Are signed languages "real" languages?
Evidence from American Sign Language and Langue des Signes Québécoise
Reprinted from

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Preamble

In the Fall of 1993, a Mr. Gilles Read sent me a letter. Mr. Read is the General Manager of the Montreal Metropolitan Deaf Community Center. He wrote to me seeking a document that addressed the question of whether signed languages were "real" languages. At the time, I was surprised to discover that there did not exist a document that simply and directly asked and answered his question, especially in one single source. Therefore, I wrote Mr. Read a letter, of which an expanded version appears below. To be sure, I could not possibly have summarized for Mr. Read all studies of signed languages to date, as fortunately thousands now exist. Nor was it possible to summarize the many important studies of signed languages that have been undertaken outside of North America. Indeed, Mr. Read was preparing to attend meetings in the Provincial government of Québec and he needed a document that specifically addressed the linguistic status of the two main signed languages used in these regions, in particular American Sign Language (ASL) and Langue des Signes Québécoise (LSQ). Thus, my goal was to draw together the disparate studies on signed languages that have been conducted in a very clear way, and to show how they bear on the critical question, "are signed languages 'real' languages?" Although the examples are drawn from studies of ASL and LSQ, the general structure of the arguments presented here are applicable to arguments for the "real language" status of other natural signed languages around the world.

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I. Introduction

This paper summarizes over thirty years of scientific research, which, in one form or another, addresses the following question: *Are the natural signed languages that are used by many deaf persons throughout the world "real" languages?* Below I demonstrate that signed languages are indeed "real" languages. I do so by drawing evidence from three categories of scientific research, including (i) Linguistic analyses of natural signed languages, (ii) Sociolinguistic analyses of natural signed languages, and, crucially, (iii) Biological analyses of the status of natural signed languages in the human brain.

1.1. "REAL" SIGNED LANGUAGES VERSUS INVENTED CODES

My discussion here concerns the linguistic, social, and biological status of the world's natural signed *languages*, rather than the invented sign-based *codes* that are often used in classrooms with deaf students as a teaching tool, such as, in Québec, "Seeing Essential English" ("S.E.E.") in the English schools, and "Française Signée ("F.S.") in the French schools. There is general scientific agreement about the status of these invented sign-based codes: *Invented sign-based codes that are used as a pedagogic tool with deaf pupils are not "real" or natural languages*. Instead, (i) they are artificially-invented teaching devices that are not used spontaneously by any native Deaf community anywhere in the world, (ii) they are not passed down from generation to generation of Deaf people, (iii) they do not delineate Deaf cultural communities, and (iv) they are "hybrids," amalgams of parts of spoken language structure and parts of signed language structure that do not possess the full grammar of either of the two languages from which they were drawn (e.g., Marmor & Petitto, 1979; Supalla, 1986). In the following text, therefore, my discussion will focus on the scientific investigations of natural signed languages--such as American Sign Language and Langue des Signes Québécoise, addressing each of the above three categories of scientific research in turn.

2. Natural Signed Languages are "Real" Languages: The Research Evidence

2.1. LINGUISTIC ANALYSES OF NATURAL SIGNED LANGUAGES

Intensive linguistic research over the past three decades on the natural signed languages of the world has revealed that they demonstrate the identical linguistic properties common to the world's spoken languages. Like spoken languages, signed languages have evolved naturally. Contrary to a widely held misconception, no person (hearing or deaf) actually invented any of the world's signed languages. Like spoken languages, natural signed languages are passed down from one generation of language users to another, and the people who use particular signed languages constitute distinct social and cultural groups. Moreover, signed languages are non-universal, that is, there is no single signed language used by all Deaf people around the world, and non-concrete, that is, they are *not* made up of "concrete pictures, " mime, or "gestures in the air." Natural signed languages have the full abstract and expressive capacity, as well as the strict grammatical regularities, of all spoken languages.

For example, linguistic analyses of American Sign Language (ASL), a naturally-evolved language that is used by many Deaf persons in the United States and parts of Canada, have revealed that it exhibits grammatical organization at the same three levels found in spoken language. These include (1) a sub-lexical level of structuring internal to the sign, identical to the phonetic, phonemic, and syllabic levels of language organization (e.g., Battison, 1978; Bellugi, 1980; Brentari, 1989, 1990; Coulter, 1986; Lane & Grosjean, 1980; Liddell, 1990; Liddell & Johnson, 1989; Padden & Perlmutter, 1987; Perlmutter, 1989, 1991; Sandler, 1986; Stokoe, 1960), (2) a level that specifies the precise ways that meaningful units are bound together to form complex signs and signs to form sentences, identical to the morphological and syntactic levels of language organization (e.g., Baker-Shenk, 1983; Fischer & Siple, 1990; Klima & Bellugi, 1979; Liddell, 1978; Padden, 1981; Supalla, 1982), and (3) a level that specifies the precise ways that sentences are joined into conversational patterns, identical to the discourse and pragmatic levels of language organization (e.g., Wilbur & Petitto, 1981, 1983).

