

Lexical expressions of time in Russian Sign Language

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Abstract: We studied lexical expressions of time in Russian Sign Language (RSL). We collected lexical signs describing a variety of time-related concepts produced by 15 RSL signers from different regions. We then analysed semantic, iconic, and morphological properties of these signs, as well as possible interaction between RSL and Russian in this domain. We found out that RSL has a large system of time-related lexemes of all common semantic types. Some of these signs are iconic (and involve metonymy and metaphor). Other signs are non-iconic, and probably borrowed from Russian, as they involve initialization or assimilated fingerspelling sequences. Morphologically, many of the basic time-related signs are simple, but RSL also has a number of compounds in this domain. Finally, numeral incorporation is very common for lexical time expressions in RSL, although it is restricted by both lexical and phonological constraints.

1. INTRODUCTION

All languages have lexical and/or grammatical means of talking about time (Sinha & Bernárdez 2015). Sign languages are no exception. In this paper, we describe lexical¹ time expressions (including calendric terms) in Russian Sign Language (RSL) and analyse them from the linguistic point of view, by answering a number of questions: Which semantic sub-fields are there in the domain of time? What are the patterns of iconicity and metaphor underlying the calendric signs? What are morphological properties of these signs? What role does contact with a spoken language (namely, Russian) play in the domain of calendric signs?

Time expression has been actively studied primarily by cultural anthropologists (Gell 1992; Sinha & Bernárdez 2015). For instance, it has become clear that calendric terminology is very different between different communities (e.g. the Mayan civilization uses three different calendric systems while Nuer do not use either calendar or clock systems (Sinha et al. 2011:143–144)). A topic that has been studied by both linguists and anthropologists is whether time is always conceived in terms of space, as is the case for instance in English (e.g. the same prepositions are used in both spatial and temporal contexts: *in the house* vs. *in an hour*). Haspelmath (1997) in a typological study found that all languages in his sample show some kind of spatial expression of time. On the other hand, recent research has argued against the universality of the space-based time systems (Sinha et al. 2011). Within linguistics, time is usually studied in the context of grammaticalized expressions of time, that is, tense marking (Dahl 1985).

Sign languages, such as RSL, are natural languages sharing the fundamental properties with spoken languages (Sandler & Lillo-Martin 2006). Therefore, it is expected that they will have time expression systems similar to those found in spoken languages. However, due to the visual-gestural modality in which they exist, sign languages have some special properties (Meier 2012). One of such properties that distinguishes sign languages from spoken languages is the abundance of iconicity on all linguistic levels. Another almost universal property of sign languages is their use of space for various purposes. It is important to consider how modality might affect time expressions as well. Therefore, we will not only describe semantic and morphological properties of lexical time expressions in RSL, but also discuss the role of iconicity, and, to some extent, the use of space in this domain.

¹ RSL also has some partially grammaticalized signs to refer to the past and the future, as well as to express a number of aspectual meanings (Filimonova 2016), but these phenomena fall outside the scope of this paper. Another issue that we do not discuss here is the syntactic properties of time expressions (for some information see Kimmelman (2017)). Another topic that we do not consider in this paper are expressions of temporal distance, such as LONG.AGO, RECENTLY, NEAR.FUTURE, although RSL has such expressions as well.

Another important feature of most sign languages is that they are in constant contact with a spoken language (at least in the written form) used in the same country. Such intensive language contact leads to instances of borrowing, which have also been described for some sign languages (Adam 2012). We thus also consider how Russian time expressions could have influenced the system of time expression in RSL, both on the general (systematic) level as well as on the level of specific signs.

2. RUSSIAN SIGN LANGUAGE

Russian Sign Language is a natural sign language used on the territory of Russia and in several other countries of former USSR (Kibrik 2008). Zeshan (2006) list RSL as a member of the Old French Sign Language Family, but their relatedness is contested (Bickford 2005). It started to emerge in 1806, when the first Deaf school opened in Pavlovsk; the emerging language and fingerspelling system were first mentioned in Victor Fleuri's book on Deaf education in 1935 (Basova & Yegorov 1986). The first linguistic analysis of RSL was carried out by Zaitseva in 1969. Despite its long history, RSL was officially recognized as a language only in 2012. According to the official 2012 census, 120 000 people use RSL, but unofficial estimations of the number of signers are much higher.

