The Signed Languages of Eastern Europe

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Contents

Abstract

This study provides an overview of the signed languages in Eastern Europe, including both the western republics of the former Soviet Union and the satellite nations that were under its control, bringing together in one place information in widely-scattered published materials as well as adding new information based on a field survey of these languages. In particular, on the basis of wordlist comparisons, it appears that most countries in this region have distinct signed languages, with the possible exception of Russia, Ukraine, and Moldova. Signed languages in countries that were part of the Austro-Hungarian empire, though still quite distinct, show somewhat greater similarity to each other than is found between other countries. The limitations of the current survey are discussed along with suggestions for more focused work to further explore the sociolinguistic situation of these languages.

1. Purpose and scope

This report presents the results of an initial survey of some of the signed languages of Eastern Europe.[1] The primary goal of this survey was to help identify what distinct signed languages exist in this part of the world and how their lexicons may have been influenced by each other, either because of genetic relatedness or borrowing.[2] The information presented is preliminary, based primarily on wordlist comparisons. These were supplemented with information gathered from published sources and informal interviews with Deaf[3] people and others, covering such topics as Deaf schools and educational practices, Deaf clubs, language prestige, and dialect variation. As such, the report probably raises more questions than it answers. Despite its limitations, it brings together in one place information about these linguistic communities that is otherwise widely scattered and not readily accessible and should be useful for planning further, more detailed investigations.

How do we determine which languages in the world are related to each other or may have influenced each other through borrowing? At first, we have very little to go on. In theory, any language may be genetically related to any other language, regardless of its geographic location, since people move from one place to another and take their language with them. So, past relationships may be masked by subsequent movements of people. However, it is impractical to compare each language with all other languages in order to find possible relationships, particularly when very little is known about most of them. Thus, most language survey work is guided by knowledge about geographic closeness, past movements of groups of people, or social, political and educational influence of one group over another. Surveyors start by comparing languages that they think might be related, based on known or suspected contact between them.

Such a situation of social and political connectedness existed during the latter half of the twentieth century in Eastern Europe, an area which includes both the western republics of the former Soviet Union

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[1] The data collection and wordlist comparisons in the present study were carried out by a colleague who, for personal reasons, prefers to remain anonymous, and who I therefore refer to simply as "the surveyor." My role has been to set the overall design of the survey, gather what information could be found in the existing published literature, interpret the numerical results of the wordlist comparisons, and do the actual writing. Thus, although responsibility for this paper is ultimately mine, it is based heavily on my colleague's work, who has also given me innumerable helpful comments as well as preparing the maps. For all these things, I am exceedingly grateful.

I would also like to thank the following people who helped in various ways to make this research possible; in alphabetical order, they are Camille Beckham, Ted Bergman, Mike Buus, Kate Cowles, Steve Echerd, Jean Ellis, Paul Lewis, Steve and Dianne Parkhurst, Bettina Revilla, Vesta Sauter, Anna Smolkova, Stuart Thiessen and Severa Trevino.

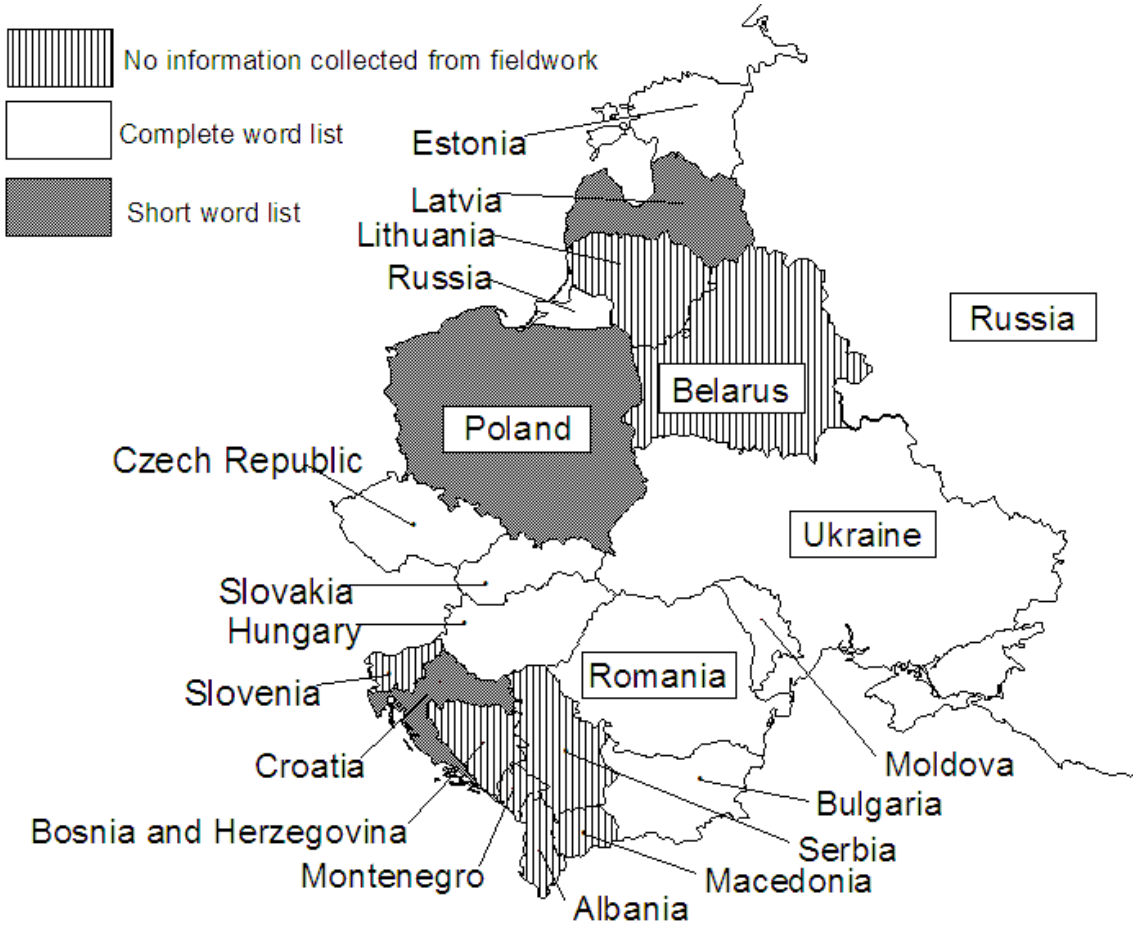
[2] I am not attempting in this study to distinguish genetic relatedness from similarities in vocabulary that result from borrowing.

[3] In this study, I follow the usual practice of capitalizing the word 'Deaf' when referring to a linguistic and cultural group, but using lower case 'deaf' when referring to audiological deafness.

and the communist countries of Europe that were under Soviet influence. In addition, many of these countries were, until 1918, part of, or influenced by, the Habsburg Monarchy and its successor, the Austro-Hungarian empire. Thus, it seemed worthwhile to gather information about the signed languages in this region and their possible interconnections, both from published sources and from fieldwork.[4]

The countries in this region and the type of information that have been collected about each are summarized in figure 1 and table 1.[5] As explained later, either a short or a complete wordlist was collected from a little over half of the countries (the most significant gap being countries in and around the former Yugoslavia). In seven countries, the surveyor was able to obtain information from Deaf people about locations of Deaf schools and associations, and this information is provided later on maps. Among published sources consulted, two stand out as the most generally useful: the *Ethnologue* (Grimes 2000) and *Global Perspectives on the Education of the Deaf in selected countries* (Brelje 1999).

Figure 1: Eastern European countries discussed in this paper[6]



[4] Another reason for choosing these countries was that the surveyor had personal connections with Deaf people in several of them, which made the field research considerably easier.

[5] The former East Germany is omitted from this report partly because anecdotal reports about it seem to indicate that it has more affinities to West Germany than to any of the Eastern European countries, and partly because the only wordlist that could be obtained from Germany was from the city of Bielefeld, part of the former West Germany. The *Ethnologue* (Grimes 2000) does report that more than one sign language is used in eastern Germany, but does not give further details. List, Wloka and List (1999:137) report that a study of SL variation within Germany is underway at the University of Hamburg.

[6] Not indicated on the map: Kosovo and Voivodina (parts of the former Yugoslavia).

Table 1: Eastern European countries discussed in this paper (details)

Country	Wordlist collected	Map of schools & clubs	Section number
Albania	none	no	--
Belarus	none	no	--
Bosnia and Herzegovina	none	no	3.14
Bulgaria	complete	yes	3.2
Croatia	short	no	3.14
Czech Republic	complete	yes	3.3
Estonia	complete	yes	3.4
Hungary	complete	yes	3.5
Kosovo	none	no	3.14
Latvia	short	no	3.6
Lithuania	none	no	3.7
Macedonia	none	no	3.14
Moldova	complete	yes	3.8
Montenegro	none	no	3.14
Poland	short	no	3.9
Romania	complete	yes	3.10
Russia	complete	no	3.11
Serbia	none	no	3.14
Slovakia	complete	yes	3.12
Slovenia	none	no	3.14
Ukraine	complete	no	3.13
Voivodina	none	no	3.14

In addition to data from these countries, the wordlist data includes a control group of four samples from American Sign Language (ASL), for reasons that are discussed in section 6.2. Four samples from Austria were also compared to the countries above (see section 7.2).

2. General survey methodology

Most of the information for this study was collected during May through August 2001 on a trip the surveyor made to several countries in Eastern Europe (including Hungary, Romania, the Czech Republic, and Slovakia), which also involved contact with Deaf people from other Eastern European countries. Some of the data was collected at the Deaflympics[7] in Rome (July 23–August 1, 2001), a major sporting event involving Deaf athletes from all over the world, which occurs every four years. This event proved to be an especially convenient venue for collecting this type of information, and made it possible to expand the scope of the survey work considerably beyond what had been originally planned for the trip.[8]

Two types of information were collected: general qualitative sociolinguistic information and wordlists. The methodology for collecting qualitative sociolinguistic information is described in this section; methodology for the wordlists is covered in section 4.

[7] Formerly known as the "Deaf World Games" or the "World Games for the Deaf". See http://www.deaflympics.com/ and http://ed-web3.educ.msu.edu/kin866/compdeaf.htm.

[8] Reports covering information collected about countries outside of Eastern Europe are in preparation.

Whenever possible, the surveyor conducted informal interviews with Deaf people[9] about a variety of sociolinguistic topics, such as the following:

- amount of dialect variation within the country
- similarity to signed languages in other countries
- history of the language and/or the Deaf community in the country
- prestige in comparison to other languages in the country
- language development efforts (dictionaries, standardization)
- locations of schools for the deaf and Deaf associations (clubs, churches, etc.)
- educational practices and policies in schools for the deaf

Often people were interviewed in groups, as this seemed less threatening to the people being interviewed and is more culturally appropriate. In addition, the information collected in this way tended to be more complete and presumably more accurate, since it represented the consensus of several people. The most important tool in these interviews was a map of the country, which was printed out from the internet. These maps provided a clear and efficient way to ask about locations of schools for the deaf, Deaf associations, population centers, language variation, and other demographics. Notes could be written directly on the map and provided a permanent record of each interview. Working in this way seemed to be very effective in establishing trust and rapport[10] and in collecting a significant amount of useful information in a relatively short time. Some notes were also written out privately afterward.

A typical interview lasted 1–2 hours. In some situations, much less time was available (as little as 15 minutes), particularly in the informal circumstances of the Deaflympics. There, in some cases, it was only possible to collect information about schools and associations and perhaps some anecdotal information about language attitudes.

Most interviews were conducted in sign, using some combination of ASL, International Gestural Communication, mime, bilingual Deaf who served as interpreters, and sometimes words from the local sign language that the surveyor learned during the trip. A significant amount of information was communicated despite the lack of a common language shared by interviewer and interviewee, but at the same time, there exists the possibility of misunderstandings about some issues in some circumstances.

