work showcasing the ability of a child's brain to learn language relatively effortlessly: "For the purposes of learning languages, the human brain becomes progressively stiff and rigid after the age of nine" (Penfield and Roberts 1959:235-236). Due to the plasticity that exists only in a young child's brain an adult cannot learn a new language as easily as a child can. The evidence for this plasticity comes from the fact that most adults fail to perfect a second language after puberty. This is because "after the age of ten or twelve, the general functional connections have been established and fixed in the speech cortex" (Penfield 1963:80), thus making it near impossible to learn a language with native-like proficiency after puberty.

2.3.1.2 Learning style: direct vs. indirect

There are both physiological and psychological reasons for why children are superior language learners. Physiologically, as mentioned before, the child's brain is specialized for learning language. This specialized capacity decreases as the child grows into adulthood. Evidence can be seen in families that emigrate with young children. Within two years, the children will learn the language of the new country fluently with no accent. They learn directly by playing with local children who speak only the new language and going to a school where only the new language is spoken. The parents, however, cannot learn language directly in this

manner. Although they may learn the language to some extent, they will most likely retain an accent and/or never achieve fluency (Penfield and Roberts 1959).

Based on the child/adult immigrant experience with new languages, perhaps it is not the time at which the language is learned that is critical, but rather the critical factor is the method in which the language is learned. Penfield and Roberts (1959) distinguish between two different ways to learn a language. The first method, *indirect language learning*, or “language education”, utilizes the technique of translating from a previously acquired language to the desired target language. This method is most often used in high school and college foreign language classes, and involves memorization of vocabulary and grammar rules, as well as dissociation between the two languages. The learner still thinks in his or her first language while constantly translating the second language. The second method of language learning, *direct language learning*, often referred to as the Berlitz method or the ‘mother’s method,’ is done by immersing oneself in an environment where only the target language is spoken. The learner has no choice but to acquire the language in order to function in his or her new environment. The learner immediately begins to think in the target language, and has no other choice but use the target language exclusively. To test the value of each learning method as it relates to age-sensitive language acquisition, Penfield and Roberts (1959) examined a family with four children. The two younger children were exposed to German starting at the ages of six months and eighteen months, respectively, from their governess in the nursery in addition to hearing it from their parents at home. At the ages of three and four, respectively, they went to a French nursery school, where they were exposed to French. At home and outside of school the kids heard English. As a result of being exposed to three languages, with no formal or direct teaching, the kids learned all three languages fluently. In contrast, the two older children first heard German a little older at the ages

of eight and nine, respectively, from playing with German kids in the neighborhood. They had a German-speaking governess who spoke no English. Because they had no choice but to learn German in order to function in their social environment, the kids learned German fluently. Regardless of age, the children were able to learn multiple languages with native-like proficiency when learned with the indirect language.

Penfield and Roberts (1959) note that while the critical period is important in terms of neurological plasticity for language learning, when using the direct method of language learning, it is possible to adults to learn a second language fluently: “When new languages are taken up for the first time in the second decade of life, it is difficult, though not impossible, to achieve a good result. It is difficult because it is unphysiological” (Penfield and Roberts 1959: 255). Language is best learned directly because the learner is faced with a sink or swim situation. In a foreign language environment, one must learn the language in order to communicate his or her needs to those around him or her. “For the direct learner, language is not a subject to be studied nor an object to be grasped. It is a means to other ends, a vehicle, and a way of life” (Penfield and Roberts 1959: 257).

2.3.1.3. Psychological reasons

In addition to the physiological distinctions between child and adult brains, there are also psychological reasons why children in the critical period are much more apt to learning language. Penfield and Roberts (1959) argue that there is a “psychological urge” for a child to learn language in order to convey his or her needs. An adult who has already acquired a primary language may not have the same psychological urge to learn a secondary language, when he or she already has a way to vocalize needs and wants. In the case of a child learning multiple

languages at once, it is often the case that the child uses each language based on the situation. The child learns that in order to get what he or she needs, he or she needs to speak in whatever language those around him or her are speaking. This contributes to the simultaneous direct learning of multiple languages (Penfield and Roberts 1959).

2.3.1.4. SLA: children vs. adults

Children can learn to speak a second language fluently and without an accent, and most adults cannot (Jedynak 2009). Furthermore, the way that a second language is acquired differs between children and adults: “Strong implication of this [critical period] hypothesis is that the processes involved in any language acquisition which takes place after the age of puberty will be qualitatively different from those involved in first language acquisition” (Snow & Hoefnagel-Höhle 1978: 1114). It is much harder for adults to learn additional languages than it is for kids, because adults are out of the critical period. More evidence for the critical period comes from the fact that the older a learner is, the more likely he or she is to speak the new language with an accent, which is an audible trace of the speaker’s L1. Adult second language learners cannot correctly articulate sounds in the second language that do not exist in the first. “Foreign accents emergence is a consequence of restrictions imposed by the close-off of the critical period” (Jedynak 2009:17). Prepubescent children can learn multiple languages effortlessly, whereas adults cannot. Whereas first language acquisition in children is somewhat automatic and involuntary, second language learning in adulthood is almost always a conscious and voluntary effort. This supports the critical period-based idea that “automatic acquisition from mere exposure to a given language seems to disappear after this age [of puberty], and foreign languages have to be taught and learned through a conscious and labored effort” (Lenneberg 1967:176). This is the reason first language acquisition is effortless and inevitable

2.3.1.5. Aphasia recovery: children vs. adults

Evidence for the superior plasticity of a child's brain over that of an adult comes from the fact that children can recover their language skills much more successfully than adults after brain damage. When children undergo therapy to rehabilitate speech after a stroke, trauma, or other brain damage causing aphasia, a full recovery can be expected. Most children under the age of ten can achieve a full recovery with no traces of aphasia later in life. The recovery processes mimics the original language acquisition processes. The child begins with babbling, progresses to single words, and eventually two word phrases, etc. Just as he/she did to learn language for the first time, the child must "start again on the road toward language acquisition, traversing all stages of infant vocalization...until perfect speech is achieved" (Lenneberg 1967:150). When a child is recovering from aphasia, he/she has the ability and brain plasticity to start from scratch and relearn language. Unlike the child aphasic, the adult aphasic does not regress back to infant stages of language learning. Rather, the adult merely learns strategies to compensate for the communication handicap. For an adult aphasic, recovery often just means improvement to the ability to communicate somewhat and fit in with the status quo (Lenneberg 1967:144). Whereas in children, the recovery processes is comparable to acquisition, in adults the processes is more oriented toward symptom reduction.

2.3.2 Arguments against the Critical Period

The critical period hypothesis is not universally accepted. Some reject the phrase *critical* for implying too rigid of a boundary between the ability of children and that of adults. These critics prefer the term *sensitive period*, which conveys a "softer and more plastic set of developmental constraints and transitions...there is no single moment when the window of linguistic

opportunity slams shut, but rather, a series of gradients that vary with task difficulty and other poorly understood parameters” (Clancy and Finlay 2001:324-325). Rather than being a specific age at which the brain is no longer able to acquire a new language, some believe that there is a slow and gradual process in which the brain loses the necessary plasticity to learn a language fluently. Others reject the idea of a critical period completely (e.g., Epstein, Flynn, & Martohardjono 1996; Hakuta 2001). If the critical period exists, critics ask, how is it possible that some, adults can successfully learn a second language fluently?

2.3.2.1. Successful adult SLA/direct method learners

Although it is much harder, foreign language acquisition is not impossible after puberty. Because support for the critical period hypothesis comes from the juxtaposition of children as natural language learners versus adults who learn with more difficulty, criticisms of the critical period hypothesis come from cases of adults who learn languages fluently after puberty (e.g. Birdsong 1992, Ioup et al. 1994).

The direct method of learning language is the most successful way for adults to learn a second language fluently. Such is the case of Josef Konrad Korzeniowski, a Ukrainian boy born to Polish parents (Penfield & Roberts 1959). Right from birth, he was exposed to both Polish and French. At the age of fifteen, he became a sailor on a British ship. Immersed in the life of an English sailor, he learned English by direct method. Daily interaction with English-speakers coupled with the supplemental use of a dictionary allowed Korzeniowski to achieve native-like fluency in English. Eventually, he became a famous author in England, writing under the name Joseph Conrad. Successful adult second language learners are often successful when learning language in the direct method. It is also believed that children who learn multiple languages early

in life have an easier time learning additional languages in adulthood (Penfield and Roberts 1959).