Scientific study of the structure and grammar of the other signed languages used throughout the world have revealed that they, too, demonstrate the identical linguistic properties found in both ASL and in spoken language. For example, studies of *Langue des Signes Québécoise (LSQ)*, the signed language used in Québec and elsewhere in Canada by culturally French Deaf persons, have revealed that it is a fully autonomous natural language with a unique etymology (history of the derivation of its signs): It is a grammatically distinct language from ASL and it is a grammatically distinct language from the signed language used in France. Indeed, LSQ is a complete and richly complex language. It has "phonological," morphological, syntactic, discourse, pragmatic, and semantic structures that are entirely equal in complexity and richness to that which is found in any spoken (or signed) language (e.g., Petitto, 1987b&c; Petitto & Charron, 1988; Petitto, Charron, & Briére, 1990; see also Brentari, 1991; Lacerte, 1991; Miller, 1991).

Taken together, the scientific study of the linguistic status of signed languages has demonstrated that complete human languages are *not* restricted to the speech channel. Signed languages possess all of the linguistic features that have been identified as being the essential, universal features of the world's spoken languages.

2.2. SOCIOLINGUISTIC ANALYSES OF NATURAL SIGNED LANGUAGES

Sociolinguistic studies have been conducted that examine the social and cultural conditions under which natural signed languages are used. These studies have revealed that signed languages exhibit the identical sociolinguistic patterns observed in spoken languages. Like spoken languages, signed languages undergo change over time, and they demonstrate the same types of historical change that are seen in spoken languages. For example, signed languages exhibit the same processes of expanding their lexicons (the set of words or signs in a language) through sign borrowings, loan signs, and compounding (e.g., see Battison, 1978; Klima & Bellugi, 1979; Woodward, 1976; Woodward & Erting, 1975). As is common among users of a particular spoken language (e.g., English, French), signed language users *within* distinct signed language communities (e.g., ASL or LSQ communities) demonstrate regional accents in their signing, lexical (=sign) variation depending on socio-economic status, and lexical variation depending on the language user's age, sex, and educational background (e.g., Battison, 1978). Further, users of distinct signed languages abide by language-specific (tacit) rules of politeness, turn-taking, and other discourse (conversational) patterns found in spoken languages (e.g., Hall, 1983; Wilbur & Petitto, 1981, 1983).

As can be seen with users of particular spoken languages, users of *particular* signed languages often share beliefs, attitudes, and customs with others who use the same language, binding them into a distinct cultural group--one that is

not simply the signed version (or Deaf translation) of the majority spoken culture within which they reside (e.g., Hall, 1989; Lane, 1989; Padden & Humphries, 1988; Rutherford, 1988). In Canada, for example, the ASL and the LSQ signed language communities, respectively, are bound by a distinct collection of beliefs and attitudes that are expressed in a variety of ways. These include, for example, (a) the existence of poetry in ASL or in LSQ, (b) humor and jokes in ASL or in LSQ, (c) indigenous artistic expression through theatre and dance in ASL or in LSQ, (d) indigenous meeting customs and traditions (e.g., witness the many Deaf social clubs in the ASL or the LSQ community, as well as in the other signed language communities throughout the world), (e) Deaf religious organizations in ASL or in LSQ, (f) Deaf sports events in ASL or in LSQ, (g) Deaf newspapers and other publications for the ASL or the LSQ communities, and so forth.

In summary, sociolinguistic studies of natural signed languages have determined that they demonstrate strikingly similar patterns of change, variation, and social and cultural use that are common to the world's spoken languages.

2.3. BIOLOGICAL ANALYSES OF THE STATUS OF NATURAL SIGNED LANGUAGES IN THE HUMAN BRAIN

Though there is now wider acceptance that signed languages are "real" languages based on linguistic and socio-cultural grounds, a persistent and powerful misconception remains. The misconception can be summarized as follows: "Spoken language is fundamentally ëbetterí than signed language; sign is 'inferior' ('secondary') to speech.î The notion that signed languages are ìrealî languages, but somehow "inferior" or ìlowerî than the ìhigherî status spoken languages, is reminiscent of the late 19th century division of spoken languages into "high" and "low" languages. (Here, languages deemed "high" were those used in Western Europe, and "lowî or "primitive" languages were those used elsewhere by aboriginal peoples.) Though subsequent scientific studies have shown that the ìhigh-lowî classification of spoken languages is wholly fallacious, similar attitudes regarding spoken versus signed languages have not been subject to the same sorts of scientific scrutiny.