Such, unfortunately, is one of the limitations of a survey of this sort. Indeed, because of the limited time available with representatives of some countries, the amount of information available varies widely from one country to the next. Information from interviews is reported here only when the surveyor was able to verify it from two or more individuals or from published works. Besides the wordlists, the most extensive information that was collected which I consider reliable enough to report here was on the locations of Deaf schools and associations.

3. Qualitative information

3.1 Eastern Europe

A few observations may be made initially that are generally true throughout Eastern Europe.

In most countries, signed languages are not officially recognized by the governments.

There are only occasional efforts toward standardization, and so some dialect variation (especially between schools) is to be expected within each country. However, the surveyor was not able to collect

[9] In one case, a hearing priest who was very familiar with the Deaf community in Slovakia was interviewed, as well as several Deaf people from that country.

[10] Note taking during the interviews did not seem to inhibit communication. Video taping would have been more intimidating, so it was only used for the wordlists, and only after rapport and trust were first established while discussing the map.

wordlists from enough signers in each country to make it possible to assess the extent of this variation; the focus of the study was on differences between countries, not within countries.

An oralist[11] approach to instruction seems to be dominant. This means the signed languages are learned by children not in the classroom, but either from Deaf parents or in informal interactions with other students and (after they grow up) in Deaf clubs and associations. There are both residential and day schools. Residential schools, of course, provide the greatest opportunity for Deaf children to interact with each other informally. However, even in day schools there is informal interaction in sign possible outside the classroom and some provision must be made for housing students whose families live out of town, so there are ample opportunities for learning the sign language.

Fingerspelling does not seem to be used much in these languages except in schools or for limited uses such as establishing the location of a city, which is then given a name sign.

Digital technology is making significant inroads in the Deaf communities, more so in some ways than in the United States. If they can afford them, Deaf people there (as in the rest of Europe) are using mobile phones with Short Messaging Service (SMS) for sending text messages.[12] TTYs are not widely used in these countries; apparently that generation of technology has been skipped by the Deaf communities there. DVD movies are coming out in Europe routinely with subtitles in a variety of languages. When Deaf people can read one of these languages, they have access to a wide selection of movies. The availability of subtitles in television programs varies from country to country; when it exists, it uses a different technology than closed captioning in the USA (Camille Beckham, personal communication). All these means of communication, of course, assume that people have some ability to read and write the national spoken language.

The sections that follow provide further sociolinguistic information about most countries in this region, primarily gathered from published sources but also including information from interviews during the survey (when deemed reliable). Especially, the interviews resulted in the maps that are included for most countries; these show the locations of Deaf schools (with their names enclosed in boxes) and Deaf associations. Such information about geographic distribution may be helpful for planning later surveys that examine variation within each country.

Following common practice, I have referred to each sign language with a name that consists of a reference to the country in which it presumably originated followed by the initials "SL." Thus, for example, the first section discusses "Bulgarian SL." A three-letter code in brackets after the name of the language is the code assigned to it in the *Ethnologue* (Grimes 2000); these codes are hyperlinks that take the user to the Ethnologue entry for the language at http://www.ethnologue.com. The discussion assumes there is only one sign language native to a country unless there is evidence to the contrary; thus, future investigations may find that names such as those used here may refer ambiguously to more than one language.

3.2 Bulgaria

In Bulgaria, there does not seem to be much dialect variation within the country. For example, four students were observed from different parts of Bulgaria interacting easily with each other. A dictionary[13] has been compiled in Sofia (Yanulov, Radulov and Georgiev 1961). There are at least nine teacher and/or interpreter training programs, although not all confer a formal degree.

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[11] An "oralist" approach (or "oralism") refers to the educational practice of emphasizing speech and lip reading, rather than signing, as the primary means of instruction for deaf children. In some oral schools, signing may be forbidden, in others it is tolerated among the students but not encouraged or used for instruction.

[12] Short Messaging Service was common in Europe before it became available in the United States. On the other hand, text pagers, which have been used by many Deaf people in the USA, were not observed or reported in Europe at the time of the survey.

[13] It has not been possible to obtain copies of most of the dictionaries mentioned in this report, so they have been cited primarily on the basis of published citations elsewhere, such as in Carmel 1992 and Harrington 2002.

The *Ethnologue* (Grimes 2000) reports that both Bulgarian SL [BQN] and Russian SL [RSL] are used in Bulgaria. The four Deaf people interviewed from Bulgaria did not suggest anything that would confirm or deny this, although they did recognize that Bulgarian SL and Russian SL are distinct, so presumably they have had some contact with Russian SL. At the same time, since the fall of communism and decline of Russian influence in the region, there may be a tendency for people to report Bulgarian SL as distinct from Russian SL simply out of nationalistic concerns. In addition, in the *Ethnologue* entry for Bulgarian SL, it also notes that different signed languages are used in the classroom and by adults outside. Clearly, further survey work is indicated to differentiate the sign languages used in Bulgaria.

Figure 2: Schools and Deaf associations reported in Bulgaria

3.3 Czech Republic

Slovakia and the Czech Republic were one country, Czechoslovakia, during the years of Soviet domination and authors tend to treat the two countries together in the same article despite apparent differences in the SLs used in each. In this paper, however, I treat them separately.

Paur (1994:135) provides a survey of educational history that gave rise to Czech SL [CSE]. In 1786,[14] the first school for the deaf was founded in Prague, with signing as the method of instruction. Starting about 1930, oralism became very strong in deaf schools, but in the 1960s, signing began to be used again, especially total communication (although the surveyor was told that oralist practices are still strong). Two terms of sign language training are offered to teachers at Charles University. According to *Special needs education in the Czech Republic*, n.d., deaf students are currently educated either in mainstream[15] programs or in special schools.

Some people interviewed in this survey reported that Czech SL was influenced primarily from Slovakia, not from any of the other surrounding countries. On the other hand, Smutná (1999:49) notes that the first teacher of the Deaf in Prague learned to teach the deaf at the Deaf school in Vienna, which in turn had borrowed from l'Épée's[16] methods developed in France. McCagg (2002:255) also notes that the Vienna and Prague schools were both established by the Habsburg dynasty, inspired by work in France. Grimes (2000) claims that Czech SL is partially intelligible with French SL. Connections with Austrian SL [ASQ] and French SL [FSL] should be investigated, as well as the relationship to Slovakian SL [SVK].

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[14] Brelje 1999:408 gives dates of 1886 and 1835 for the first schools in the Czech Republic and Slovakia.

[15] "Mainstream" programs are those in which children with special educational needs, such as deafness, are educated in the same classes with normal children, rather than in special classes tailored to their particular educational needs.

[16] Charles-Michel de l'Épée was an eighteenth-century priest in France who is widely credited as the first to develop deaf education as a field of instruction. His methods centered on the development and use of "methodical signs" to represent the method or structure of spoken French grammar in a signed medium, resulting in what might be termed "Signed French" today (Lane 1980).

The *Ethnologue* (Grimes 2000) reports that the signing used in schools differs from that used by adults outside of schools and that there is "more than one signed language used in the country," but does not indicate what the other ones are. The nature of this variation needs to be assessed, as to whether it represents the existence of a manual code for spoken Czech or dialect variation within Czech SL, or if there is, in fact, more than one natural sign language in the country.

Interpreter training programs in Brno and Prague were reported to the surveyor. Paur (1994:136) reports that interpreters are required in exchanges between Deaf people and government officials, and that (as of about 1989) there were two regularly-scheduled television programs in sign language and plans for an interpreted news broadcast.

At least one general dictionary exists (Gabrielova, Paur and Zeman 1988), as well as a book of Christian religious signs (Sauter, Wiesner, and Leskova 2001).

Figure 3: Schools and Deaf associations reported in the Czech Republic

Figure 3 notes locations of only those schools that were reported by the Deaf people interviewed in this survey. Smutná's (1999:56) list is longer:

- Prague (4 schools)
- Hradec Kralove
- Horicky u Nachoda
- Plzen
- Liberec
- Ceske Budejovice
- Vodnany
- Brno
- Ivancice u Brno
- Kyjob
- Valasske Mezirici
- Olomouc-Kopecek
- Ostrava-Portuba
- Frydek-Mistek

3.4 Estonia

Toom (1994:349) and Paavel (1994) report about 2000 people (Deaf and hearing) who know Estonian SL [ESO] to some extent, and that the number of Deaf people is over 1400. The *Ethnologue* (Grimes 2000) reports approximately 4,500 people in Estonia who know Estonian SL, with 2,000 who regularly use interpreters.

Toom (1994) reports that researchers have not been able to determine history and development of Estonian SL. The first school for the deaf was founded in 1866, but it is not clear whether signing was used there. She also recognizes an "Estonian Pidgin Sign Language" which follows the grammar of Estonian. The latter is more widespread and is the language used by interpreters.

Unlike most other countries in Eastern Europe, Estonian SL is used as a language of instruction in Deaf schools, although there is also oral instruction alongside the use of sign (Grimes 2000). Grimes also reports sign language instruction for parents of deaf children, interpreters, and hearing people generally. This more progressive approach is apparently fairly recent (cf. Paavel 1994:140, Toom 1994:380).

Some people reported to the surveyor that the use of signing in schools was introduced from Sweden, so this language may be influenced by Swedish SL [SWL]. On the other hand, Grimes (2000) reports

apparent influence from Finnish SL [FSE] and Russian SL [RSL]. It also reports that Russian SL is used by Deaf Russians in Tallinn, that in other parts of Estonia there is bilingualism and pidginization involving Russian SL and Estonian SL, and that even within Estonian SL there are local dialects (with Pärnu being the most archaic). Thus, further survey should pay attention to the relationship of Estonian SL to the signed languages of Russia, Finland, and Sweden, as well as to the variation that exists within the country.

Research is in progress at Tartu University. There is a dictionary and grammar for Estonian SL (Toom 1988).

Figure 4: Schools and Deaf associations reported in Estonia

3.5 Hungary

The *Ethnologue* (Grimes 2000), citing the National Association for the Deaf and Hard-of-Hearing (SINOSZ) of Hungary, reports that there are 60,000 Deaf who use Hungarian SL [HSH] and another 300,000 hard-of-hearing who use it as a second language. It also indicates that there may be some Deaf people who use it in western Romania.

Oralism has been strong in all seven Hungarian Deaf schools since 1871 (McCagg 2002:268), which according to Csanyi (1999) and McCagg (2002:264) are all residential. Thus, the use of sign in the schools is mostly in informal interactions among students outside of the classroom. The school in Vac (Vácz) was the first one established, in 1802, with apparent influence from Austria (Csanyi 1999:176, McCagg 2002:253, Dotter and Okorn 2003:62).

Education for the first degree (ages 6–16 for Deaf students, equivalent roughly to elementary and middle school) is free. Some people reported that if deaf students progress on to the second degree in the educational system (ages 16–20, roughly high school), they need to pay for their own interpreter, although others reported that the government provides education at least through age 20. There is one training program for interpreters and teachers, granting a university diploma, in Budapest (cf. Csanyi 1999:180).

Subtitles are available on one news program and some TV programs are interpreted. At least two dictionaries exist (Lancz 1999, Starcke and Maisch 1985) and other linguistic studies (Iván 1995, Alberti and Szabó 2002).

There is a fair amount of difference reported in the signing that exists in the different schools,[17] and it seems generally accepted that there are seven dialects of the language, corresponding to the seven schools (Lancz 1999:xix). Further investigation is needed to determine to how different the dialects are from each other, or whether they perhaps constitute separate languages.

The *Ethnologue* states that Hungarian SL is related to Austrian SL [ASQ], German SL [GSG], and possibly Yugoslavian SL [YSL]. The fingerspelling system (as reported by Lancz 1999:xxi) is virtually identical to the one used for ASL. External relationships such as these also need to be investigated.

[17] Unfortunately, it is not known which school was attended by the person who provided the wordlist for Hungarian SL.

Some people observed that Hungarian SL tends to involve significant mouthing and lip-reading of Hungarian. Deaf people from other countries reported that Hungarian SL was hard to learn, compared to signed languages in other countries, because in essence one needs to learn Hungarian at the same time. Other reports indicate, however, that Hungarian SL is also used without full mouthing.