2.3.2.2. “Wolf children”

Evidence against the Critical Period Hypothesis comes from cases of “wolf children” (Lenneberg 1967:141), or children who were abandoned at a very young age and found to have no language, but then developed language later in life.

Such was the case of “Anna” (Davis 1947). After being born out of wedlock into an unloving home, Anna was passed around to the homes of various family members, family friends, local ministers, and then to multiple children’s homes. At the age of five months old, Anna was sent to her grandfather’s farm to live, where she was neglected. By the age of six, she was malnourished, physically underdeveloped, and without speech. After being removed from the oppressive environment, she began to progress through the usual developmental stage of language. At the age of seven, she had the language skills of a two-year-old. Anna died at the age of ten and a half with only slightly more improved language abilities. Although she was able to develop speech in a delayed manner, and past the critical period according to some (e.g. Penfield and Roberts 1959, Pinker 1994, Krashen 1973), Anna was not able to attain the abilities appropriate for her age.

In a similar case, Genie was found at the age of thirteen with no language. As a child, she was confined to a small room tied naked to a chair. Her parents did not interact with her and when they did, it was to abuse her physically and verbally. When she was found, she was only able to recognize her own name and the word “sorry.” Although she could not speak, she was able to communicate nonverbally with emotions and body language. Once she was removed

from the deprived environment, Genie, like Anna, began going through the stages of language development. Starting with babbling, moving on to single words, and then two word sentences. However, whereas most children would experience an increasing expansion of vocabulary, Genie never hit this language milestone. Her language development was severely limited. She never mastered grammar and complex sentences (Garmon & Apsell 1994). Cases like Anna and Genie raise questions about the critical period because they were able to learn language after a delayed period. However, these cases are not trustworthy because the children may have had underlying developmental and health disorders that may affect language.

2.3.3 Relevance to Native Speaker Status

Even if the Critical Period Hypothesis is not correct, it is clear that older children and adults have a far more difficult time achieving native speaker competence than younger children. Even though it is possible for an adult to achieve native-like fluency in a second language, it is not so for the majority of cases. Taking a conservative approach, then, the LOCUS must have learned his/her L1 within the critical period.

One challenge is defining when the Critical Period ends: 5 years (Krashen 1973), 6 years (Pinker 1994), 12 years (Lenneberg 1967), and 15 years (Johnson & Newport 1989). Taking the most conservative proposal, the LOCUS must have learned his/her L1 before age 5.

2.4 Summary: LOCUS vs. the Ideal

The preceding sections have argued that the optimal subject has a linguistic system with specific properties: (1) a single PhM module (or as few as possible), (2) a PhM that has not undergone attrition, and (3) a PhM that was learned during the Critical Period. These properties mean that the ideal subject is (1) monolingual, monodialectal, and that elicitation/experimentation controls for speech style, and (2) the subject has used his/her L1 continuously, and (3) the subject learned his/her L1 during the Critical Period.

If speech or grammaticality judgments are elicited from a LOCUS, it is highly likely that those speech/judgments were generated by a single PhM. In contrast, if the subject is not a LOCUS, there is the possibility that any speech/judgments are influenced by other PhMs, and so the speech/judgments not reflect the computational mechanisms of any individual PhM.

As a practical example, suppose speech is elicited from a Samoan speaker (see §2.1.3), and includes forms for ‘tea’ [ti:] and ‘blood’ [koko]. It may seem that the speaker has a PhM that generates both [t] and [k]. However, these words are generated by different PhMs: [koko] by the *tauta leaga* PhM, and [ti:] by the *tauta lelei* PhM. In neither PhM are *both* [t] and [k] permissible surface consonants. Consequently, the assumption leads to an incorrect understanding of the Competence mechanisms of the speaker.

As mentioned previously, the properties discussed above are not the *only* desirable (or necessary) properties of an optimal speaker-hearer. They were chosen because they are properties of the PhM, rather than of other cognitive modules (e.g. the phonetic module, the lexicon) or physical mechanisms (e.g. articulators).

3. The LOCUS in phonological research

The previous sections have proposed that the optimal speaker-hearer (LOCUS) possesses three central qualities: a fluent L1, learned during the Critical Period, and continually and consistently used. These requirements follow from the form of Generative theory, which proposes that there is an independent phonological module for each linguistic system in an individual, and from research on the acquisition and maintenance of those modules. So far, this thesis has done nothing new in identifying the LOCUS's properties. However, it was necessary to identify the LOCUS before addressing the issue of the role of the LOCUS in Generative phonological research.

The question addressed in this section is whether research in Generative phonology makes use of LOCUS subjects. If it is correct to conclude that the optimal speaker-hearer is a LOCUS, then research *should* make use of LOCUSes.

The journal *Phonology* was examined because it is the only journal devoted entirely to phonological research.¹ The vast majority of articles in *Phonology* are set in Generative theories, whether rule-based theories (e.g. Chomsky & Halle 1968, Kiparsky 1982) or constraint-based ones (e.g. Prince & Smolensky 2004). Using volumes 16-29 of the journal *Phonology*, research articles from the last thirteen years (1999-2012) were examined. The goal was to see whether subjects who supplied the data cited were LOCUSes, satisfied some of the requirements of LOCUSes, or were not identified to be LOCUSes.

¹ The only other phonology journal is *Laboratory Phonology*, but it focuses on a subfield of phonology: <http://www.degruyter.com/view/j/labphon?rskey=pCCDJr&result=4&q=laboratory%20phonology>.

Overall, very few research articles addressed the LOCUS requirements. The most frequently mentioned related concept was ‘native speaker’: in most cases of primary research, authors will assert that their subjects are native speakers. However, they typically do not provide evidence for the assertion (i.e. they do not explain how native speaker status was determined).

So, there is a significant disconnect between what Generative theory requires in its subjects, and what is reported about subjects in Generative phonological research.

However, this survey has limitations. It does not show that phonological researchers fail to determine the LOCUS status of their subjects; it only shows that LOCUS status is rarely *reported* in publications. It is also possible that phonology articles in more general journals (e.g. *Natural Language and Linguistic Theory*) or journals that focus on other closely related fields (e.g. *Journal of Phonetics*) have a different character. Even so, not reporting subjects’ LOCUS status poses significant difficulties for the reader: it requires the reader to assume that the research ensured that the data was elicited appropriately.

3.1 Constructing the *Phonology* Database

A database of subject properties were constructed from research articles in volumes 16 to 29 of *Phonology*.² A similar database is being constructed for de Lacy (in prep.). The database

² Some articles lacked data. Others were not covered due to lack of time or access. The issues that were not included were: 16.2, 23.3, 24.2, 26.2, 26.3, 27.3, 28.3, 29.2, 29.3. In addition, one article was not covered: Gussenhoven & Peters (2004) (21.2:251-285).

constructed here used de Lacy (in prep.)’s database as a starting point, but re-evaluated all articles and looked for slightly different information.

The focus of the database is not an article, but a ‘dataset.’ A dataset is a collection of data points that are closely related. For example, data from the same language and dialect, or data collected from the same speaker(s), would be grouped together in one dataset. Since the goal was to determine whether subjects were LOCUSes, focusing on the dataset – rather than the journal article as a whole – was necessary.

While the LOCUS properties were the focus of this work, other information was recorded about each dataset. Each dataset was labeled with a general description, and it was determined whether it was central or incidental to the main focus of the article, the source of the data (whether elicited by the author or taken from another publication), the language and dialect, and other speech community information. After recording the general information about the dataset, information about the subjects was recorded when applicable. Relevant information included the number of subjects, ages, impairments, sex, and ‘native speaker status’ including monolingualism, Critical Period acquisition, and continuous use. In addition, it was recorded whether the data was individuated or pooled (i.e. whether the data was from a single speaker or was the amalgamation of several speakers’ data), and the transcription method.

The goal in recording factors other than the LOCUS requirements was to see if there were any relationships between properties that authors mentioned (e.g. if authors mentioned their subject’s sex and age, were they more likely to mention native speaker status?).

Each data point within a dataset was also examined. Each dataset was recorded with an identifier (usually how it is labeled in the text of the article (i.e. (1), figure 1, etc.), the number of subjects used for the data point, whether or not the data was pooled, and the type of data (i.e.

transcription or phonetic measurement). For phonetic measurements, the type of measurement was recorded: pitch track, spectrogram, duration, and/or intensity. For transcriptions, information was recorded for how many surface forms are included in one data point, underlying form, surface form, whether the data is partially or fully transcribed in IPA or not, morpheme decomposition, word/sentence gloss, and morpheme-by-morpheme gloss. These categories were recorded using a A (all), S (some), N (none) criteria.