The above view about signed languages runs especially deep *because* it invokes biology. At the heart of the misconception is the notion that signed languages are *biologically* inferior to spoken languages. Why is this so? The answer involves a three-tiered set of related assumptions: First, a common quip is "most people speak, so speaking must be better." I call this the "more is better" assumption. Second, drawing from the observation that "most people speak," people have further assumed that this must "prove" that speech, alone, has been selected for over the development or evolution of the species (or, in "phylogeny"). Third, the assumption that speech has been selected for over human evolution, has implicitly been used to support the core, critical assumption about the biological foundations of human language: the brain must be neurologically set for speech early in the developmental history of individual human organisms (or, in "ontogeny").

This third assumption has generally been regarded as being true because of the remarkable regularities observed in very early spoken language acquisition. Noting such universal regularities in, for example, the *timing* of the onset of speaking children's early vocal babbling and first words, researchers have concluded that the brain and its' maturation must be attuned to perceiving and producing *spoken* language input (per se) in early life. To be sure, a typical answer to the question "how does early human language acquisition begin?" is that it is the result of, and wholly determined by, the development of the *anatomy of the vocal tract* and the neuroanatomical and neurophysiological mechanisms involved in the *motor control of speech production* (e.g., Locke, 1983; MacNeilage & Davis, 1990; MacNeilage, Studdert-Kennedy, & Lindblom, 1985; van der Stelt & Koopmans-van Beinum, 1986). An implicit *assumption* that underlies such views is that spoken languages are better suited to the brain's maturational needs in development. Put another way, the view of human biology that underlies the prevailing third assumption is that the human brain is "hardwired" for speech and that speech is "special" or "privileged." On this view of the brain, then, signed languages can only be regarded as being "*biologically*" inferior to (or "lower" than) spoken languages. By extension, many educators and researchers, alike, have assumed that speech is better in order to achieve "normal" language acquisition.

2.3.1. Is there any evidence in support of the alleged "inferior" biological status of signed languages?: Surprisingly, with the exception of the studies reported below, the critical studies required to evaluate the above assumptions have *not* been conducted. As noted above, most all contemporary answers to questions about the biological foundation of language have been based on the core assumption that very early language acquisition is tied to speech. There is, however, a fatal flaw with this assumption: Given that only languages utilizing the speech modality are studied, it is in principle, *a priori*, impossible to find data that would do anything but support this hypothesis. Only when a modality

other than speech is analyzed can any generalization about the brain's predisposition for speech be evaluated, and, therefore, whether signed languages have the same or different status in the human brain.

2.3.2. The critical ontogenetic evidence regarding the biological status of natural signed languages: Over the past 12 years, research in my own laboratory has been directed at understanding the biological foundations of human language. My central aim has been to discover the specific biological and environmental factors that together permit early language acquisition to begin in our species.

Studies of very early signed language acquisition offer an especially clear window into the biological foundations of all of human language (be it spoken or signed), as well as its biological status in the brain. Spoken and signed languages utilize different perceptual modalities (sound versus sight), and the motor control of the tongue and hands are subserved by different neural substrates in the brain. Comparative analyses of these languages, then, provide key insights into the specific neural architecture that determines early human language acquisition in our species. If, as has been argued, very early human language acquisition is under the exclusive control of the maturation of the mechanisms for speech production and/or speech perception, then spoken and signed languages should be acquired in radically different ways. At the very least, fundamental differences in the *time course* and nature of spoken versus signed language acquisition would suggest that each may be processed and represented in different ways, presumably due to their differing biological status in the human brain.

To investigate these issues, I have conducted numerous comparative studies of children acquiring spoken languages (English or French) and children acquiring signed languages (American Sign Language or Langue des Signes Québécoise), ages birth through 36 months.