Figure 5: Schools and Deaf associations reported in Hungary

3.6 Latvia

The only information I have about Latvian SL [LSL] is a minimal entry in the *Ethnologue* (Grimes 2000) that only includes its name.

3.7 Lithuania

There is little information available about Lithuanian SL [LLS]. Kupcinskas (1999) notes the existence of dialect variation and mentions efforts underway by the Lithuanian Deaf Association to standardize the language, largely from a prescriptive rather than descriptive perspective. There is a school for the Deaf in Vilnius. Zaitseva (1987:106) cites a 1962 dictionary of "Lettish" SL by Baris and Porš̌s.[18]

3.8 Moldova

Over much of the twentieth century, Moldova was strongly influenced by the Soviet Union (as one of its republics since 1947), but also with considerable influence from Romania, which controlled it during part of the century. During the Soviet era, there were significant sociolinguistic influences from Russia, such as increased use of the Russian language and the use of the Cyrillic script for the Romanian language. In Deaf schools, Soviet teachers were brought in to teach Russian (in an oralist approach) to deaf students, as there was reportedly no deaf education system previously. This resulted in a generation of deaf children who read and wrote only in Russian while their hearing parents did not know much Russian. Currently the schools are reported to have a mixture of influence from Russian, Romanian, Russian SL [RSL] and Romanian SL [RMS], with stronger Romanian influence in the west and stronger Russian influence in the east.[19]

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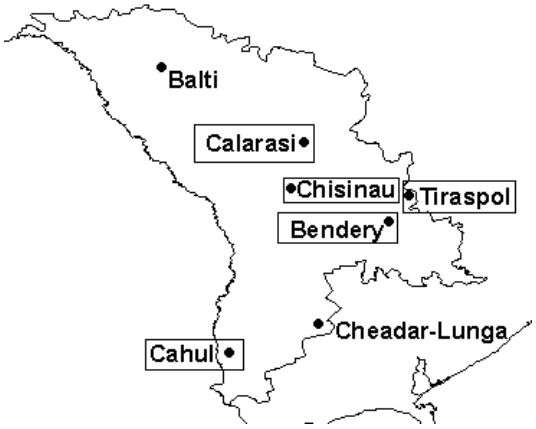
[18] Unfortunately, in my copy of Zaitseva's article, the reference list with full publication information is missing.

[19] For example, it was reported that fingerspelling was done "in Romanian" in western schools and "in Russian" in eastern schools. It is not clear whether this means that fingerspelled words were borrowed from these spoken languages or the fingerspelling system was derived from the corresponding sign languages, or both. It is also not clear to what extent this describes usage in the classroom or only in informal interactions among students.

As seen below in the data from wordlist comparison, this strong connection with Russia is reflected in a relatively high percentage of lexical similarity between Moldovan SL[20] and Russian SL. However, there are indications that though similar, they may be distinct languages rather than dialects of the same language. For example, it was reported that at one children's camp, a Deaf person came from Russia to teach the children, but they needed an interpreter to understand him.

The surveyor was unable to find any indication that there were formal sign language training programs for interpreters or teachers, or that a dictionary has been produced.

Figure 6: Schools and Deaf associations reported in Moldova



3.9 Poland

Van Cleve (1987, 3:100) reports that there are 50,000 deaf in Poland, 25,000 of whom are members of the Polish Association of the Deaf (Polaki Zwiazek Gzuchyeh, PSG), but provides no statistics specifically on how many people use Polish SL [PSO], sometimes referred to as the "school sign language." There are some regional dialects and attempts by the Polish Association of the Deaf unify them. There are at least two manual codes for spoken Polish.

The surveyor was not able to collect information directly from Deaf people about where Polish SL is used. The first school was founded in Warsaw as early as 1816 (Brelje 1999:409), when the city was part of Czarist Russia. Schools for the deaf have also been reported in Kraków, Lodz, Lwów, Poznań, Rybnik, Vilnius, and elsewhere; these were boarding schools in the 1960s, but I was not able to discover if they still are. According to *Special needs education in Poland*, n.d., most students with special educational needs are in special schools rather than mainstreamed; presumably this is true of deaf students, as well as those with other special needs. Since 1985, schools have begun to supplement traditional oral education with signs (Szczepankowski 1995).

There are hundreds of local Deaf associations, coordinated by the Polish Association of the Deaf (Eckert 1999:288, Stawowy 1970, Williams 1993:111, 2002:226).

Interpreters are legally required in some circumstances, and there are classes for hearing people to learn the language, several dictionaries (Hendzel 1981, 1986, Hollak and Jagodzinski 1879, Szczepankowski 1974) and videos.

[20] No three-letter code has been assigned to Moldovan SL in the *Ethnologue* (Grimes 2000).

3.10 Romania

In Romania, not much dialect variation was reported to the surveyor.[21] However, a dictionary which was compiled in one city (Sibiu) is reportedly not liked or used by Deaf in other parts of the country, so it could be there is some dialect variation, and this merits further investigation.[22]

The *Ethnologue* (Grimes 2000) provides little information about Romania, except for the existence of Romanian SL [RMS] and a comment that Hungarian SL [HSH] may be used in western Romania. This comment may perhaps be explained (and called into question) by information from Camille Beckham (personal communication). She reports that there are two Deaf schools in Cluj, one which teaches in Romanian while the other teaches in Hungarian. Both take an oralist approach, but allow students to sign under some circumstances. The sign language in the Hungarian school, however, is not the same as that used in Hungary, but rather is more like the Romanian school. It remains to be seen if true Hungarian SL is used anywhere in Romania.

Figure 7: Schools and Deaf associations reported in Romania

3.11 Russia

The first school for the deaf in Russia was established in 1806 near St. Petersburg (Gitlits 1975:23, Williams and Fyodorova 1993:298, Williams 2002:224).[23] The first teachers of the deaf were trained in Vienna and France, and the schools in St. Petersburg and Moscow maintained close relations with other schools for the deaf in Europe until 1917 (Abramov 1993:200–202,Williams and Fyodorova 1993:297–299). Accordingly the *Ethnologue* (Grimes 2000) reports that Russian SL [RSL][24] is related to Austrian SL [ASQ] and French SL [FSL].

However, there is reason to question how much sign language was actually transmitted between countries by these early teachers (Williams and Fyodorova 1993:302). Jean-Baptiste Jauffret, who was sent to Russia from France by the Abbé Sicard, knew little about the Deaf or sign language. Another early teacher, Father Sigmund, was trained in Vienna, but Williams and Fyodorova's description of his teaching

[21] The Carpathian mountains and the Transylvanian Alps divide approximately the northwest third of the country from the rest. The information collected by the surveyor, including the wordlists, comes almost exclusively from this northwestern region, so conceivably may not be representative of the country as a whole.

[22] There is also reportedly a dictionary of religious signs, compiled by missionaries in collaboration with Deaf people.

[23] A school in Moscow was established by a Deaf man in about 1860 (Williams 2002:228).

[24] The Russian name for Russian SL is *russkii zhestovyi iazyk* (Pursglove and Komarova 2003:255).

methods do not mention signing. Therefore, these claims of genetic relationship to other signed languages should be regarded as unproven, and indeed, the wordlist data analyzed in the present survey provide no support for them (see section 7).

Zaitseva (1987) reports that between about 1870 and 1938, deaf education was strongly oralist, but in other eras signing has been considered a useful auxiliary strategy for achieving the goal of total intellectual, moral and physical development. Her survey of sign use in deaf schools (p. 105) revealed considerable use of Russian SL and/or Signed Russian, both in and especially outside the classroom.

Grenoble (1992:324–325) notes that there is significant dialect variation between Moscow and St. Petersburg. She found major or minor differences in approximately 50 percent of 320 signs she compared between Deaf people in Moscow and Gejl'man's dictionary (1975, 1977, 1978, 1979) prepared near St. Petersburg. Zaitseva (1983:77) and Grenoble (1992) report the existence of Signed Russian, used for formal and official situations and by interpreters; to be more precise, there is a continuum of signing styles from Russian SL to Signed Russian.

The surveyor was not able to obtain any reliable information about specific locations of Deaf schools in Russia, but based on published sources, it appears that there are too many to list all of them, anyway. The *Ethnologue* (Grimes 2000) reports schools for the deaf in Moscow, Armavir, Gorky, Kazan, Kirov, Kolomna, Kujbyshev, St. Petersburg, Novosibirsk, Rostov on Don, and Sverdlovsk. Williams (1993:111) gives a map of seventeen schools that existed in Russia (including parts of modern Poland) before 1917. Andersson (1981) reports that there were 254 residential deaf schools in the Soviet Union with an enrollment of 46,700. There were thirty-two vocational schools with an enrollment of 1,500. The dominant educational approach has been oralist for many years (Gitlits 1975:17–18, 74, Grenoble 1992:325). In 1992, however, a bilingual school was established in Moscow (Pursglove and Komarova 2003:250).

Gitlits (1975:44–45) mentions the existence of seven hundred Deaf clubs in the Russian Federation in 1975 and that any community in Russia with more that fifty Deaf residents had a Deaf club. Pursglove and Komarova (2003:249, 257) report that the All-Russia Federation of the Deaf (VOG),[25] founded in 1926, has seventy-two branches (including every major city of the Russian Federation) and an estimated total membership of 156,000.

Carmel 1992 lists several dictionaries published in Moscow and Leningrad (Gejl'man 1957, 1975, 1977, 1978, 1979, 1980, 1981); Gejl'man's works represent the St. Petersburg (=Leningrad) dialect (Grenoble 1992:324). Several other studies (e.g., Zaitseva 1983, 1987, 1991, Grenoble 1992) provide further information about the language.

The *Ethnologue* (Grimes 2000) reports that Russian SL is also used in Bulgaria and Estonia.

3.12 Slovakia

People reported that Slovakian SL [SVK] has been influenced primarily from Hungary, Poland, and the Czech Republic. There are at least four residential schools for Deaf orphans. These schools also serve the local community, so it may be that some students live at home. Deaf children are guaranteed the right to education using sign language (section 4 letter b of Act No. 149/1995 of the Law Code of the National Council of the SR on sign language of the deaf, as cited in *Special needs education in Slovakia*, n.d.).

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[25] Gitlits (1975: 69–76) portrays the VOG as participating actively in the World Federation of the Deaf and being very effective in securing government programs on behalf of Deaf people, such as securing the right of Deaf people to have an interpreter in legal proceedings. On the other hand, Abramov (1993:203–204) has a more pessimistic view of the social welfare of the Deaf community under communist rule, noting that for seventy-five years the Deaf in Russia did not even know of the existence of Gallaudet University and the increasing status of signed languages in other countries. Pursglove and Komarova (2003:249, 251) characterize VOG's policies during the Soviet era as being "oralist" and attitudes toward sign language as "lukewarm to downright hostile," with no profoundly Deaf people in positions of power, and even now dominated by hard-of-hearing people. Their article documents the changes that have occurred among the Deaf in Russia since 1990.

The surveyor was not told about any formal interpreter training program, but there is informal teaching of the language to hearing people on a once-a-week basis in one location. Some TV programs have interpreters. At least one dictionary exists (Csonka, Mistrík and Ubár 1986).

Figure 8: Schools and Deaf associations reported in Slovakia

Figure 8 notes locations of schools that were reported by the Deaf people interviewed. Smutná's (1999:56) list of towns with schools for deaf children is somewhat different:

- Bratislava (2 schools)
- Lucenec
- Kremnica
- Presov
- Levoca

3.13 Ukraine

I have little information about Ukrainian SL [UKL]. Gitlits (1975:44) mentions that there were 319 Deaf clubs in the country. Carmel (1992) lists several dictionaries published in Kiev (Ivanusheva 1969, Maksimenko, Ivanusheva and Shchur 1987, Sapozhnikov and Filyanina 1971).