3.1.1 Ambiguity and uncertainty

Information was found by reading through the articles and identifying relevant parts. In some cases, articles could be searched for key words (e.g. ‘male’, ‘native speaker’). However, some of the articles were scanned PDF documents, and could not be searched reliably.

There were some significant difficulties in finding subject properties. One is that there is no standard for recording experimental or fieldwork methods. There was usually no ‘methodology’ section in the articles (except in some articles that reported laboratory experiments – e.g. Silva 2006:290-291, Domahs et al. 2008:21-22). Information about subjects was often found in acknowledgment footnotes (e.g. Paradis and LaCharité 2001:255).

In some cases, it was difficult to determine whether a property was being identified. Some comments implied that subjects were native speakers, but did not state this outright. For example, Rubach (2000) refers to his subjects as “Russian consultants” (Rubach 2000:39). This term does not assert that the consultants were native speakers of Russian – i.e. that they had learned it during the Critical Period. Given the context, one might assume that the consultants were native speakers, but there is no direct evidence given. They could have been citizens of Russia who had emigrated as adults and were speaking Russian as a second language.

In other cases, an author asserted that his/her subjects are native speakers without providing any evidence for the assertion. For example, Yu (2000) states that his data is “based on the intuition of two native speakers” (Yu 2000:117). However, Yu does not explain how native speaker status was determined. A questionnaire may have been given, or comprehension and production tests might have been administered, or it may have been assumed that the subjects were native speakers. Moreover, given the variation with which the term ‘native speaker’ is used, it is difficult to be sure that ‘native speaker’ is the same as LOCUS (e.g. Paikeday 1969). It is possible that the speakers were bilingual and perhaps had an L2 that was interfering with their L1 intuitions. Perhaps the subjects were fluent in the target language and felt they could speak with native-like proficiency, but did not learn this language in the critical period. In short, without a clear explanation of how native speaker status was determined, it was difficult to judge whether LOCUS requirements had been met.

I sought out clear statements about LOCUS properties, and for evidence for those statements. In other words, did the author convincingly prove that the speakers she/he used were in fact native speakers?

3.2 Basic Properties

130 articles were examined. These articles contained 424 datasets.

It is crucial to distinguish *Primary* from *Secondary* datasets. A Primary dataset is one that reports otherwise unpublished data.³ Usually the data was obtained by the author from fieldwork or a laboratory experiment, and when written up usually includes personal reflexive pronouns like “we”, “ours”, or “I” (e.g. Peperkamp et al. 2008:139, Warner et al. 2001:400). A Primary dataset can also be an analysis of existing data, such as a transcription or acoustic analysis of existing audio recordings.

For example, Peperkamp et al. (2008:139-147) describes the methods and stimuli used in a sentence reading experiment, then describes the speakers who participated in the experiment, and finally provides the resulting spectrograms.

In contrast, Secondary datasets report data quoted from other publications. In this case, the original source is often cited next to the data (e.g. Kennedy 2008:65).

One generalization was immediately apparent: for Secondary datasets, information about subjects is very rarely reported. In other words, if an author cites data from another publication, the issue of whether that data was produced by a native speaker is almost never addressed.

In the rare cases where subject information is included for Secondary datasets, there is no explicit mention of native speaker status. For example, Grice (2000) draws data from a secondary source, Grice & Benz Müller (1998), and reports that the data comes from two female

³ See University of Maryland Libraries (2013) "Primary, Secondary and Tertiary Sources, UMD Libraries". <http://www.lib.umd.edu/ues/guides/primary-sources#primary> for discussion of the various uses of the terms ‘primary’ and ‘secondary’.

speakers, one in her late 20s and the other in her mid 30s. However, no information about native speaker status is provided. Similarly, Boersma and Hamann (2008) refer to data from a secondary source and refer to “the three female speakers recorded for the study by Zygis & Hamann 2003” (Boersma and Hamann 2008:250-251). They provide no other information on the speakers other than how many speakers were used, and the sexes of those speakers. There is no information on the native speaker status of these speakers.⁴

The relationship between Secondary datasets and lack of subject information is discussed in more detail in section 3.6. For present purposes, the implication is that for 320 datasets (75%) there is no discussion of whether the data was sourced from a LOCUS.

So, I focused on Primary datasets only. There were 104 Primary datasets (25% of the total).

3.3 Primary datasets and ‘Native Speaker’ status

Do Primary datasets report whether the data was elicited from a LOCUS? The first step towards answering this question is to examine the notion of ‘native speaker.’

Primary datasets were almost always (96/104 – 92%) accompanied by some information about the native speaker status of the subjects. More accurately, for 8 datasets there was no assertion or implication that the subjects were native speakers.

⁴ It might be significant that the authors of these articles were referring to data that they themselves elicited and reported in previous articles. In a sense, then, the data reported was ‘semi-primary’: it was elicited by the authors, but reported elsewhere.

However, the nature of the information varied significantly. In 54% of cases, there was an assertion that the subjects were native speakers. However, for only 10% of the total was there accompanying *evidence* that the subjects were native speakers. Figure 1 summarizes the nature of the ‘native speaker’ information.

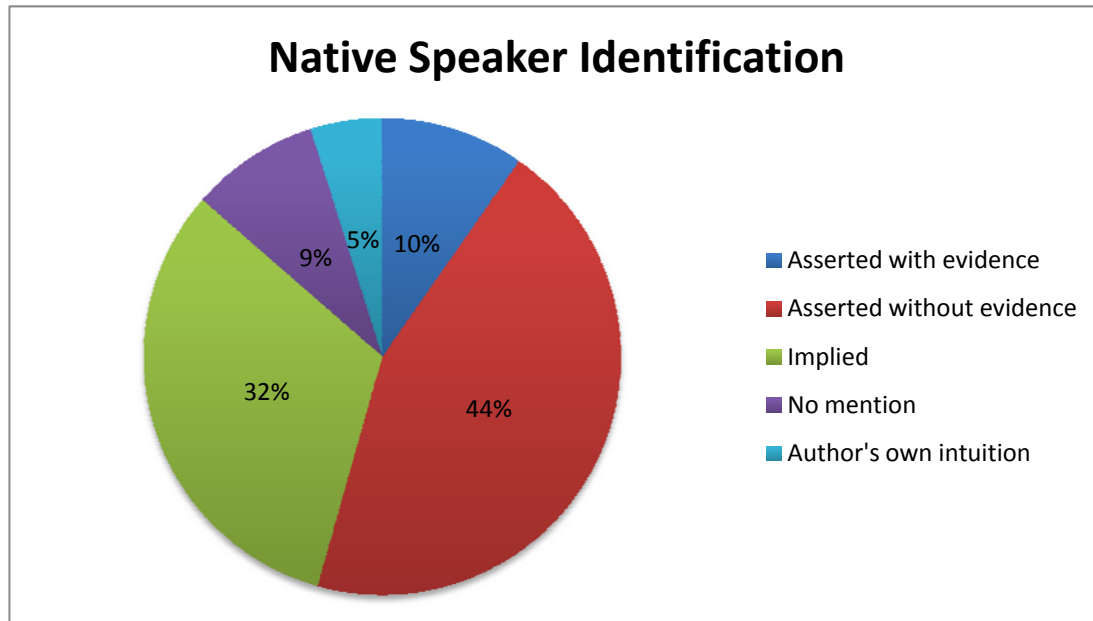


Figure 1. Native Speaker identification in Primary Datasets in *Phonology* (1999-2012).

- “*Asserted with evidence*”

The clearest cases were authors who asserted that the subjects were native speakers, and then provided evidence for the assertion (“Asserted with evidence” in Fig.1) – 10% of all Primary datasets. This includes rare cases where authors address the questions of whether the subjects are monolingual, have had continuous use of their L1, and learned the L1 in the critical period (see section 3.4).

For example, Hayes & Londe (2006) had Hungarian subjects self-report their native speaker statuses. Prior to eliciting speech data, subjects answered questions about their speech and language background, and any subject who self-reported that they were not native speakers of Hungarian was excluded. In this case, subjects were asked directly whether or not they were native speakers and indirectly by asking about their childhood and language exposure. "The forms began by asking the speakers about their linguistic background, and in our analysis we excluded data from any consultants who said that they were not native speakers of Hungarian, or that they had not spoken Hungarian in childhood" (Hayes and Londe 2006:71). Although there are no explicit questions to determine monolingualism or continuous use, through this survey method, the author addresses the critical period criterion by assuring that subjects learned and spoke the language in childhood.