The empirical findings from my cross-linguistic and cross-modal studies are clear:

(i) *Deaf* children who are exposed to signed languages from birth, acquire these languages on an identical maturational time course as hearing children acquire spoken languages. Deaf children acquiring signed languages from birth do so without any modification, loss, or delay to the timing, content, and maturational course associated with reaching all linguistic milestones observed in spoken language. Beginning at birth, and continuing through age 3 and beyond, speaking and signing children exhibit the identical stages of language acquisition. These include the (a) *"syllabic babbling stage"* (7-10 months, approx.) as well as other developments in babbling (e.g., "variegated babbling," ages 10-12 months, and "jargon babbling," ages 12 months and beyond; Petitto, 1984, 1987a&b; Petitto & Marentette, 1991a), (b) *"first word stage"* (11-14 months, approx.; e.g., Petitto, 1985, 1986, 1988, 1992, 1993b; Petitto & Marentette, 1991b; Petitto, Costopoulos, & Stevens, in preparation), and (c)*"first two-word stage"* (16-22 months, approx.; Petitto, 1987a; Petitto & Marentette, 1991b). Though some researchers have claimed that "first signs" are acquired earlier than "first words," subsequent analyses have revealed that the claim is wholly unfounded1.

Surprising similarities are also observed in deaf and hearing children's timing onset and use of gestures. Signing and speaking children produce strikingly similar pre-linguistic (9-12 months) and post-linguistic communicative gestures (12-48 months; e.g., Petitto, 1984, 1987a, 1992). They do not produce more (or more elaborate) gestures, even though linguistic "signs" (identical to the "word") and communicative gestures reside in the same modality, and even though some signs and gestures are formationally and referentially similar. Instead, deaf children consistently differentiate linguistic signs from communicative gestures throughout development, acquiring and using each in the same ways observed in hearing children (see Petitto, 1992).

Signing children exhibit highly similar patterns of later grammatical development as well (ages 22-36 months, approx., and beyond), including systematic morphological and syntactic developments (e.g., "over-regularizations," negation, question formation, and so forth; e.g., Petitto, 1984, 1987a; see also Newport & Meier, 1985).

Throughout development, signing and speaking children exhibit remarkably similar complexity in their utterances. For example, analyses of young ASL and LSQ children's social and conversational patterns of language use over time, as well as the types of things that they "talk" about over time (its' semantic and conceptual content, categories, and referential scope), have demonstrated unequivocally that their language acquisition follows the identical path as is observed in age-matched hearing children acquiring spoken language (Charron & Petitto, 1991; Petitto, 1992; Petitto & Charron, 1988).

(ii) *Hearing* children exposed to *both* signed and spoken languages from birth (e.g., one parent signs and the other parent speaks) demonstrate no preference for speech whatsoever, even though they can hear. Instead, they acquire both the signed and the spoken language to which they are being exposed on an identical maturational timetable (the timing of the onset of all linguistic milestones occurs at the same time in both the signed and spoken modalities). In addition, such children acquire the signed and spoken languages to which they are being exposed (e.g., ASL and English, or, LSQ and French) in the same manner that other children acquire two different spoken languages from birth in a "bilingual" home, for example, one with spoken French and spoken English (Petitto, 1985, 1986, 1993b; see especially, Petitto, 1993a, and Petitto, Costopoulos, & Stevens, in preparation).

(iii) *Hearing* children who are exposed *exclusively* to signed languages from birth through early childhood (i.e., they receive little or no systematic spoken language input whatsoever), achieve each and every linguistic milestone (manual babbling, "first signs," "first two-signs," and so forth) in signed language on the identical time course as has been observed for hearing children acquiring spoken language and deaf children acquiring signed language. Thus, entirely normal language acquisition occurred in these hearing children (a) *without* the use of auditory and speech perception mechanisms, and (b) *without* the use of the motoric mechanisms for the production of speech (Petitto, a&b; Petitto, Costopoulos, & Stevens, in preparation).

2.3.3. Significance of biological studies of early signed and spoken language acquisition: Despite the modality differences, signed and spoken languages are acquired in virtually identical ways. The differences that were observed between children acquiring a signed language versus children acquiring a spoken language were no greater than the differences observed between hearing children learning one spoken language, say, French, versus another, say, Finnish.

Such findings cast serious doubt on the core hypothesis in very early spoken language acquisition: that the maturation of the mechanisms for the production and/or perception of speech, exclusively determines the time course and content of early human language acquisition. These findings further challenge the hypothesis that speech (and sound) is critical to normal language acquisition, and they challenge the related hypothesis that speech is uniquely suited to the brain's maturational needs in language ontogeny.

If speech, alone, were neurologically set or "privileged" in early brain development, then, for example, the hearing infants exposed to both speech and sign from birth might be expected to attempt to glean every morsel of speech that they could get from their environment. Faced implicitly with a "choice" between speech and sign, the very young hearing infant in this context might be expected to turn away from the sign input, favoring instead the speech input, and thereby acquire signs differently (e.g., later). Simlarly, deaf *and* hearing infants exposed only to signed languages from birth should have demonstrated grossly abnormal patterns of language acquisition. None of this happened.