3.14 Republics and provinces of the former Yugoslavia: Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia, Slovenia, Voivodina

Van Cleve (1987, 3:116–118) reports information primarily about the northern republics of the former Yugoslavia. He estimates that some form of signing is used by approximately 30,000 people. During the early 1800s, some children in northern regions were sent to schools for the deaf in Austria or Hungary (indeed, this area was under the same political control), so the possibility of a linguistic connection between Yugoslavian SL [YSL] and signed languages in those two countries should be investigated. The first two schools opened in 1840 in Slovenia and 1885 in Croatia.

There are regional variants, sometimes with separate names such as Serbian SL and Slovenian SL, as well as different signing styles, depending on a person's educational background (Grimes 2000, van Cleve 1987, 3:117). There is an official one-handed fingerspelling system based on the international alphabet of the World Federation of the Deaf, as well as an unofficial two-handed alphabet which is in much wider use. Reportedly all these differences cause no problem in comprehension, but I found no indication that the amount of dialectal variation has been investigated systematically. Beginning in 1979, there were efforts to unify the language by developing a national dictionary of "standard" signs. It is not clear how well this standard has been accepted, as there have also been regional dictionaries prepared in Serbia and Slovenia. The bulk of available information seems to concern northern parts of the former Yugoslavia; I found no information relating to sign use specifically in Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro, or Voivodina, so these regions especially should be investigated further.

The surveyor was not able to collect information directly from signers from any of these regions, except for a short wordlist from Croatia.

Carmel (1992) reports a dictionary (Podborsek and Moderndorfer 1990), and there is a dictionary of "Slovene SL" available on CD-ROM (Zoom Promotion 2000).

4. Methodology for wordlist comparison

How do we determine if two languages are similar (and thus, possibly historically connected, either from common ancestry or borrowing)? The first step is often a comparison of a sample of words in each language. This yields a rough measure of possible relatedness and is relatively easy to do. Thus it is a useful early step in language survey, because it helps identify groups of languages that should be examined more closely.[26]

4.1 The wordlist

The most commonly-used wordlists for language comparison were developed by Morris Swadesh (Swadesh 1955, Samarin 1967:218–223). These, however, were developed for spoken languages. A number of the concepts included in them, such as numbers and body parts, tend to be similar or identical in most signed languages, so they aren't very useful for doing language comparison.[27] Thus, previous surveys of signed languages have often modified these lists to choose a more appropriate sample of the overall vocabulary (see, for example, Woodward 1991, 2000; Bickford 1991; McKee and Kennedy 2000; Parkhurst and Parkhurst 2001).

The list used in the present study, consisting of 240 words, is given in section 9.1 (Appendix 1: Wordlist). It is essentially the same as that used by Parkhurst and Parkhurst (2001) in their study of dialect variation in the signed languages of Spain, which in turn was based on a shorter wordlist used by Bickford (1991) in Mexico. However, due to the fact that the wordlist needed to be used in many different countries with differing national languages, the way that it was used was different than in these earlier studies.

Of the 240 words, eighty-four are easily represented in pictures, so a book of pictures representing those words was assembled and used when requesting the signs for them. Over 90 percent of these pictured words were nouns. The use of pictures made it unnecessary for the person providing the information to know how to read any spoken language and was helpful in immediately putting people at ease. It also allowed these words to be collected without any influence from a spoken language. Finally, when it came time to transcribe the videotaped interview, it was much easier to keep track of what word was being signed when the pages of the picture book were turned after every four signs, than it was with a long list of words on a single sheet of paper.

However, there were still over 150 words on the list that are not easily pictured, so they were presented by means of written words from some spoken language familiar to the person providing the signs. That is, whenever possible, these words were translated using dictionaries into the national spoken language used in each country. In most cases, it was possible to verify the translation with people who were bilingual in English, ASL, or some other language spoken for which the translations had already been verified.

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[26] More elaborate and precise methods for determining the similarity of different languages include detailed comparison of wordlists according to the comparative method, contrastive study of the grammar, and various experimental procedures such as dialect intelligibility and sentence repetition tests (Grimes 1995).

[27] For the same reason, words such as MOTHER and FATHER, and words that tend to be onomatopoetic, are omitted from the original Swadesh lists, since there is an artificially high degree of similarity for such words in spoken languages. However, such words may be very useful for comparing signed languages.

4.2 Wordlist collection

After the surveyor contacted a signer and explained what was wanted,[28] they started through the list while recording the conversation on videotape.[29] Wordlist collection always began with the picture book. Once that was finished, if a person seemed to be unable to read the rest of the words (whether due to not knowing the national language or not being able to see well enough to read the print), the conversation was graciously ended or someone else was brought in to assist as an interpreter, to avoid embarrassing people. This practice of sometimes stopping with only the words from the picture book essentially created two versions of the wordlist: a complete list (240 words) and a short list (84 words). There were occasional other reasons that in some cases only the short list was collected, such as lack of time to collect the full list. In some countries surveyed (particularly those for which data was collected at the Deaflympics), time constraints made it impossible to get a translation of the complete list into the national language of their country.

There were also some minor variations in the data available from each language. A couple of signers skipped some pages of words by accident or didn't know some words, resulting in missing data for those words. Conversely, sometimes more than one sign was provided for a given concept, providing extra signs that were checked for similarity with other languages (since either of a pair of synonyms might be similar to a sign in another language).

Quite often, other individuals were present, especially at the Deaflympics. Sometimes there was interaction between the principal signer and audience, especially when the signer couldn't read well.[30] In one case, a pair of individuals from the same country was filmed at the same time and both were assertive enough to make clear when their individual signs were different, so lists from both people were included in the study. In another similar case, one person was more passive and so his list was not included in the study.

In five cases (Czech Republic, Estonia, Poland, Russia, Slovakia), wordlists from two or more signers were available from the same country. All of these lists were included as separate samples in the study, partly as a way of beginning to assess possible dialect variation within that particular country and partly for assessing the range of variation that might be considered "normal" within the same country.

4.3 Wordlist comparison and analysis

The signs collected in each list were analyzed according to the parameters (characteristics) that are known to be important in distinguishing signs in other signed languages, especially location, large movements, and handshape.

Then, signs for the same concept from different languages were compared. In order to simplify the process with the large amount of data collected, the different signs for a given word were organized into groups of similar signs.[31] The groups of signs were not overlapping; that is, each sign from a given

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[28] All people who provided data for this study did so with informed consent. Before beginning to collect data, the purpose of the study was explained and people were assured that the videotape would be used only for private nonprofit research and not published or otherwise distributed, nor would individuals be identified publicly in any way. This was done informally; a formal written consent form would have made the research impossible to carry out, since it would have been too intimidating in many cases, impossible to use with some subjects because of low reading ability, and extremely cumbersome to translate into many different national languages and cultural perspectives.

[29] Mini-videocassettes were used, with an ordinary camcorder on a tripod.

[30] This did not seem to confuse the results. Even when a word was explained by some sign, it was generally clear what sign the primary signer used in his own language.

[31] This study is part of a larger study that includes data from over sixty-nine signers representing thirty-seven different countries. If each pair of signs was judged individually for similarity, it would have been necessary to make 2,346 (i.e., 69×68/2) pair-wise comparisons for each of eighty-four or 240 words (depending on the wordlist used), an impractically large task. Dealing with signs in groups of similar signs greatly simplified this process by making it

language was grouped with whatever signs from other languages that it was similar to, but was included in only one such group. This meant that sometimes semi-arbitrary decisions had to be made about the group in which a sign should be placed. In some cases, two groups that might otherwise have been kept separate were combined so as to accommodate a sign that showed equal similarity to both groups, with the result that all signs in either of the former groups were counted as being similar to each other.

Similarity was judged according to a consistent set of guidelines. For two signs to be placed in the same group, the most important factor was the location where the sign was performed.[32] Two signs that differed significantly in their location were always placed in different groups, so that all the signs in any given group were performed in essentially the same location. However, in order to be in a particular group, a sign also had to have either the same handshape or the same motion as one or more other signs in that group. Also, it was normally the case that the iconic image (if any) employed in forming the sign was the same for all signs in a group. Two factors were largely irrelevant in establishing these groupings: (a) the orientation of the primary hand and (b) the handshape and orientation of the secondary hand.

As an example of the type of groupings that this process produced, consider some of the signs that were reported for MOUSE.[33] Several of them are performed at elbow height with the strong hand. Three different handshapes are used in combination with movements of the strong hand that involve side-to-side or forward motion, or both. In most cases, only one hand is involved and the iconic image is of a mouse scurrying across the floor. All of these were judged to be similar enough to be included in the same group.[34]

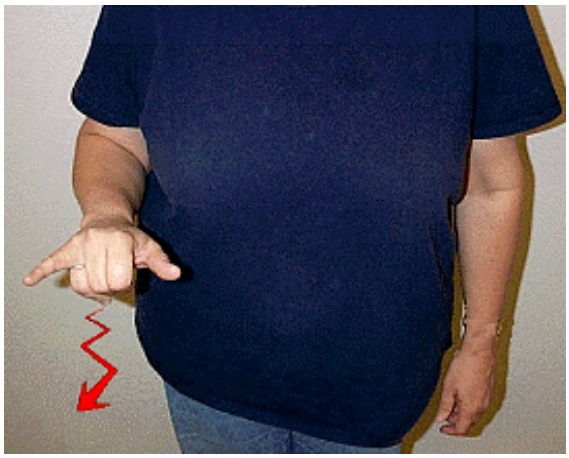
MOUSE (Slovakia):
One-hand 1 (palm down, index finger pointing forward), move zigzag forward at elbow height.

possible to use computational tools to automatically compute the similarity percentages.

[32] Several studies (Siedlecki and Bonvillian 1993, Bonvillian and Siedlecki 1996, Meier, Mauk, Mirus and Conlin 1998, Marentette and Mayberry 2000) have found that in children acquiring ASL, location is produced with a high degree of accuracy, whereas there is less accuracy with movement and especially handshape. Conceivably, then, location is the most stable parameter within a given signing community even among adults, whereas movement and handshape may vary more from one person to the next. Informal observations among ASL signers support this hypothesis, although I know of no systematic study of the matter. If this is correct, then the existence of many signs that differ in location between two signers would tend to indicate that they used different languages, and so these observations about language acquisition may provide some independent justification for the decision to weight location most heavily when judging similarity between signs of different signing communities. (I thank Bettina Revilla for pointing out the significance of these facts to the present study.)

[33] Since this word was obtained with a picture, the actual meaning of the word obtained may be ‘rat’, ‘rodent’, or something else similar.

[34] In the following tables, when more than one sign is associated with the same country, this was due to either one signer reporting synonyms or two signers from the same country.



MOUSE (Russia, Ukraine):
One-hand Y (palm down, fingers pointing forward), move zigzag forward at elbow height.

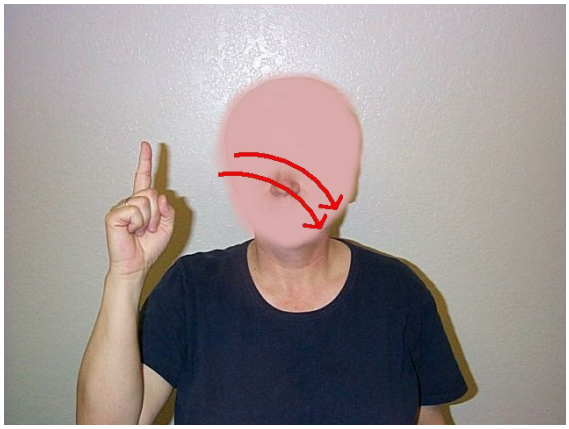
MOUSE (Russia):
One-hand bent V (palm down, fingers pointing forward), move zigzag forward at elbow height.

MOUSE (Romania):
One-hand 1 (palm down, index finger pointing forward), move straight forward at elbow height.

MOUSE (Moldova):
Strong hand Y (palm down, fingers toward the front), move side-to-side on top of weak hand index at elbow height.