Silva (2006) asserts that he consulted "36 adult native speakers of Korean." Silva then documented the ways in which he assured that all his subjects were in fact native speakers:

(3) *Silva (2006): Techniques for determining native speaker status I*

"In response to a demographic questionnaire, all subjects reported that they were born, raised and educated in the capital region of Korea (i.e. Seoul city or Gyeonggi province) ... All subjects entered the United States after the age of 18 and use Korean at home, speaking English as a second language (primarily for business or educational purposes)."

In this instance, Silva asserts that his subjects had learned the L1 in childhood, presumably before puberty, and grew up speaking it. They spoke English as an L2, but they had retained continuous use of their L1. Furthermore, Silva asserts:

(4) *Silva (2006): Techniques for determining native speaker status II*

“Further assurances regarding the authenticity of the data were obtained through the on-field judgments of the two female native speakers who were contracted to recruit and record subjects for this study; these data collectors, both doctoral students in linguistics with specific training in phonetics and phonology, ascertained that each subject was a bona-fide native speaker of Korean with no discernable second-language phonetic traits” (Silva 2006:291).

Silva’s techniques end up addressing LOCUS criteria, indicating that his conception of ‘native speaker’ is close to that of the LOCUS. (Of course, the speakers are not entirely optimal – they were not monolinguals, but it likely that their L2 had not affected their L1 because it was learned rather late and the L1 was actively maintained.)

Another case of good native speaker identification comes from Tucker and Warner (2010). The authors assert that they consulted “native Romanian speakers...Two speakers were living in the United States, but had lived in Romania at least until the end of high school. The remaining five speakers were recorded in Romania, and had lived most or all of their lives there.” After generally asserting that the subjects were native speakers, the authors go on to provide specific evidence: “Two of these speakers were monolingual, three spoke English and one also spoke Russian, but their L2s were learned in school or later” (Tucker and Warner 2010:294). In terms of the LOCUS requirements, the subjects were late bilinguals, so it can be implied that they had learned their L1s in the critical period. Because all of the subjects were either monolingual, or late bilinguals, it can be inferred that they all had continuous use of their

L1. However, it should be noted that unlike Silva (2006), Tucker & Warner (2010) do not explain *how* they determined the properties of their native speakers – did they administer a questionnaire? Did they find out through a targeted conversation?

- “*Asserted without evidence*”

For 44% of Primary datasets, there was an accompanying assertion that the subjects were native speakers, but no evidence was provided. An example of an assertion without evidence is when an author refers to subjects as “native speakers” without providing any details about how the term is being defined. For example, Jessen and Ringen (2002) identify participants as “native speakers of German” (Jessen and Ringen 2002:198).

Some implications about monolingulism or critical period are made when authors assert native speaker status, and then mention that subjects were born in one place but currently reside in another. Tucker and Warner (2010) assert that they collected data from native Romanian speakers who were born in Romania, but moved to the United States where they currently reside. In this case, it is implied that the speaker is at least bilingual in Romanian and English, however this is just a reasonable assumption with no direct evidence to support it.

The problem with this group is that it requires a great deal of trust, in two ways. One is that the reader must trust that the researcher has the same conception of ‘native speaker.’ However, the term ‘native speaker’ has many interpretations (Paikeday 2003), and there is no guarantee that the researcher’s is the same as the reader’s (in the present case, it is never clear that ‘native speaker’ means ‘LOCUS’). The other problem is that the reader must trust that the researcher used methods to determine native speaker status effectively. For example, did the

researcher simply assume that the subjects were native speakers, or did the researcher ask questions, or administer a questionnaire?

Consequently, assertions about ‘native speakers’ without any evidence raise uncertainty about the properties of the PhMs the data reported come from.

- “*Implied*”

For 32% of Primary datasets, it was implied that the subjects were native speakers. There was no outright assertion that the subjects were native speakers. However, other information was given that suggested that the researchers were sensitive to native speaker status.

Often times an author will refer to subjects as “speakers” (i.e. Gick 1999:41), “participants” (i.e. Pater 2000:237), “informants” (i.e. Edmondson and Esling 2006:157), or “consultants” (i.e. Rose 2000:297). In these cases, there is no reference to the fact that the participants are native, but I understood it to be implied. Also included in this category would be cases where authors use their own intuitions to provide data, but include no subject information on themselves. For example, Lombardi (2002) provides English speech data, but does not indicate that this is secondary data, or provide speaker information to indicate that it is primary-sourced. This is most often the case when the language in question is English, or a “native” language of the author.

The ‘implied’ category is the most subjective. It would be reasonable to group all these cases with the ‘no mention’ category. However, it was felt that *some* information was given, unlike the ‘no mention’ category.

- “*No mention*” and “*Author’s own intuition*”

For 9% of Primary datasets, there was no mention of the subjects’ properties. For example, Flemming (2001) asserts, “The measurements are from one speaker, reading \gVt\ syllables” (Flemming 2001:17). No further information is provided for this “one speaker.”

A further 5% were apparently from the author’s own intuitions (i.e. self-introspection, or self-elicitation). However, self-introspection/elicitation was rarely acknowledged outright, and no information about the author/subject was given.

For example, Raffelsiefen (2004) implies that she used her own intuitions for English data. She does not provide subject information for herself, but she does state that she used Google searches to verify her grammaticality judgments (Raffelsiefen 2004:99), as well as consulting “speakers,” for whom identification or subject information is never given (Raffelsiefen 2004:124). Raffelsiefen provides grammaticality judgments for both German and English data. Therefore, it is questionable that she would be a reliable native speaker for both languages.

It is difficult to know how to relate the ‘author’s own intuition’ class to native speaker status. One might assume that authors are aware of the importance of having a native speaker data source. However, this is merely an assumption.

Strictly speaking, then, native speaker status was only provided for 10% of Primary datasets to any reasonable degree of certainty – these were the only datasets where the authors explained how they determined native speaker status. Of all the *Phonology* datasets, then only 2.5% provided evidence that their subjects were native speakers.

Without further research, it is difficult to determine why native speaker status is not reported with evidence more frequently. It seems likely that a common belief is that the meaning of ‘native speaker’ is clear (perhaps meaning something like ‘LOCUS’), and that determining native speaker status is a trivial matter. This might explain why so many researchers assert that subjects were native speakers without providing evidence. It might also explain why so many datasets had no explicit assertions about the native speaker status of their subjects – the assumption might be that native speaker status is taken for granted.

The problem with such assumptions is that they are not based on clear evidence. There are no field-wide standards for determining native-speaker status (see e.g. section 3.3 on fieldwork textbooks). So, exactly how a subject’s native speaker status is determined might vary from researcher to researcher. In this thesis, I have argued that the LOCUS requirements are part of the criteria used to determine whether a subject is adequate for Generative experiments and elicitation. So, how many datasets were elicited from LOCUSes?

3.4 LOCUSes and near-LOCUSes in *Phonology*

The LOCUS is a particular type of ‘native speaker’: i.e. one that is monolingual, monodialectal, learned their L1 in Critical period, and has used it continuously.

- *Dialect and speech style*

The subjects' L1 dialects were not systematically mentioned. However, Beckman et al. (2009)'s comment reveals sensitivity to the importance of dialect, and its potentially confounding effect:

“Subjects were speakers of Modern Standard German, and no speaker exhibited dialectal deviations from Modern Standard German with respect to fricative voicing” (Beckman et al. 2009:fn.12).

A similar sensitivity is shown in Warner et al. (2001), with a decision to ignore dialect variability:

“... we chose the speakers who epenthesized most variably ... The speakers represented various dialects, since we considered it more important to control for variability of epenthesis than for dialect. All were raised in a monolingual Dutch environment within the Netherlands, and had acquired foreign languages only after childhood” (Warner et al. 2001:400).

D'Imperio & Rosenthal's (1999) analysis of Italian stress is particularly careful with dialect. They had seven Italian speakers “from different regions of the Central-Southern part of Italy,” but took pains to keep their data separate (i.e. not pool it) (e.g. D'Imperio & Rosenthal 1999:4).

However, exceptions aside, in general it is not possible to be sure whether subjects dialect-switched in their speech or grammaticality judgments.

Similarly, there is almost no explicit discussion of speech style. The clearest discussion is found in one article: Broselow et al. (1998) (See section 2.1). Consequently, there may be speech-style shifting in the elicited data and grammaticality judgments as well. The implication is that each dataset could report an amalgamation of the outputs of several different PhMs, and so the data might not reflect the Competence mechanisms of any individual existing module.