What is most interesting about these research findings is that the modality "switch" can be "thrown" *after* birth regarding whether a child acquires language on the hands or the language on the tongue. Such findings have led me to propose a new way to construe human language ontogeny (see especially Petitto, 1993a&b). Speech and sound are *not* critical to human language acquisition. Instead, there appears to be a stunning, biologically-based *equipotentiality* of the modalities (spoken and signed) to receive and produce natural language in ontogeny (Petitto, 1994).

The only way that signed and spoken languages could be acquired with such startling similarity, is if the brain's of *all* newborns possess a mechanism that is sensitive to aspects of the structural regularities of natural language, irrespective of the input modality. Rather than being exclusively "hardwired" for *speech* or sound, our species appears to "hardwired" to detect aspects of the patterning of *language* (specifically, aspects of its structural and prosodic regularies; see Petitto, 1993a&b). If the environmental input contains the requisite patterns unique to natural language, human infants will attempt to produce and to acquire those patterns, irrespective of whether the input is signed or spoken. (For a discussion of the specific neural substrates that underlie this capacity in ontogeny, as well as their possible roots in phylogeny, see especially Petitto, 1993a&b.)

In summary, the present findings prove wholly false assumptions about the "biological inferiority" of signed languages relative to spoken languages. Signed and spoken languages are acquired in the same ways, and on the same maturational time course. With regard to the brain and human biology, this indicates that signed and spoken languages

engage the *same* brain-based mechanisms in very early language acquisition.

3. Conclusion: Are Signed Languages Real Languages?

Results from studies of early language acquisition provide especially strong evidence relevant to assessing whether signed languages are real languages. Here we see clearly that the prevailing assumption about the biological foundations of human language--indeed, the very assumption upon which notions of the alleged biological superiority of speech over sign rests--is *not* supported when the relevant studies are conducted. Specifically, *no* evidence was found that the newborn brain is neurologically set exclusively for speech in early language ontogeny. *No* evidence was found that speech is biologically more "special," more "privileged," or "higher" in status than sign in early language ontogeny. Instead, the key, persistent research finding to emerge is this: The biological mechanisms in the brain that underlie early human language acquisition do not appear to differentiate between spoken versus signed language input. Both types of input appear to be processed equally in the brain. This provides powerful evidence that signed and spoken languages occupy identical and, crucially, equal biological status in the human brain.

In summary, I have outlined three lines of scientific research on the status of natural signed languages relative to spoken languages, including Linguistic, Sociolinguistic, and Biological research. All three types of research provide powerful converging evidence that natural signed languages are "real languages," demonstrating all of the features characteristic of language in our species. Thus, there is no scientific reason to exclude ASL or LSQ, or any other natural signed language, from the family of languages used by human beings. That signed languages are real languages can now be considered to be an unequivocal scientific fact.

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Footnotes

1 Most all of the claims regarding the earlier onset of first signs over first words stem from one group of researchers (e.g., Bonvillian, Orlansky, Novack, & Folven, 1983; Folven & Bonvillian, 1991). Recently, a second group of researchers (Meier & Newport, 1991) has based their theoretical arguments in support of a possible "sign advantage" largely on Bonvillian et al.s' claims. The subjects in Bonvillian et al.'s studies are reported to have produced their "first sign" at a mean age of 8.2 months (a date that differs from hearing childrens' first words, which occurs at approximately 11 months). However, in their studies, the infants' "first signs" were *not* required to be used in a meaningful or referential way. Instead, infant manual *productions containing "recognizable adult phonetic forms" without any "referential" content*, were attributed "sign" status (=lexical or word status). What they were actually measuring, however, is clear from the spoken language acquisition literature and from my own work: In spoken language, we see that hearing infants around ages 7-10 months begin production of "syllabic babbling," whereupon they produce vocal *productions containing recognizable adult phonetic forms without any referential content*. Similarly, in signed language, we see that sign-exposed infants around ages 7-10 months also begin production of "syllabic babbling," albeit on their hands (Petitto & Marentette, 1991a). Thus, it would appear that Bonvillian et al., have *mislabeled* genuine instances of *manual babbling* in sign-exposed infants as being "first signs." Recall that their date for the age of first signs is 8.2 months--which is smack in the middle of infants' manual (and/or vocal) babbling stage (see also Petitto, 1988, for a discussion of other methodological considerations associated with this research, including the *overattribution* of linguistic ìsignî status to these infantsí non-linguistic communicative gestures).

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