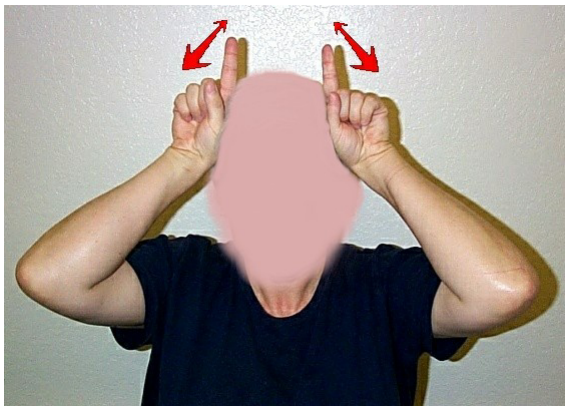
MOUSE (Bulgaria, Poland):
One-hand 1 (palm down), circle hand (bending at wrist) at elbow height.

In contrast, other people reported signs that were quite different from these, differing in such factors as location, type of motion, involvement of the second hand, and the iconic image that formed the basis for the sign. Each of the following signs was judged to be different enough from the above group and from each other, that each was assigned to its own individual group.



MOUSE (ASL[35]):
One-hand 1 (palm to side, index finger pointing up), start from a location in front of and on strong side of head, brush twice across nose.

[35] The reasons for including ASL in the study are discussed in section 6.2.



MOUSE (Latvia):
Both hands 1 (palm forward, index fingers pointing up), at temples, fingers alternate forward and back.

MOUSE (Estonia):
One-hand baby-O (palm down, fingers pointing forward) in neutral space, index finger and thumb tap open and shut.

In making these groupings, the intent was to identify those groups of signs that Deaf people themselves would probably perceive as being similar and which could conceivably be the basis for communication across dialect or even language boundaries. The surveyor's familiarity with ASL and with the Deaf community in a number of different countries helped to make these groupings both reasonable and internally consistent.

Once signs were placed in groups, SIL's WordSurv program[36] was used to do the tedious task of tabulating the similarities of each pair of languages in the study, yielding the following statistics:

- number of signs available for comparison between the two languages
- count of similar signs (number of words in which a given concept was expressed by similar signs in the two languages, i.e., that were classified into the same group)
- percentage of similar signs

5. Results of wordlist comparison

The results of the comparisons are given in a series of tables in section 9.2. Table 9 and table 10 report the total number of signs available for comparison on the complete and short wordlists. Table 11 and table 12 report the main results of this study, the actual percentages of similar signs between each pair of signers.

Each table shows statistics for different pairs of wordlists. The format is similar to tables that show the distance between cities on a map. Each label along the diagonal refers to one person who provided a wordlist, identified by the name of his or her country and (in some cases) by a number. Each label applies to both a row and a column, and thus each cell shows the results when comparing the wordlists that label its

[36] WordSurv version 2.5 for DOS was used. It is available from http://www.sil.org/computing/catalog/wordsurv.html.

row and column. For example, the following excerpt from table 9 (in section 9.2) reports that there were 237 signs available for comparison between ASL #1 and ASL #3.

Table 2: Number of signs available for comparison (excerpt from Table 9)

	↓			
ASL #1				
239	**ASL #2**			
237	237	**ASL #3**	←	
215	214	212	**ASL #4**	

6. Calibrating the methodology

Because of the specific methodology used, numerical results from the present study may not be directly comparable with results from other studies. That is, the percentages of similarity from this study may not be the same as would have resulted from a different methodology.[37] A number of factors can conceivably affect the results, including the number of words compared, the particular words chosen, and the criteria used to determine whether two signs are similar. What is more significant than the actual numbers is the relative similarity or dissimilarity among the languages compared with the same methodology.

To put it another way, it is important to "calibrate" the methodology so as to know what the results mean. This requires addressing issues such as the following:

- 6.1 Differing results due to different wordlists: To what extent are the quantitative results influenced by the particular wordlists used (considering both the number of words in each list and the particular set of words chosen)?
- 6.2 Upper and lower limits of variation: How do the numeric results relate to qualitative concepts such as "same language" and "unrelated language"?
- 6.3 Statistical significance: What range of percentages (high and low) gives meaningful information?
- 6.4 Differing results due to criteria used for judging similarity: To what extent are the quantitative results influenced by the criteria used to place signs in groups of similar signs?

These issues are addressed in the next four subsections.

6.1 Differing results due to different wordlists

As noted before, there are several reasons that, for some pairs of signers, only the words in the short list are available for comparison. See table 9 in section 9.2 for details; any comparison involving Estonia #2, Latvia, Poland #1, Poland #2, or Croatia has eighty-four signs or less available for comparison because these signers provided only the words on the short list. There were seventeen signers who provided most or all of the words in the complete list.

Because the concepts in the short list are easily represented visually, signs for these words are in general more iconic than the words that are only in the complete list, and this may affect the lexical similarity figures. Thus, for pairs of signers in which only the short list is available (because the complete list was not collected from one or both of them), the percentages of similarity that resulted may be different from what would have been found had the complete list been available from both signers.[38]

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[37] I am assuming that as long as a given methodology is used consistently, numbers within the same study still provide useful information, even if there is no easy way to compare them to other studies.

[38] In addition, because the shorter list involves a smaller sample size, it may be subject to more random error. This aspect of the problem is dealt with in section 6.2.

To test this hypothesis, two sets of comparisons were tabulated for each pair of signers when the complete list was available. In one, only the words in the short list were considered; in the other, all words available were considered. These results are presented in table 11 and table 12 in section 9.2.

On the average, the results from the short list are 7.52 percentage points higher than the results from the complete list. The greatest difference between the two lists was 16 percentage points, on a comparison between Russia #2 and Slovakia #1 (36 percent for the complete list, 52 percent for the short list). Usually, the percentage of similarity on the short list was higher, probably because of the greater iconicity in this list.[39]

Since, the effect of using two different lists was noticeable, I have kept the two sets of results separate. As noted, in some cases the short list provides the only information available, but is still useful despite its tendency to inflate the similarity scores. This is because even when signs are iconic, there can still be considerable variation from one language to the next. That is, there are often a variety of ways in which a concept can be expressed iconically (as can be seen in the examples for MOUSE discussed above), so that even iconic signs can still be useful in comparing two languages.

6.2 Upper and lower limits of variation

An important aspect of calibrating the methodology is deciding what the quantitative results mean. More precisely,

- On the high end, what percentages of similarity might be expected between two signers who know the same language?
- On the low end, what percentages of similarity might be expected between two unrelated languages (due to such factors as chance similarity and iconicity)?
- For a given wordlist, how far must the results differ from these expected percentages in order to be statistically significant?

To help answer these questions, wordlists were collected from four people fluent in ASL, three of whom were actively involved in the same Deaf club in Phoenix, Arizona. Since ASL is generally regarded as a single unified language, this provided a way of establishing normal percentages of lexical similarity (for this methodology) that occur within one language. At the same time, since ASL is (as far as I know) unrelated or only distantly related to the signed languages of Eastern Europe, it also provided a way of estimating how much lexical similarity might typically exist between languages that are very different from each other.[40]

When collecting wordlists from the same language, normally no two wordlists will be identical. Sometimes there is more than one sign available for a given concept within a language, and different signers will mention different signs. As expected, the wordlists from the ASL signers were very similar but not identical. As can be seen in table 3, the percentages of lexical similarity within the four ASL wordlists were around 90 percent. It is reasonable to assume that for two signers from the same language who are

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[39] This was not always the case, however; for example, among the ASL signers, the figures were higher for the complete list. The reason for this is not yet clear, but Parkhurst and Parkhurst (2003) have noted something similar. In their comparison of the results obtained from different word lists, those word lists with a higher percentage of iconic words (such as the short list in the present study) tend to produce higher scores for unrelated languages but lower scores for closely-related languages. It could be that the higher potential for iconicity in some concepts allows closely-related languages to tolerate greater variation than is possible with concepts that are not easily represented iconically.

[40] It is not clear how much of a connection exists between ASL and the other languages in this study. Historical records noted elsewhere in this paper suggest that several Eastern European SLs have some historical connection with Austrian SL, and the results from the wordlist comparisons tend to confirm that. But, Austrian SL, like ASL, was influenced by French Sign Language, and Russian SL is reported to have come from France as well, so there does seem to be some historical connection which was not anticipated when the study began. Even so, the results show that ASL has relatively little similarity with the other languages in the study, so is still useful as a baseline for comparison.

tested using this methodology, one can expect similarity figures to be in the same range, and that any figures of 90 percent or above indicate that two people know the same (or essentially the same) language.[41]

Also as expected, the percentages of similarity between the ASL signers and the wordlists from Eastern Europe were among the lowest in the whole study, as can be seen in table 3. The percentages of similarity found within Eastern Europe (EE) are considerably higher than those found when comparing ASL to Eastern Europe. The greatest similarity between ASL and any Eastern European country was only around 50 percent, whereas within Eastern Europe the maximum similarity between any two wordlists was just under 90 percent, comparable to what was found within ASL. The average similarity found between ASL and the Eastern European countries was around 40 percent, while the average within Eastern Europe was somewhat higher.

Table 3: Comparing ASL with Eastern European signed languages as a whole (summary figures, rounded to the nearest percentage point)

	Complete list (240 words)			Short list (84 words)		
	Within ASL	**ASL vs. EE**	**Within EE**	**Within ASL**	**ASL vs. EE**	**Within EE**
Maximum	94%	43%	89%	92%	56%	88%
Minimum	89%	30%	33%	85%	33%	34%
Average[42]	91%	37%	46%	88%	44%	51%

6.3 Statistical significance

However, we can't take the figures in table 3 at face value as benchmarks for deciding when two languages are the same or when they are very different. The problem is that the results for a whole list of words can vary around the expected values due to chance factors, and the amount that the results will vary depends on the length of the wordlist. (In what follows, I explain the concept of statistical significance and how it applies to this study for readers who may not be familiar with it. Those who are familiar with such matters may wish to skip ahead to table 4.)

To illustrate the problem, consider a more familiar statistical example, that of flipping a coin. Every time the coin is flipped, the chance of it coming up heads is 50 percent. This does not mean that if it is flipped 100 times it will always come up with exactly 50 heads. Sometimes there will be 47 heads, sometimes 55, and so forth. The more times the coin is flipped, the more likely it is that the total number of heads will be close to 50 percent, but it will rarely be the case that it will be exactly 50 percent.

Thus, we can't conclude that a coin is unbalanced just because we get only 45 heads out of 100 flips. However, it is extremely unlikely that a balanced coin would result in 25 heads out of 100 flips, so if we had a result like this, it would be reasonable to conclude that the coin was not balanced. But, what if we got 35 heads in 100 flips? Or 400 heads in 1,000 flips? How low do the results need to be in order to conclude that the coin is weighted toward tails?

In applying this principle to the present study, flipping a coin a single time is analogous to comparing two signs with the same meaning from two different signers. The total percentage derived from comparing 240 words from two signers is analogous to flipping a coin 240 times. What we want to know is the answers to questions like these:

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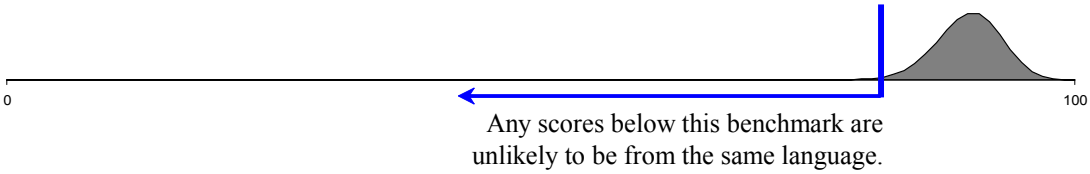
[41] Since three of the four ASL signers were from the same local community, it would be more precise to say that the 90 percent criterion reflects variation within one dialect. If Deaf people from all across the U.S. and Canada were included in the sample, the figures may have been somewhat lower. So, figures below 90 percent don't necessarily mean that two wordlists are not from the same language, just that there was more variation than exists within one particular dialect of ASL.

[42] The averages here are over all the comparisons made; they are not the averages of the maximum and the minimum.