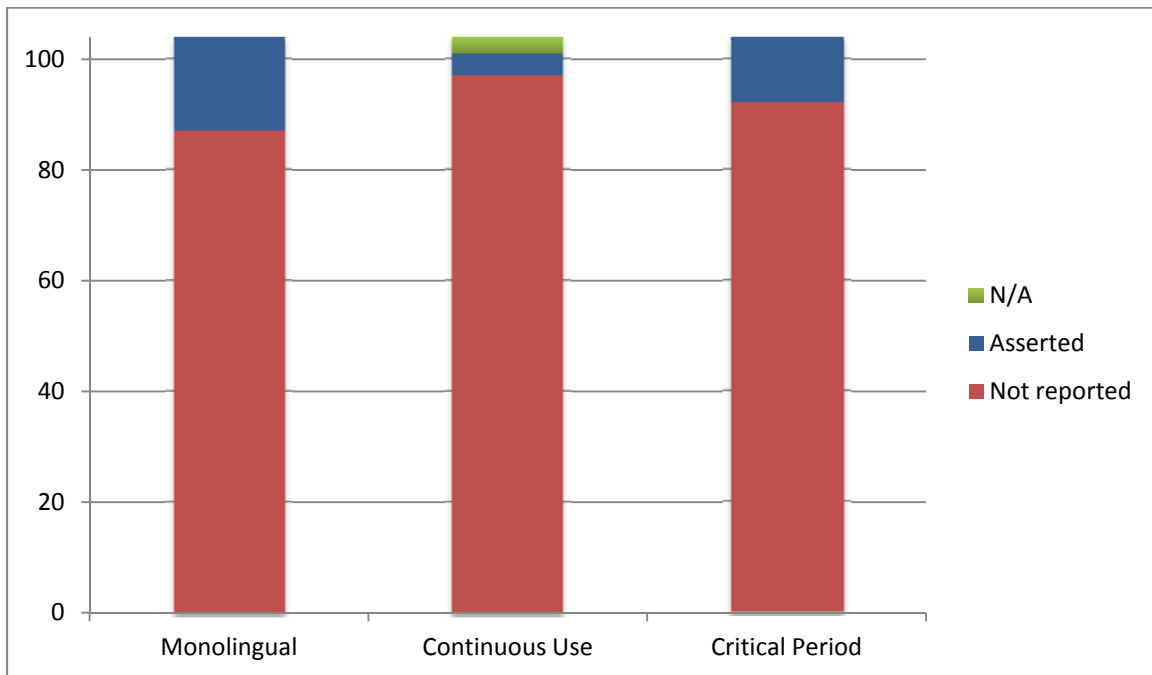


Figure 2. The LOCUS criteria for Primary datasets in *Phonology*

• *Monolingualism*

However, monolingualism is asserted for 17 datasets: the author stated outright that speakers were monolingual, bilingual, or multilingual. Of these, for three datasets the author's clearly stated that the subjects were monolingual.

For example, Carpenter (2010) ensured monolingual speakers by specifying that only monolingual speakers were allowed to participate. "The call for participants requested

monolingual English speakers. No one reported being bilingual” (Carpenter 2010:360). Carpenter does however assert that the subjects were technically late bilinguals due to classroom exposure to other languages, but still self-reported as monolingual speakers with English as their sole native language.

Tucker & Warner (2010:294) observe “Two of these speakers were monolingual, three spoke English and one also spoke Russian, but their L2s were learned in school or later.”

Truckenbrodt (2002) proves native speaker status with information about monolingualism. In this study, the author asserts, “speakers grew up with German as their only native language” (Truckenbrodt 2002:94). Additionally, he notes that he discarded bilingual subjects. In this case, it is implied that the subjects are monolingual in the fact that they grew up with only one native language, German, and then proven with the fact that he discarded all bilinguals from the study. Although “one native language” is vague because the subjects could have been late bilinguals learning L2s as adults, we can be assured that all speakers were monolingual because they were specifically screened for this characteristic.

In one case, lack of monolingualism was acknowledged to be a concern:

“Second, although all of our participants came from northern areas of Mainland China and spoke Standard Mandarin natively without any noticeable accent, they did have backgrounds in different Northern Chinese dialects. This could potentially have an effect on the results” (Zhang & Lai 2010: 177).

For the remainder (87 datasets), subjects’ mono-, bi-, or multi-lingual status is not reported.

- *Continuous Use*

For 4 Primary datasets (4%), it was asserted that speakers were using or had used their native language continuously. For example, Walker et al. (2008:506) report “This subject was raised in Rwanda, where he lived until he was 28, after which he resided in France, where he continued to speak Kinyarwanda at home.”

For 97 datasets, continuous use was not reported. I considered the continuous use criterion to be ‘not applicable’ for 3 datasets because the speakers were monolingual.

Some implications must be made about the native speaker criterion when an author asserts that a subject has moved from his or her native language environment. For example, Grice et al. (2000) asserts that he elicited Greek speech data from a “female native speaker from Athens who had lived in Edinburgh for several years at the time of the recording” (Grice et al. 2000:181). In this case, the speaker has presumably changed linguistic environments. Should it be assumed that the speaker has acquired Scottish English after moving to Edinburgh? Do we assume that the speaker has retained continuous use of Greek from his or her old linguistic environment? Is the speaker still continuously using his/her L1? Perhaps the speaker moved to a closed environment where only Greek was spoken. These details remain unclear. In a later dataset, Grice et al. (2000) specifies that the subject was an “educated native of Bucharest...who has lived outside Romania for more than ten years but still uses Romanian regularly” (Grice et al. 2000:181). In this case, continuous use is specified, but not monolingualism.

- *Critical Period Acquisition*

For 12 Primary data sets, it was asserted that the target language had been learned during the Critical Period, or at least during childhood. For example, Rialland (2005:240) states that his subjects “used Silbo on a daily basis in their childhood and young adulthood.”

One problem with the numbers reported above is that they are all assertions: the authors asserted that their subjects were monolinguals, had continuously used their L1, and had acquired it in childhood. It was not explained *how* monolingualism, continuous use, and Critical Period acquisition were determined – whether through direct or indirect questions, or by some other means (e.g. assumed due to geographical location).

- *How many LOCUSes are there?*

However, the numbers given above refer to individual properties, not to subjects who meet all three criteria. So, how many of the subjects were actually LOCUSes: i.e. for how many subjects was monolingualism, continuous use, and Critical Period/childhood acquisition asserted?

In practice, being monolingual all but ensures continuous use and acquisition during the critical period. There were three cases where subjects were clearly (asserted to be) monolingual, mentioned above.

- *How many partial LOCUSes are there?*

It is reasonable to argue that the requirement on monolingualism could be relaxed somewhat, particularly if the speakers has one L1 and only learned other L2s later in life. For example,

Warner et al. (2001:400) report that their subjects “were raised in a monolingual Dutch environment within the Netherlands, and had acquired foreign languages only after childhood.”

Putting aside the monolingualism requirement, there was one dataset where it was implied that subjects had learned their L1 in the Critical Period and had continuously used it, and the subjects were not monolingual. Silva (2006) reported that his subjects were Korean speakers who also spoken English as an L2. However, they were “born, raised and educated in ... Korea.” implying Critical Period acquisition, and after entering the United States, they “used Korean at home”, implying continuous use (Silva 2006:291).

There were 24 other datasets where it might be reasonably inferred that the subjects had learned their L1 during the Critical Period and continuously used their language, though this was not stated outright. For example, Hayes & Londe (2006:71) report that they excluded subjects who “had not spoken Hungarian in childhood” (i.e. meeting the Critical Period requirement); they do not mention continuous use, however since their research on Hungarian was conducted in Hungary, it might be reasonably assumed that the subjects continuously used Hungarian (as long as they were not visiting from overseas).

To summarize, there were very few datasets whose subjects could be considered LOCUSES: 3 out of 104 Primary datasets (3%), or 1% of both Secondary and Primary datasets in the database.

Comparing LOCUSES to native speakers, for 76% of Primary datasets it was asserted that the subjects were ‘native speakers’. However, there are only 3 LOCUS datasets. This difference may be due to a conception of ‘native speaker’ that is not the same as a LOCUS. It is possible that some researchers consider a person a native speaker of a language if the person learned the language in childhood; they may not have used it since then. For example, Tucker & Warner

(2010) report for one of their datasets that the subject was a “native Romanian speaker” who “moved to the United States after completing high school” (p.304). However, there is no mention of the age of the speaker, and whether he had spoken Romanian regularly since moving to the United States.