- When comparing two signers who know the same language, what is the probability that the results on a particular list will show less than 90 percent similarity, or less than 85 percent? How low must this figure be before it is reasonable to conclude that there are differences between two signers that are significantly greater than what would be expected for two people who know the same language?
- When comparing two signers who know unrelated languages, what is the probability that the results on a particular list will show more than 35 percent similarity, or more than 45 percent? How high must this figure be before it is reasonable to conclude that there is more than chance similarity between the two signers (i.e., that their languages are genetically related or have borrowed signs from each other)?

It may be helpful to present these questions graphically. Taking any two signers at random from the same language, the results from doing a wordlist comparison will vary. Different pairs of signers will result in different scores, but if we graph all the scores, they will tend to fall in a familiar bell curve (or normal distribution) centered around a particular value (which, based on table 3, appears to be about 90 percent), as shown in figure 9. This is what can be expected to happen when we know ahead of time that the people being compared are using the same language.

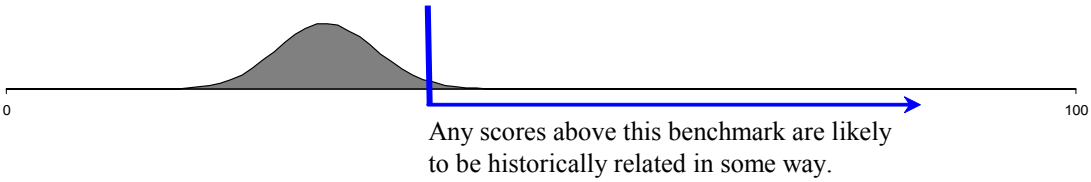
Figure 9: Normal distribution of similarity scores expected within one language



What happens when we *don't* know ahead of time that two signers use the same language, but their score is lower than the curve in figure 9? Then, we can conclude that it is unlikely that they use the same language. The lower the score, the less likely it is that they use the same language. So, we want to establish a cut-off point, or benchmark, below which we can be reasonably certain that two people use different languages.[43] This benchmark is represented by the vertical blue line and arrow in figure 9.

Similarly, when comparing languages that we know ahead of time to be unrelated, we would expect a bell curve centered at a fairly low level (which, based on table 3, appears to be about 40 percent), as shown in figure 10.

Figure 10: Normal distribution of similarity scores between unrelated languages



Then, if we want to compare two languages to find out if they are related, we see how high their score is compared to the curve in figure 10. The higher the score, the less likely that the two languages are completely unrelated, and thus the more likely that there is some historical connection between them.

How can we make decisions like this? There is a statistical formula, called a binomial distribution, that calculates the probability of having a particular result after a certain number of trials, when the probability of success in one trial is known. In our earlier example of flipping a coin, it can compute the probability that a balanced coin would result in less than 25 heads out of 100 flips, or greater than 70. This

[43] To be precise, below the benchmark, the differences between two signers are significantly greater than what we find within the ASL community.

probability is what is called STATISTICAL SIGNIFICANCE. When the probability of a given result is very low (unlikely to have resulted solely from chance factors), then we say it has high statistical significance.

How does this apply to the present study? We want to establish the statistical significance of the wordlist comparison data, which means we want to establish the locations of the benchmarks in figure 9 and figure 10. These benchmarks will tell us which scores are statistically significant and which are not.

But, in order to do so with the standard statistical formula, we need to determine the probability of "success in one trial." That is, we need the answer to the following two questions:[44]

- What is the probability that two signs with the same meaning will be judged similar, if the two signers know the same sign language?
- What is that probability, if the two languages are unrelated?

We can estimate these probabilities based on the actual results we observed when comparing ASL to itself and to other languages, as reported in table 3. The averages in the columns labeled "Within ASL" can be taken as estimates of the probability that two signers who know the same signed language will give similar signs with a given meaning.[45] These are 91 percent (complete list) and 88 percent (short list). Likewise, under the assumption that ASL is unrelated, or only distantly related, to all the other languages in the study, averages in the columns labeled "ASL vs. EE" can be taken as estimates of the probability that two signers who know unrelated or only distantly-related signed languages will give similar signs.[46] These are 37 percent (complete list) and 44 percent (short list).

Using these estimates, we can calculate benchmarks of statistical significance for making decisions about language identity and relatedness. These benchmarks are given in table 4 and table 5.[47]

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[44] In statistical terms, in order to apply the binomial distribution to compute statistical significance of various results, we want to establish a reasonable estimate of the probability of success in one trial, under two distinct conditions: a) the two signers know the same language, and b) the two signers know unrelated languages.

[45] Since the actual probability of success in one trial is unknown, a χ^2 test would have given more accurate statistical results. However, for the purposes of this study, which was to identify groupings of languages that would be subject to further study, estimating the statistical significance with a binomial distribution, as done here, is sufficient. Also, I did not calculate actual statistical significance for each pair of wordlists, but only established guidelines of which results would be considered significant at different levels.

[46] Since there is some possibility of distant historical connection of many of these languages through contact with French SL, it is not known whether totally unrelated languages might have similarity figures that are even lower.

[47] Because these norms are based on estimates, they cannot be used as hard and fast guidelines. Further, because they are based on assumptions that are particular to the present study, different figures would need to be calculated for other studies.

Table 4: Statistical significance of results concerning whether two languages are the same

	Complete list	Short list
Length of wordlist (sample size)	240	84
For a given word on the wordlist, probability that signs from two signers who know the same language will be similar (probability for one trial, estimated based on Table 3)	91%	88%
How low do results need to be, in order to conclude that the figures reflect real differences in the languages of the two signers that are greater than what would be expected, if they knew the same language? (benchmark: maximum percentage similarity that satisfies a given criterion for statistical significance)		
95% certainty that results are not due to chance (p<.05)	< 87%	< 82%
99% certainty (p<.01)	< 86%	< 78%
99.9% certainty (p<.001)	< 84%	< 76%

Adopting a standard criterion of 99 percent certainty (and given the methodology used) the lexical similarity of wordlists between two signers should be less than a benchmark of 86 percent (complete list) or 78 percent (short list) in order to justify examining them further for evidence that the two people might know two distinct languages, or at the very least, two dialects of the same language. Above those benchmarks, the results are not significantly different from what we would expect by chance from signers of the same language.

Table 5: Statistical significance of results concerning whether two languages are unrelated or only distantly-related

	Complete list	Short list
Length of wordlist (sample size)	240	84
For a given word on the wordlist, probability that signs from two signers who know unrelated or only distantly related languages will be similar (probability for one trial, estimated based on Table 3)	37%	44%
How high do results need to be, in order to conclude that the languages show more similarities than languages that are unrelated, or only distantly related? (benchmark: minimum percentage similarity that satisfies a given criterion of statistical significance)		
95% certainty that results are not due to chance (p<.05)	> 43%	> 53%
99% certainty (p<.01)	> 45%	> 58%
99.9% certainty (p<.001)	> 47%	> 61%

Again, using a criterion of 99 percent certainty, lexical similarity of two signed languages should be above a benchmark of 45 percent (complete list) or 58 percent (short list), in order to justify looking further for evidence of close genetic relationships or lexical borrowing. Although pairs of languages with lower scores may, in fact, have some historical connection, this methodology is too coarse to discover it, because scores below the benchmark could just as easily have resulted from totally unrelated languages.[48]

[48] There are two main ways that the methodology could be made more sensitive to such differences: by increasing the number of words compared, or by becoming more stringent in the criteria used for deciding whether two words are similar.

So, then, we have established two benchmarks to use in evaluating the scores that resulted from wordlist comparisons: an upper benchmark that helps us decide if two signers use the same or different languages, and a lower benchmark that helps us decide if two languages are related to each other.

6.4 Differing results due to criteria used for judging similarity

Another way that the methodology might influence the absolute results is due to the criteria used for creating groups of similar signs. If stricter criteria had been used to judge similarity, the overall figures would presumably have been lower. Similarly, if looser criteria had been used, the overall figures would have been higher.

This is a major reason for saying that the absolute numbers of lexical similarity reported in this study are not comparable to those of any other study, unless exactly the same criteria are used. That is, if two languages are reported as being 60 percent similar in this study, it does not necessarily mean that they are as similar to each other as two other languages reported to have 60 percent similarity in some other study. Comparisons of this sort between studies should always be avoided, unless it can be demonstrated that the criteria are the same.

However, since the criteria for grouping signs were the same across the entire corpus, the results are still useful for the primary purpose of this study: to identify those languages that are most like each other. That is, what one should pay attention to in the charts of results below are those pairs of languages that scored relatively higher or lower, compared to other pairs of languages in this study. It is, of course, not possible to be absolutely consistent across an entire corpus of this size. However, one person (the surveyor) made all the judgments of similarity, based on clear guidelines (as discussed in section 4.3), and they were rechecked for consistency several times. I believe they are as internally consistent as is humanly possible.[49]

7. Analysis and interpretation

Examining table 11 and table 12 in appendix 2, the similarity figures range between about 30 percent and 94 percent. The highest figures were those among ASL signers; the lowest were often between the ASL signers and all the others, although there were also low figures between many pairs of Eastern European signers.

7.1 Similarity within countries

It is striking that in many cases, two signers from the same country had similarity percentages lower than the upper benchmarks discussed above for statistical significance (86 percent complete list and 78 percent short list), as can be seen in table 6.

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[49] At one point in preparing this study, an opportunity arose to measure how much the strictness of the criteria affected the overall scores. As part of the process of making the criteria consistent across the whole study, the criteria used were loosened somewhat (mostly, to put less emphasis on handshape). This relaxation of criteria resulted in scores that were typically 0–15 percent higher. Steve Parkhurst (personal communication) notes that when he changed his criterion from looking for similarity to a somewhat looser one of looking for probable cognates (as judged by being able to conceive of plausible reasons for one sign changing into the other), the scores increased by about 10 percent.

Another way to approach this issue is to examine the standard deviation of scores among those languages that are, at best, distantly related (ASL versus EE). This figure is 3.38 for the full list and 4.2 for the short list. Taking this as an estimate for the probability of error, differences of less than 5 percent between two scores should probably be ignored.

Table 6: Similarity percentages between signers from the same country

	Complete list	Short list
Russia #1 and #2	72%	76%
Estonia #1 and #2	n/a	76%
Poland #1 and #2	n/a	73%
Slovakia #1 and #2	72%	72%
Slovakia #1 and #3	75%	80%
Slovakia #2 and #3	89%	85%
Czech Republic #1 and #2	84%	88%

There are two possible explanations of these results. It could be that when there were two signers from the same country, each knew and used the synonymous signs reported by the other, but only reported one of the signs that they knew and it happened that many of the signs they did report were different. If this was the case, they could still be said to use the same language, despite their lower scores. Steve Parkhurst (personal communication) has noted that Deaf people in the U.S. seem to place a higher value on conformity than do Deaf in Europe. So, it could be that the standard suggested by the variation within ASL is artificially high as a "definition" of the notion "same language."

On the other hand, if the lower percentages arise because each signer did not know many of the signs provided by the other, then there may be significant barriers to effective communication when such people attempt to talk with each other or use videotapes prepared by the other. Thus, the extent to which these differences in results reflect real dialect differences within each country should be investigated further.

7.2 Clusters of languages

Looking at scores between countries, all of them are well below the upper benchmark used to establish whether two signers use the same language. It is therefore reasonable to conclude that all the countries represented in this study use distinct signed languages.[50]

Indeed, many of the similarity scores between countries are low enough that they are not significantly greater than the similarity found between ASL and Eastern Europe, according to the lower benchmarks established above. However, the results indicate that some of languages are not completely unrelated either. There are two clusters of languages that have similarity scores that are somewhat higher than the benchmarks for unrelated languages.

One cluster of countries includes Russia (both signers), Ukraine, and Moldova. All the scores in this cluster (including those between the two Russians) were about the same—about 70 percent on both lists (see table 11 and table 12). These figures were the highest found anywhere between different countries and about the same as many of the figures in table 6 for signers from the same country. These countries should be investigated further to see how much difference there is between them: whether they represent different dialects of the same language or closely-related languages. Although there were reports that parts of Moldova were influenced by Romanian SL, the results of this study do not show any significant similarity between those two languages. (However, the surveyor only collected data from one signer who may not have been from those parts of Moldova which were reportedly influenced by Romanian SL.) At any rate, the wordlist from Romania does not seem to be part of this cluster, because it does not show any significant similarities to wordlists from Russia or Ukraine, either.