3.5. Other Subject Properties

A variety of other information about datasets’ subjects was provided, and summarized in Figure 3.

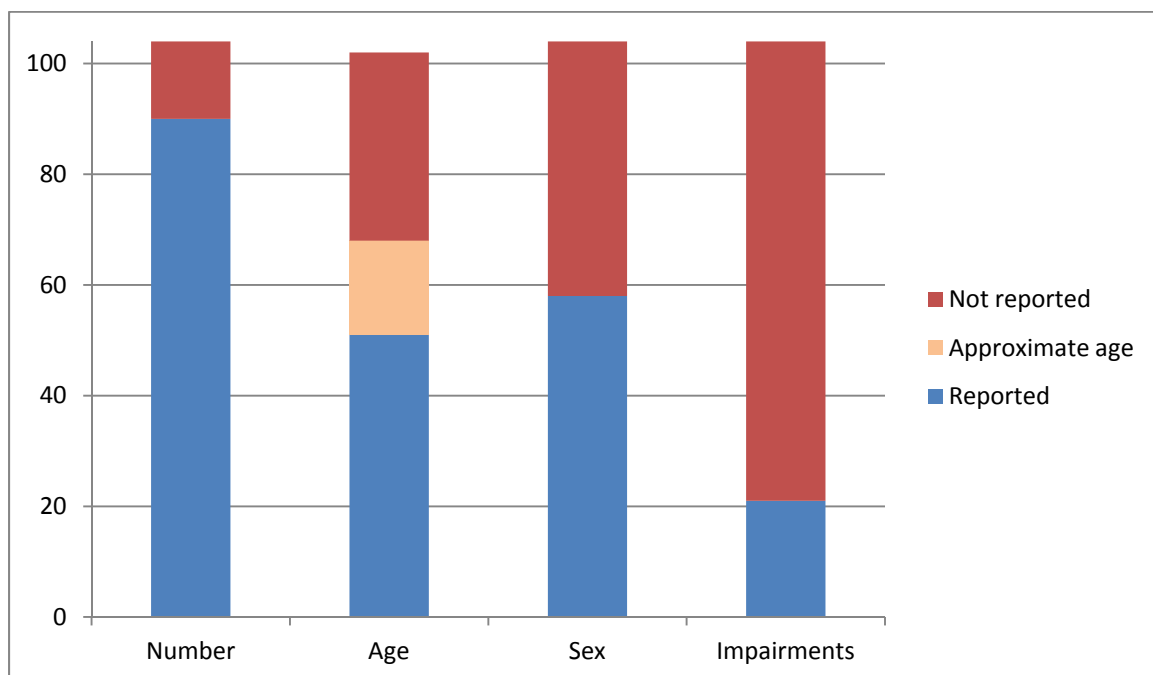


Figure 3. Other properties of datasets’ subjects

For 90 datasets (87%) there was explicit information about the number of subjects in the experiment/elicitation. For example, Jessen & Ringen (2002:198) state clearly: “Six native speakers of German were recorded digitally.” However, such information is not often as clearly stated. For example, McLaughlin (2000) does not state outright how many subjects produced the data cited. There is a footnote which might be used to infer that four speakers provided the data (though exactly who produced which form, and whether there was equal contribution is not recoverable):

“I thank Thérèse Diouf, Amadou Faye, El Hadji Arfang Diouf, and Tapha Diouf for providing me with the original reduplicative forms and for their grammaticality judgments...” (McLaughlin 2000:333)

For a minority of datasets, the number of subjects is not given. For example, Pearce (2006) cites data from Kera, and states “I wish to thank the Kera who enthusiastically provided recordings,” but gives no information on how many Kera there were.

Both sex and exact age are reported for about half of the Primary datasets. There is a close connection between the reporting of sex and age. If age was reported, then in all but two cases sex was also reported. For age, for 34 datasets the exact age was given, and for 17 there were age ranges or vague terms such as ‘adult’ and ‘undergraduate student’.

Finally, for 21 datasets there was some screening (or at least acknowledgement of the importance) of – speech, language, hearing, or vision impairments. For example, Yu (2007:194) reported that “None of [the subjects] reported any speech or hearing problems”, but does not provide information on what was asked, or whether there was any objective testing.

It is difficult to judge whether there is any connection between reporting age, sex, and impairments and reporting any LOCUS properties due to the fact that LOCUS properties are infrequently addressed explicitly. It is perhaps remarkable that age, sex, and impairments are mentioned so often, compared with Continuous Use and Critical Period criteria. It is possible that reporting sex, age, and impairments is considered generally good scientific practice, and so they are more naturally thought of. In comparison, monolingualism, continuous use and Critical Period acquisition are specific to linguistics, and so may be less likely to come to mind.

4. Case Studies

The previous section focused on the journal *Phonology*. This section examines a case which comes very close to explicitly addressing LOCUS criteria – Echeverría (1964). It also examines the LOCUS in textbooks about linguistic fieldwork (section 4.2).

4.1 Echeverría (1964)

A goal of the present study was to find a phonological description that addressed – or comes close to addressing – the LOCUS criteria.

Echeverría (1964) is a study of Araucanian phonology; the language is now called ‘Mapudungun.’ An extensive description of all of the speakers used in the study is provided (pp.19-20). He begins by generally asserting that all five speakers used were “bilingual native speakers.” He then goes on to provide evidence for the assertion by listing the qualities of each speaker. Listed qualities include age, place of birth, occupation, educational attainment, when the target language was first learned, and current residence including how long the speaker had been living there.

(5)

<i>Name</i>	<i>Monolingual</i>	<i>Continuous Use</i>	<i>Critical Period</i>
José	No	Unclear	Yes
Teresa	No	Yes	Yes
Juan	No	Yes	Yes
María	No	Yes	Yes
Lorenzo	No	Unclear	Yes

For continuous use, Teresa is reported to “speak Mapuche in her parent’s house,” and Juan “speaks Mapuche frequently.” No information is given for José and Lorenzo. For most, information about how long they have been living away from home is provided: for José it is 10 years, for Juan 28 years, for Lorenzo 30 years, while María “lives in Concepción temporarily.”

For the critical period, we are told that four of the speakers learned the language as a child (“Aprendió la lengua desde niño/niña”).

Of the articles I consulted, Echeverría (1964) is rare in discussing crucial LOCUS criteria so clearly and systematically. Certainly, the speakers do not fit the LOCUS criteria perfectly (e.g. none were monolingual); however, the criteria were at least addressed.

Interestingly, it seems that Echeverría’s criteria may not have been adequate. He reports that José’s data was ultimately rejected because he repeatedly failed to know words and had an inconsistent pronunciation. It is possible that José may not have learned Mapudungun as his primary native language, even though he learned it as a child.

4.2 Fieldwork textbooks

The goal of this section is to compare the LOCUS concept to requirements on language consultants found in fieldwork textbooks. The discussion focuses on one older work – Samarin (1967) – and three very recent ones: Bowern (2008), Cheliah & de Reuse (2011), and Crowley (2007). I show that there are a variety of conceptions of the ideal consultant, and not all correspond well to the LOCUS.

4.2.1 Evolving Terminology

Current fieldwork lacks a universally accepted terminology with which to define participating speakers. An ‘informant,’ as defined by Samarin (1967), is “someone who provides samples of what has been said or what can be said in their language” (Samarin 1967:20). The term informant became synonymous with the now most commonly used term ‘consultant’, because ‘informant’ was felt to reduce the speaker to a mechanism that was only necessary for producing data, and ‘consultant’ is felt to imply a more active role of the native speaker in the fieldwork (Rice 2006 in Cheliah and de Reuse 2011). For Cheliah and de Reuse (2011), ‘native speaker’ has a positive connotation as one who “hold[s] the key to the structure of the target language in their linguistic competence,” and “contributes a narrative to the corpus...comments on linguistic analysis, or co-authors an article with the fieldworker”(Cheliah and de Reuse 2011:165-168). Being labeled with native speaker status seems to provide some consultants with honor and sense of importance to the research. In contrast, Crowley (2007:86) uses ‘language-helper’ to refer to the same concept; the language-helper is “somebody who provides native-speaker judgments.”