The other cluster includes the central European countries of the Czech Republic, Slovakia, Hungary, and (more marginally) Bulgaria, Poland, and Romania. On the complete list, most countries in this cluster

[50] Two languages that are distinct, as judged by the ability of people to understand each other, may still have a high proportion of words that are similar to each other. However, studies in spoken languages have found that once lexical similarity measures drop below 60 percent, it is always the case that two samples of speech are from distinct languages (Grimes 1988). It is reasonable to expect that a similar generalization would be true for signed languages, although the actual numbers may be different, both because of the modality differences and the methodology used for determining the percentages.

had similarity scores in the range 45–55 percent with each other; and on the short list, several scores were in the 55–65 percent range. These figures are slightly above the benchmark established earlier for considering the possibility of historical connection. One possible explanation for these similarities is that the first schools in the Czech Republic, Slovakia, and Hungary were established by teachers who had been strongly influenced by the school in Vienna, Austria (Dotter and Okorn 2003:62), and it is conceivably possible that Bulgaria, Poland, and Romania also were influenced by this school.[51] That is, the similarities would be due to an earlier instance of social and political connectedness: the Habsburg monarchy and later Austro-Hungarian empire. This means that the languages in this cluster should be compared with Austrian SL [ASQ] and any other sign languages of Western Europe that have historical connections with the school in Vienna or whose countries were part of the Habsburg/Austro-Hungarian empire.[52]

Fortunately, data was also collected from four Austrian signers. These are compared to the data from the rest of the study in table 7 and table 8. In these two tables, the six Eastern European countries that appear to form a cluster of related languages are given in boldface and enclosed in a box.

Table 7: Percentage of similar signs with Austria (complete wordlist)

Austria #1	Austria #2	Austria #3	Austria #4	
33	35	33	36	Russia #1
37	35	34	37	Russia #2
32	34	34	36	Ukraine
35	35	36	38	Moldova
39	39	39	39	Estonia #1
				Estonia #2
				Latvia
				Poland #1
				Poland #2
50	**50**	**48**	**52**	**Slovakia #1**
50	**52**	**48**	**50**	**Slovakia #2**
51	**52**	**50**	**53**	**Slovakia #3**
51	**50**	**51**	**52**	**Czech Republic #1**
51	**50**	**49**	**50**	**Czech Republic #2**
38	**40**	**41**	**40**	**Romania**
48	**51**	**52**	**50**	**Hungary**
43	**46**	**45**	**47**	**Bulgaria**
				Croatia
38	43	42	43	ASL #1
37	43	41	42	ASL #2
37	41	39	41	ASL #3
37	39	36	40	ASL #4

[51] There are also the reports that during the early nineteenth century, children from northern regions of Yugoslavia were sent to school in Austria and Hungary. The results from Croatia do not show any evidence of a connection to these two countries. However, only a short wordlist was collected and further wordlist collection is needed from other parts of former Yugoslavia. So, some of the Yugoslavian republics may also be part of the central European cluster.

[52] Dotter and Okorn (2003:62) provide such a list of schools that also includes schools in present-day Italy, Slovenia, Ukraine, and Germany.

Table 8: Percentage of similar signs with Austria (short wordlist)

Austria #1	Austria #2	Austria #3	Austria #4	
49	44	44	42	Russia #1
51	45	47	46	Russia #2
40	40	40	40	Ukraine
44	42	46	46	Moldova
51	43	46	44	Estonia #1
49	45	47	45	Estonia #2
51	48	44	45	Latvia
54	**55**	**51**	**56**	**Poland #1**
57	**52**	**51**	**54**	**Poland #2**
59	**57**	**57**	**59**	**Slovakia #1**
59	**57**	**57**	**57**	**Slovakia #2**
65	**62**	**62**	**66**	**Slovakia #3**
68	**65**	**63**	**63**	**Czech Republic #1**
64	**60**	**56**	**57**	**Czech Republic #2**
51	**49**	**50**	**46**	**Romania**
61	**60**	**60**	**57**	**Hungary**
59	**55**	**58**	**58**	**Bulgaria**
55	52	52	52	Croatia
52	54	54	52	ASL #1
51	53	51	51	ASL #2
46	48	47	47	ASL #3
51	51	47	51	ASL #4

It can be seen from these tables that Austria did indeed show greater similarity to these six countries, and especially to the core group of the Czech Republic, Slovakia, and Hungary, than to most of the other countries.[53] Therefore, Austria should be included in further surveys that explore connections among this group of central European countries.

It is not surprising that the figures for the central European cluster are lower than for the Russia/Ukraine/Moldova cluster. Most of the central European countries established their first deaf schools before the beginning of the twentieth century, and the Austro-Hungarian empire was broken up in 1918, so there has been considerable time for the languages in the central European cluster to diverge from each other. In contrast, reports from Moldova indicate that schools there were founded during the twentieth century and suggest that there was strong influence from Russian SL more recently. Further, Ukraine and Moldova were actually part of the USSR, whereas the central European countries were never under a common government.

The Austro-Hungarian connection appears to be more significant for most Eastern European countries than their association with the Soviet Union, since there is no significant similarity between signers from Russia and those from most other Eastern European countries. This is contrary to what I initially expected; it seems that the Soviet dominance of Eastern Europe during the twentieth century had little influence on most of the signed languages of the region.[54]

The above clusters of signed languages are summarized in figure 11, with the approximate degree of lexical similarity represented by the width of the line enclosing each cluster.

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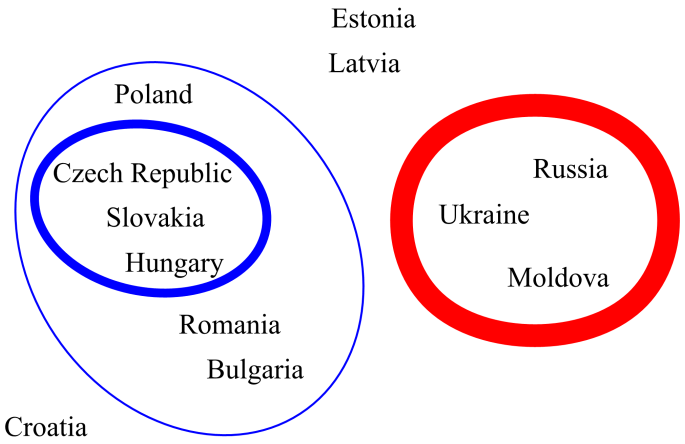
[53] Interestingly, the similarity scores, when comparing Austria to ASL, were also somewhat elevated. This may point to a connection between Austrian Sign Language and ASL, perhaps through Old French Sign Language, but that is not the focus of the current paper.

[54] It is interesting that Poland shows more similarity to central Europe than to Russia, even though the school in Warsaw was founded when it was under Czarist control; on the other hand, only a short wordlist was available from Poland, so it is not clear how reliable the results are.

Figure 11: Clusters of signed languages in Eastern Europe



In passing, it is worth pointing out that the central European cluster illustrates a principle that is important in signed language survey. Patterns of relatedness among signed languages do not necessarily follow the same patterns as the spoken languages in the same region. Thus, for example, spoken Hungarian is unrelated[55] to the national languages of the countries that surround it, but Hungarian SL does seem to have some connection to the signed languages of those countries. This is because natural signed languages are independent from spoken languages, with their own vocabulary and grammar; they are not signed versions of spoken languages, have no necessary connection to them, and have their own independent history.[56]

One other pair of languages perhaps deserves a closer look. Recall that it has been reported that Russian SL is used by some Deaf people in Bulgaria, implying some possibility of influence between the two languages. The lexical similarity figures for Bulgaria vs. Russia were indeed slightly higher than the benchmarks for statistical significance.

7.3 Limitations of the current survey

A final word of caution is in order in interpreting the results of this study. A preliminary survey of this sort is not meant to provide definitive results about the relatedness or identity of different languages. Besides the various caveats mentioned above, another important factor is that lexical similarity is only one facet of what is involved in comparing languages. Grammatical structure and other differences can be just as significant; two languages can have very similar vocabulary but enough other differences to make it difficult for people to communicate with each other. For further discussion of these issues, see B. F. Grimes 1988 and J. Grimes 1988.

Thus, just because two signers show 75 percent similarity to each other does not mean that they necessarily speak distinct but related languages, even though this number is below the benchmark established for two samples of the same language and above the benchmark for unrelated languages. A 75 percent score suggests that there is a good chance that two signers use related, but distinct, languages. However, there are better measurements available than lexical similarity for drawing these sorts of conclusions. These include the comparative method, recorded text testing, and sentence repetition tests

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[55] That is, except for the possibility of very deep relationships.

[56] There do exist signed versions of spoken languages, such as Signing Exact English, that are sometimes confused with natural signed languages. Also, Deaf people sometimes sign in a way that mimics the grammatical structure of the spoken language used around them, especially when interacting with hearing people or in formal, official or academic settings. In this paper, however, I am interested only in the natural sign language that is used by Deaf people among themselves in ordinary social situations.

(Grimes 1995). The survey of signed languages in Spain done by Parkhurst and Parkhurst (2001) is a good example of how several of these techniques can be applied to signed languages.

However, a more refined survey requires more time and effort, so is usually not attempted until one has an approximate idea of what language relationships may exist. The intent of the present study has been to develop that approximate understanding of Eastern Europe so that further studies can proceed more efficiently—by testing only those groups of languages where there is reason to believe that genetic relationship or significant borrowing may exist.

8. Recommendations for further survey

In this section, I give recommendations for further studies on the languages of this region.

1) It seems reasonable to adopt as a working assumption that the countries in this study have signed languages that are distinct from each other, with the possible exception of the Russia/Ukraine/Moldova cluster (since it shows results that are close to what were found within certain countries, although not as high as what was found within ASL). The evidence so far favors such a hypothesis, so I recommend that language planners continue to treat each country as having a distinct language, until there is evidence that any signed languages cross national borders.

2) Two clusters of languages look like good candidates for more detailed surveys that would compare languages between countries: the countries of central Europe (those which were part of or near to the Habsburg/Austro-Hungarian empire or which were under influence from the Vienna school), and the cluster of Russia, Ukraine, and Moldova. As mentioned above, such surveys should use more precise measures such as intelligibility testing, rather than relying on wordlist comparisons alone. They should include other countries outside Eastern Europe that may be part of the same cluster. For example, Austria should be included in studies of the central Europe cluster, as well as parts of neighboring countries (e.g., southern Germany, cf. List 1994:220). With regard to the Russia/Ukraine/Moldova cluster, other republics that were part of the Soviet Union should be checked for influence from Russian SL.[57]

3) The possible connections of Estonian SL with the signed languages of Sweden, Finland, and Russia should be checked out, first with wordlist comparisons and then, if there is evidence of significant influence, by more precise measures.

4) An important question that remains largely unanswered by this study is the amount of variation within each country, both dialect variation within the same signed language and the possible existence of two or more distinct signed languages (including cases where a signed language is reportedly used outside of its country of origin, such as Romanian SL in Moldova and Russian SL in Estonia, Bulgaria, and Moldova). Both the qualitative observations in section 3 and the results summarized in table 6 suggest that there may be significant variation within some countries, but it is not at all clear how extensive it is.[58] Since, for most countries, a wordlist was collected from only one or two signers, whatever internal variation may exist in those countries is only hinted at in the results of the present study. Thus, the next step in surveying these countries should be to collect data from several signers in different parts of each country (particularly the cities noted in this study where there are Deaf schools and associations) and make comparisons within the country. Unless the differences are so great as to constitute obviously distinct languages, it will probably be necessary to go beyond wordlist collection to direct testing of intelligibility or bidialectal proficiency. Once new information is collected within each country, it may also be important

[57] Wordlist data has been collected from some of these countries and results will be presented in a later report.

[58] Camille Beckham (personal communication) has observed that complaints about "lack of standardization" tend to arise in three situations: 1) from hearing people who are trying to learn the language, 2) from Deaf people who have been told by hearing people that their language is not "as good" because it is not standardized, and 3) within specific semantic domains, such as religious signs that vary between churches or denominations. For further discussion of standardization among dialects of signed languages, see Bickford 1991:267–270.

to compare certain dialects of each country with signed languages in other countries, since some dialects of a language may be more like particular foreign signed languages than others are.

5) Finally, wordlist data should be collected from those countries where the surveyor was not able to obtain wordlists, namely Lithuania, Belarus, Albania, and the countries in the former Yugoslavia (see the map in figure 1).

Appendix 1: Wordlist

In this appendix are listed English glosses of the words that were requested when collecting the wordlists from each person, along with the word class of each. Items number 1–84 were presented by means of pictures; this is the group of words that is referred to as the "short list." The rest of the words were presented in writing when possible, using some language that the person giving the wordlist could read.

	Word Class	English
1	n.	cat
2	n.	fish
3	n.	chicken
4	n.	mouse
5	n.	dog
6	n.	snake
7	n.	lion
8	n.	elephant
9	n.	horse
10	n.	bear
11	n.	bull/cow
12	n.	fly (insect)
13	n.	apple
14	n.	milk
15	n.	bread
16	n.	egg
17	n.	carrot
18	n.	meat
19	n.	wine
20	n.	corn
21	adj.	blue
22	adj.	green
23	adj.	black
24	adj.	white
25	adj.	red
26	n.	knife
27	n.	flower
28	n.	leaf
29	n.	tree
30	n.	table
31	n.	window
32	n.	shirt
33	n.	shoe
34	n.	bed
35	n.	airplane
36	n.	car
37	n.	bus
38	n.	money
39	n.	sun
40	n.	moon
41	n.	star(s)
42	n.	1
43	n.	2
44	n.	3
45	n.	4
46	n.	5
47	n.	6
48	n.	7
49	n.	8
50	n.	9
51	n.	10
52	n.	100
53	n.	1000
54	n.	Africa
55	n.	Europe
56	n.	Jesus
57	n.	Virgin Mary
58	n.	angel
59	n.	priest
60	n.	nun

61	n.	church
62	n.	fire
63	n.	soldier
64	n.	doctor
65	n.	man
66	n.	woman
67	n.	boy
68	n.	girl
69	n.	baby
70	n.	bathroom
71	n.	book
72	n.	door
73	n.	house
74	n.	land/field
75	n.	light (or light bulb)
76	n.	mountain
77	n.	ocean
78	n.	river
79	n.	rock
80	n.	rain
81	n.	snow
82	n.	ice
83	v.	to sit
84	v.	to stand
(short list ends here)		
85	n.	wind
86	n.	winter
87	n.	summer
88	n.	birthday
89	n.	blood
90	n.	city
91	n.	friend
92	n.	wood
93	n.	school
94	n.	teacher
95	n.	water
96	adv.	fat
97	adv.	thin/skinny
98	adv.	cold
99	adv.	hot
100	adv.	dirty
101	adv.	clean
102	adv.	sad
103	adv.	happy
104	n.	day
105	n.	night
106	adv.	afraid
107	adv.	dry
108	adv.	wet
109	adv.	sweet
110	adj.	old
111	adj.	young
112	adv.	true
113	adv.	false
114	adj.	good
115	adj.	bad
116	adv.	beautiful
117	adv.	ugly
118	adv.	yes
119	adv.	no
120	--	thank you
121	--	response to thank you
122	adv.	weak
123	adv.	strong
124	adv.	envy
125	adv.	free
126	adv.	angry
127	v.	to exercise
128	v.	tired
129	v.	to ask
130	v.	to begin
131	v.	to end
132	v.	to continue
133	v.	to build
134	v.	to buy
135	v.	to confess
136	v.	to come
137	v.	to cook
138	v.	to dance
139	v.	to die
140	v.	to live
141	v.	to sleep
142	v.	to dream
143	v.	to eat

144	v.	to fight
145	v.	to forgive
146	v.	to go
147	v.	to hate
148	v.	to help
149	v.	to kill
150	v.	to listen
151	adv.	deaf
152	v.	to see
153	v.	to search
154	v.	to lie
155	v.	to need
156	v.	to meet
157	v.	to pay
158	v.	to play
159	v.	to read
160	v.	to sell
161	v.	to sign
162	v.	to sing
163	v.	to understand
164	v.	to work
165	v.	to write
166	v.	to love
167	pro..	what?
168	adv.	when?
169	adv.	where?
170	pro.	who?
171	adj.	how many?
172	adv.	how?
173	adj./adv.	all
174	adj./adv.	almost
175	adv.	always
176	n.	garbage
177	adj.	hungry
178	n.	law
179	n.	many
180	adj./adv.	more
181	n.	name
182	adv.	never
183	adj.	new
184	adv.	nothing
185	adj./adv.	now
186	adj./adv.	only
187	adj.	other
188	n.	paper
189	v.	peace
190	adj./adv.	some
191	n.	story
192	n.	animal(s)
193	n.	salt
194	adj.	colors
195	n.	poor person
196	adj.	wealthy person
197	n.	January
198	n.	February
199	n.	March
200	n.	April
201	n.	May
202	n.	June
203	n.	July
204	n.	August
205	n.	September
206	n.	October
207	n.	November
208	n.	December
209	n.	month
210	n.	week
211	n.	year
212	n.	Monday
213	n.	Tuesday
214	n.	Wednesday
215	n.	Thursday
216	n.	Friday
217	n.	Saturday
218	n.	Sunday
219	n.	God
220	n.	devil
221	v.	sin
222	n.	judge
223	n.	president
224	n.	family
225	n.	mother
226	n.	father
227	n.	child

228	n.	son
229	n.	daughter
230	n.	brother
231	n.	sister
232	n.	grandfather
233	n.	grandmother
234	n.	cousin
235	n.	spouse
236	n.	boyfriend
237	n.	girlfriend
238	n.	sweethearts
239	n.	police
240	n.	kitchen

Appendix 2: Results of wordlist comparisons

Table 9: Total signs available for comparison (complete wordlist)

Russia #1																						
214	Russia #2																					
223	225	Ukraine																				
222	225	234	Moldova																			
223	226	235	235	Estonia #1																		
					Estonia #2																	
						Latvia																
							Poland #1															
								Poland #2														
199	203	211	211	212					Slovakia #1													
217	222	230	230	231					209	Slovakia #2												
220	225	233	233	234					211	233	Slovakia #3											
219	222	229	230	231					210	227	229	Czech Republic #1										
220	224	232	233	234					210	229	232	231	Czech Republic #2									
213	217	225	226	226					204	222	225	223	225	Romania								
224	228	236	237	238					214	233	236	233	236	228	Hungary							
223	227	235	236	237					213	232	235	232	235	227	239	Bulgaria						
																Croatia						
224	228	236	237	238					214	233	236	233	236	228	240	239	ASL #1					
223	227	235	236	237					213	232	235	232	235	227	239	238	239	ASL #2				
221	226	233	234	235					211	231	234	230	233	226	237	236	237	237	ASL #3			
199	205	211	212	213					191	210	212	209	211	203	215	214	215	214	212	ASL #4		

Table 10: Total signs available for comparison (short wordlist)

Russia #1																				
67	Russia #2																			
73	77	Ukraine																		
73	77	83	Moldova																	
73	78	83	83	Estonia #1																
72	77	82	82	83	Estonia #2															
73	78	83	83	84	83	Latvia														
73	78	83	83	84	83	84	Poland #1													
73	78	83	83	84	83	84	84	Poland #2												
71	77	81	81	82	81	82	82	82	Slovakia #1											
68	74	78	78	79	78	79	79	79	78	Slovakia #2										
71	77	81	81	82	81	82	82	82	80	79	Slovakia #3									
70	75	79	79	80	80	80	80	80	80	76	78	Czech Republic #1								
73	78	83	83	84	83	84	84	84	82	79	82	80	Czech Republic #2							
73	78	83	83	84	83	84	84	84	82	79	82	80	84	Romania						
73	78	83	83	84	83	84	84	84	82	79	82	80	84	84	Hungary					
72	77	82	82	83	82	83	83	83	81	78	81	79	83	83	83	Bulgaria				
70	76	80	80	81	80	81	81	81	79	77	80	77	81	81	81	80	Croatia			
73	78	83	83	84	83	84	84	84	82	79	82	80	84	84	84	83	81	ASL #1		
72	77	82	82	83	82	83	83	83	81	78	81	79	83	83	83	82	80	83	ASL #2	
72	77	82	82	83	82	83	83	83	81	78	81	79	83	83	83	82	80	83	83	ASL #3
64	70	74	74	75	74	75	75	75	74	72	74	72	75	75	75	74	73	75	74	74	ASL #4

Table 11: Percentage of similar signs (complete wordlist)

	Russia #1	Russia #2	Ukraine	Moldova	Estonia #1	Estonia #2	Latvia	Poland #1	Poland #2	Slovakia #1	Slovakia #2	Slovakia #3	Czech Republic #1	Czech Republic #2	Romania	Hungary	Bulgaria	Croatia	ASL #1	ASL #2	ASL #3	ASL #4
Russia #1																						
Russia #2	72																					
Ukraine	74	72																				
Moldova	73	67	74																			
Estonia #1	43	41	42	42																		
Estonia #2																						
Latvia																						
Poland #1																						
Poland #2																						
Slovakia #1	37	36	35	35	40																	
Slovakia #2	39	37	38	37	36					72												
Slovakia #3	40	40	41	39	40					75	89											
Czech Republic #1	37	35	38	41	36					50	52	53										
Czech Republic #2	34	33	34	36	34					48	50	52	84									
Romania	41	41	41	40	38					40	45	48	40	39								
Hungary	38	36	37	38	38					46	51	53	49	50	48							
Bulgaria	46	46	44	43	43					46	48	50	44	41	46	39						
Croatia																						
ASL #1	41	39	38	43	36					34	36	39	41	39	34	40	41					
ASL #2	39	36	37	42	34					33	35	38	42	39	33	39	39		92			
ASL #3	39	37	36	42	34					33	34	38	41	39	31	38	38		94	92		
ASL #4	36	33	34	41	32					30	32	35	43	39	31	37	36		89	91	89	

Table 12: Percentage of similar signs (short wordlist)

Russia #1																				
76	Russia #2																			
71	65	Ukraine																		
73	68	64	Moldova																	
49	49	42	47	Estonia #1																
50	45	51	49	76	Estonia #2															
56	53	54	58	48	54	Latvia														
48	40	39	45	36	40	44	Poland #1													
44	44	36	43	36	41	48	73	Poland #2												
48	52	44	44	48	44	45	45	51	Slovakia #1											
46	46	44	44	43	47	46	49	49	72	Slovakia #2										
51	53	47	46	52	52	55	51	55	80	85	Slovakia #3									
47	47	47	54	43	46	53	60	60	58	66	64	Czech Republic #1								
45	46	41	47	42	45	46	60	60	54	62	62	88	Czech Republic #2							
48	50	41	47	45	47	51	48	52	49	54	57	55	51	Romania						
52	50	46	48	46	49	50	52	54	52	58	57	64	60	56	Hungary					
56	61	48	51	54	49	51	51	49	59	58	63	59	55	59	52	Bulgaria				
41	46	34	35	37	36	44	44	44	48	51	53	51	48	56	51	51	Croatia			
48	45	39	46	46	41	46	39	38	46	48	52	48	44	46	48	49	41	ASL #1		
50	44	40	46	42	41	49	40	40	46	49	49	49	46	46	47	48	40	92	ASL #2	
42	39	33	41	42	37	41	39	37	42	42	46	42	41	41	42	43	36	90	86	ASL #3
47	41	36	45	43	42	45	44	40	42	47	46	56	49	44	44	46	40	88	89	85	ASL #4

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