4.2.2 No universal definition

Even though fieldwork textbooks and related work refer to the ‘native speaker,’ and properties of the ‘consultant’, there is explicit and implicit acknowledgment that there is no universal agreement about the term ‘native speaker’ (Paikeday 1985). In some cases, it seems to be a relative term that relies on the opposite concept of ‘non-native speaker’. However, there are some common themes: in addition to having acquired one’s language in childhood, a native speaker should possess intuitions about his or her language, and is able to speak, read, write, and

translate fluently (Davies 1991, 2003, 2010:5-6). This definition includes a pragmatic component to native speaker status. Davies (1991) states, “I believe that native speaker membership is largely a matter of self-ascription, not of something being ‘given...’ we should bear in mind, however, that such a choice carries responsibilities in terms of confidence and identity” (Davies 1991:8). This aspect of native speaker suggests that one gets to assert one’s own native speaker status through personal choice, but must do so responsibly by making an accurate assertion.

It is worth noting the distinction between “native native-speaker” and the “linguist native-speaker.” The native native-speaker is simply a native speaker of the language who is not trained as a linguist. The linguist native-speaker is a trained linguist who is carrying out documentation and description of his/her own native language (Ehlich 1981: 154, cited in Chelliah and de Reuse 2011:186). This may be the case when authors use their own intuitions about a language they are describing. When the author does not provide speaker information for him/herself, it is unclear under which category, native native-speaker or linguist native-speaker, the author falls. The linguist native-speaker is at risk for providing limited information to support the point of the research. He or she may be unable to provide unbiased information.

This frustration is exhibited in Paikeday (1985). In a roundtable-style discussion including Chomsky and other linguists, philosophers, psychologists, and lexicographers, the concept of native speaker is discussed. Professor J. Edward Gates of Indiana State University suggested that a native speaker is “one who speaks a language as his/her mother tongue” (Paikeday 1985:1). In this case, native speaker status is determined at birth. One is born into a language environment, and the language spoken in that environment is the one that is native. However, this definition is insufficient for multilingual speakers who may exhibit module interference, and for speakers who do not have continuous use of their original language.

Paikeday offers two definitions that encompass two “senses” of the native speaker. The first is “a person who has a specified language as the mother tongue or first-learned language.” This alludes to the importance of critical period. The second definition is “one who is a competent speaker of a specified language and who uses it idiomatically” (Paikeday 1985:9-10). He later rejects the idea of native intuitions and suggests that those feelings or intuitions are just a result of habit and not of nativity. Continuous use can be implied from the second definition in the sense that if a language is not continuously used, one cannot develop intuitions. Intuitions result from habitually use of a language (1985:14). David Guralnik, Editor in Chief of Webster’s New World Dictionaries, recalls a personal narrative to highlight the importance of continuous use. He recalled:

“[I’m reminded] of an army buddy. Born in Switzerland and perfectly bilingual in French and German, he came to the U.S. at the age of seventeen, with no more than a year or two of high-school English. When I met him, he was 23 or 24, and I knew him for nearly a year before I learned that he was not born here. I would have defied any linguist to discover from his speech that he was not a native” (Paikeday 1985:18).

Therefore, native speaker cannot just be defined based on one’s mother tongue. Paikeday’s discussion highlights the arbitrariness of the usage of ‘native speaker.’

4.2.3 Optimal consultants and the LOCUS

Fieldwork textbooks can include explicit discussion of the properties of ideal language consultants. For example, from Balmer (1981:63-64):

(6) *Ideal language consultant properties (Ballmer 1981:63-4)*

1. Producer: conceptualizes and articulates expressions of language
2. Analyzer: hears, understands, and processes expressions of a spoken language
3. Learning environment with respect to target language: primary socialization in target language
4. Age: adult, not a child or senile person
5. Health: receptors (eyes, ears, brain) and effectors (brain tongue, mouth) all operating normally
6. Intelligence: at least medium
7. Physical defects: should not exhibit a lisp or stutter
8. Linguistically proficient: can produce syntactically well-formed utterances that are semantically meaningful, pragmatically adequate, and textually coherent
9. Language competence: preferably monolingual
10. Linguistic environment: birth place, residence, and working place of the native speaker preferably in language community
11. Linguistic education: native speaker should preferably not be a writer, poet, literary critic, or linguist, but a normal language user
12. Performance abilities: a good communicator but not a professional performer
13. Intuitions: well-working
14. Introspection: does not need to offer grammatical judgments
15. Argumentation abilities: well-working
16. Theoretical abilities: not needed.

Ballmer's concern is to identify a wide range of properties of an optimal research participant, so his requirements go far beyond the concerns of this thesis. Ballmer's list ranges from language-specific (e.g. #8) to general cognitive abilities (e.g. #6) and physical characteristics (e.g. #5).

Many of the properties relate to impairments, whether articulatory, perceptual, or cognitive. Features #1 and #2 suggest that the speaker must not have any physical impairments: he or she must be able to produce and perceive language. (The implication of #2 is that the criteria apply to spoken language, not other modalities – e.g. signed languages). Feature #4 excludes children and elderly, presumably for cognitive reasons. Like feature (4), Features (5),

(6), (7), (8), (12), (13), (14), (15), and (16) are characteristics that would disqualify individuals from being ideal research candidates, but not necessarily discount them as native speakers. Features (10) and (11) provide crucial insight into reducing the risk of exposure to various dialects and/or languages other than the L1.

Focusing on the features relevant to this thesis, feature #3 is somewhat related to the critical period requirement, though it is not an identical requirement. Feature #9 mentions monolingualism, though as a preference, not as a requirement. Feature #10 can be construed as relating to the ‘continuous use’ criterion – if a person is in their language community, then presumably they are using their language frequently.

In short, many of Ballmer’s desiderata approximate the key properties of the LOCUS. However, the requirements are not *identical* to the ones identified here. I will now address each of the LOCUS properties in turn, and relate them to requirements in fieldwork textbooks.

4.2.3.1 Monolingualism

Chelliah and de Reuse (2011) points to the importance of monolingualism in order to eliminate the risk of intermodular interference. In a research scenario, “when listening to Lamkang speakers, I [Chelliah] hear them freely code switch and code mix between Lamkang, Manipuri, Hindi, and English” (Chelliah and de Reuse 2011:178). In some cases, multilingual speakers may use a particular language depending on the social situation. In such cases, it is difficult to determine if the speakers are equally proficient, or native-like, in all the languages.

An additional risk associated with multilingual’s is that of “language contact influence... Scollon (1979:3-5), for example, describes a situation with the Chipewyan at Fort Chipewyan who speak Cree, Chipewyan, English, and French, where the phonology of these four languages

is converging” (Chelliah and de Reuse 2011:178). In this scenario, not only are lexical items interchanged, but the various phonologies intertwine as well.

In short, from the LOCUS point of view, because finding perfectly equal balanced bilinguals or multilinguals is extremely rare and hard to determine, it is best to discard multilingual speakers as ideal native speakers of a single language. It is possible that this will discard perfectly good subject, but it will assure that no inappropriate speakers make it through the screening processes.

However, Bower (2008) rejects the monolingualism criterion: for her, the ideal consultant for research purposes is a bilingual native speaker of the target language and fluent in the contact language. Bower’s rejection of the monolingual criterion seems to follow for practical reasons: having a bilingual speaker allows the researcher to converse directly with the native speaker. With a monolingual speaker, if the researcher does not speak the target language, s/he must work through an intermediary.

So, the monolingual criterion makes elicitation more complex (when the researcher does not speak the target language). However, the consequence of relaxing it is make elicitation more complex in another way: code switching and code mixing must be strictly controlled in any elicitation. For bilinguals and multilinguals, such control might be impossible, particularly in a conversational situation.

4.2.3.2 Critical period

For Davies (2010), acquisition in the critical period is the crucial characteristic for a native speaker: a native speaker is “one who has early acquired the language” (Davies 2010:8).

One member of Paikeday's discussion, referred to as Doctor A, suggests that native speakerhood can be determined "By simply questioning speakers about their origins. Thus, the language I learned from parents, siblings, servants, in the school, etc. was English, so I'm a native speaker of a variety thereof" (Paikeday 1985:17). In this sense, native speaker status is a product of one's history, and the learning of a particular language as a child.

4.2.3.3 Continuous Use

One cannot only use the critical period criterion as the sole defining quality of a native speaker. If native is defined by the early age at which the language is acquired, "a native speaker is not always the best choice for a field consultant because even though the speaker may have learned the target language in childhood, that variety might become underused and forgotten by adulthood" (Davies 1944:2722). In Paikeday (1985:20), Victoria Fromkin is reported as defining the native speaker as "someone whose first language is the one being referred to and who has continued to use this language. It is also sometimes used for a person who has learned the language in question before the completion of the critical age for language acquisition" (Paikeday 1985: 20). This definition encompasses the criteria of both critical period and continuous use, but does not consider issues of bilingualism.

Bowern (2008) addresses the issue of continuous use. When full native speakers are unavailable, Bowern (2008:130-138) suggests that researchers may use semi-speakers (also called part-speakers or passive speakers). Semi-speakers are not fluent and may be so due to prolonged absence from home due to education or work, or growing up in an area with a dying language. These speakers may be used to record dying languages or when multiple speakers are unavailable.

The problem, of course, is that these criteria may not ensure an appropriate quality of data. As Bowerman (2008:138) observes, semi-speakers “often increase in fluency as work progresses.” The implication of this statement for the phonological module is difficult to evaluate simply because we do not know at what point of fluency the speaker is using only his/her L1 phonological module in generating outputs. As with the Mbabaram speaker in Dixon (1991) (see section 2.2.1 above), continuous use is critical to obtaining reliable evidence.

Holding to the continuous use criterion has the implication that any severely moribund language is probably lost to Generative phonology: if no speaker has continuously used it, then it is unclear whether their outputs are a true reflection of their L1 phonological module.

4.2.3.4 Techniques

In general, the textbooks consulted were not particularly specific about techniques that could be used to determine consultant properties.

Crowley (2007) suggests finding a speaker of the target language, asking them to participate, and letting the individual judge whether or not they feel comfortable providing native speaker judgments. This approach places a great deal of trust in the consultant.

Samarin (1967) suggests asking the community to agree upon good informants to participate. Good informants, in this case, “must first of all have enough time to more or less regularly meet with the field worker. He must also be a good speaker of the language” (Samarin 1967:24). This approach does not screen for ideal speakers, but rather the most convenient informant.

Alternative techniques are to ask both direct and indirect questions. For example, Hayes and Londe (2006) selected native speakers by administering a questionnaire design to exclude non-native speakers. The questionnaire inquired directly by asking the subject to self-report if he/she was a native speaker of Hungarian, the target language of the research. Native speaker status was also questioned indirectly by asking if the subject spoke Hungarian in childhood, an effort to inquire about having learned the L1 in the critical period. With this direct/indirect technique, the researcher is able to assert that he used native speakers, and prove the assertion by showing that he excluded any subjects who self-reported to not be native speakers.

5. Conclusions

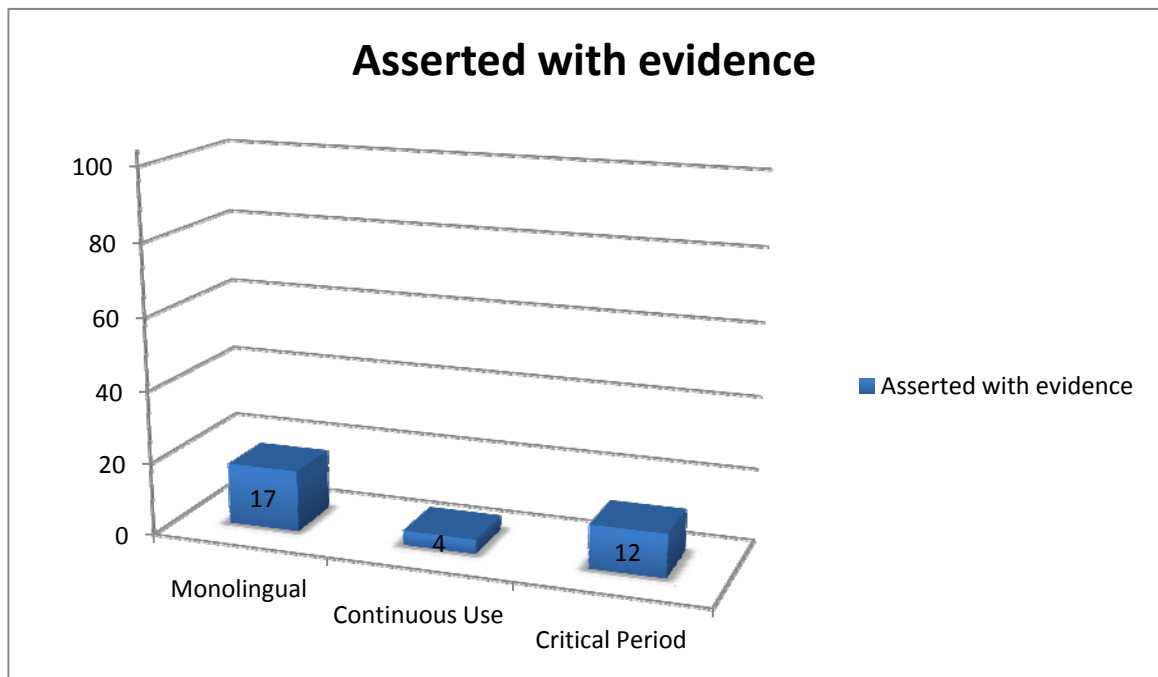
For Generative phonologists, the ideal research subject is Chomsky's ideal speaker-listener, one who is "in a completely homogenous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors (random or characteristic)" (Chomsky 1965:3-4). Only data elicited from a speaker in this situation void of Performance limitations will reflect true linguistic Competence. However, the ideal speaker only exists in a fictional situation. Therefore, one must strive to find the 'optimal' speaker-hearer –one who is as close as possible to the ideal by being least affected by Performance confounds. That optimal speaker, the LOCUS, has three defining characteristics: a single phonological module, acquired in the Critical Period, and not undergone attrition. In terms of methodology, this means that potential subjects must ideally be monolingual (and ideally monodialectal, with speech style controlled), and if not have at least learned their L1 during the critical period, and use their L1 continually. Such a person was called the 'LOCUS.'

The optimal speaker, the LOCUS, is discoverable by screening for the mentioned three characteristics. However, the overwhelming majority of current research does not systematically evaluate subjects for the necessary qualities of an optimal speaker. A review of research articles in the journal *Phonology* over the past 13 years revealed that very few of the datasets were explicitly claimed to come from a LOCUS: specifically, 3 out of 424 (0.7%).

A common concept is 'native speaker,' mentioned in over 90% of Primary datasets. However, this concept is rarely defined; in some cases it seems to be similar to the LOCUS, and in others less so. 10% of Primary datasets included some evidence for assertions involving

native speakers. Evidence included information about whether or not the speakers were monolingual, had learned the L1 in the critical period, and/or had continuous use of the L1. However, in the majority of cases, researchers will state that native speakers were consulted, but will not prove that these speakers were in fact true native speakers, or at least that they had properties that Generative theory requires.

When providing evidence for native speaker status, the most common practice was to indicate whether or not the subjects were monolingual., although in only three cases were the speakers actually monolingual. The least common criterion to address was the Critical Period. Cases where all three criteria were addressed were extremely rare (e.g. Silva 2006, Walker et al 2008).



LOCUS criteria in the journal *Phonology*: Primary datasets only (104 total)

22 out of the 104 primary datapoints (21%) provided at least one point of evidence for assertions (either 1, 2 or 3 of the criteria): 17 addressed monolingualism, 4 addressed continuous use, and 12 addressed the critical period. However, while datasets may have addressed these factors, they did not necessarily prefer monolinguals, those who had learned their L1 early, and continuously used it.

Apart from *Phonology*, popular and recent fieldwork textbooks do not clearly advocate eliciting data from LOCUS speakers. They instead recommend selecting speakers based on practical issues such as availability and convenience to the researcher (i.e. Samarin 1967).

Without being sure of the source of data, it is not possible to confidently assert that it appropriately reflects Phonological module capabilities. If controllable Performance factors have not been eliminated as potential confounds, it is unclear whether data reported reflects Performance, or Competence. If data is not carefully controlled for source, speech or grammaticality judgments may be generated by several different Phonological modules, resulting in a set of data that does not give any insight into the Competence mechanisms of any individual Phonological module.

In other words, the value of a significant amount of the data presented as evidence for the Phonological module may be questionable. Currently, in *Phonology*, most subject information is drawn from implications made by the reader. As discussed in section 3.2.5, a number of questions arise due to lack of subject information.

Questioning the validity of the data does not necessarily question theories. ‘Theories rise and fall on evidence,’ and what this work has shown is that the source of the evidence is of questionable relevance.

An important point is that many of the ‘native speaker’ concepts mentioned in *Phonology* seem to accord quite closely with LOCUS requirements. So, it may be a very small step to gaining acceptance of the importance of using LOCUS subjects. In fact, it is possible that many researchers take great care to control their subjects’ properties, but simply do not report it. The next step is to develop cross-field standards for determining and reporting subject properties.

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