Variation attested in RSL has been attributed to regional (Moscow, St. Petersburg, and Novosibirsk dialects), social, and generational differences (Grenoble 1992, Burkova & Varinova 2012), as well as to the influence of manually coded Russian (Zaitseva 2000). Among the sources of variation, common for sign languages, the system of Deaf education has to be mentioned: Deaf schools are typically boarding schools, but Deaf and hard of hearing students are placed in different institutions. Most teaching methods are based on the oralist tradition, and RSL is not taught at schools. At the same time, RSL coexists with manually coded Russian (MCR) (Grenoble (1992) uses the term Signed Russian) – an artificially created system, using signs to mirror the utterances in spoken Russian. MCR was historically taught to interpreters and used in official contexts (Grenoble 1992; Zaitseva 1978). Several printed RSL dictionaries were published (Geilman 1975, 1981; Bazoev et al. 1995; Fradkina, 2004), and two dictionaries can be found online: Surdoserver (<http://surdo.asmon.ru/>) and Spreadthesign (www.spreadthesign.com, international on-line sign language dictionary project). The RSL corpus was developed by Burkova et al. (2012 – 2015).

RSL has a one-handed fingerspelling alphabet that is a kinetic representation of Russian orthography (and not phonetics) (Zaitseva 2000). The numeral system of RSL is two-handed; it is consistent across dialects, although there exists some variation in the numeral range 11 – 15 (the dictionary by Geilman (1981) gives the two-handed version of these numerals, while Zaitseva (2000) and all other dictionaries only describe the one-handed variants), but both versions are intelligible by native signers of different dialects.

3. METHODOLOGY

Data collection took place in Moscow and Novosibirsk in 2016. We collected the data by direct elicitation (translation of words written in Russian) into Russian Sign Language and subsequent discussion of the elicited signs, their meanings, and contexts of use. The elicitation was conducted face-to-face. Although it is a common knowledge in the field that using written stimuli in sign language research is not optimal (Herreweghe & Vermeerbergen 2012), given the fact that we were interested in lexical items and not grammatical structures we consider this method appropriate, especially in combination with further discussions of the signs with the participants being conducted in RSL.

Fifteen signers participated in the data collection: signers 1-10 were consulted for the whole dataset, and signers 11-15 only for our investigation of numeral incorporation. The signers were nine males

and six females, age ranging from 18 to 63; note however, that all but one signers are below 36 years old. All but two signers have deaf relatives; however, only ten of the signers learned RSL at home from older relatives. Six of the signers are from Moscow, another four from Novosibirsk, and the rest come from other regions. This means that some of the lexical variation that we found (that is, multiple signs for the same notion) could be regional. We did not systematically pursue regional differences because our sample was small and not representative of the whole territory on which RSL is used.² Sociolinguistic properties of the signers are summarized in Table 1.

INSERT TABLE 1 HERE

The participants were recruited through personal contexts of the authors; they are thus not likely to be a representative sample of all RSL signers. The signers gave us permission to use the recordings for analysis and publications.

In addition to using elicited data, we used some data from on-line dictionaries and Youtube videos of Russian Sign Language found on the Internet.

In order to collect time expressions, we used a questionnaire created within the project “Calendric Terms in Sign Languages” by Klára Richterová and colleagues (<http://ujkn.ff.cuni.cz/en/research/calendric-terms/>). This project will result in an open-access database of calendric terms in 24 sign languages. In addition, we collected some time expressions not mentioned in the questionnaire.

4. SEMANTIC CLASSIFICATION

There are various approaches to classification of time expressions in anthropology and linguistics. For instance, one can classify time expressions based on the frame of reference. Sinha & Bernárdez (2015) discuss the difference between deictic time (events seen from the present moment) and sequence time (events represented in terms of ordering). The same difference is targeted by the linguistic terms of absolute vs. relative tenses (Dahl 1985), but it can equally apply to lexical expressions. In this sense, *yesterday* is an absolute (deictic) time expression, as it is assessed in relation to the moment of speech, while *a day before* is a relative (sequence) time expression.

In anthropology, one also sometimes distinguishes time-based and event-based time intervals (Sinha & Bernárdez 2015). The former type is based on some objective measure of time (e.g. *hour, week*). The latter type is based on some significant event and bound to the duration of such event (e.g. *spring, sunrise*). Some languages appear to completely lack time-based time intervals and rely on event-based time expressions only (Evans-Pritchard 1987; Sinha et al. 2011).

Haspelmath (1997) discusses the notion of canonical time periods (the major events used to measure time, usually based on the natural environment), and suggests that there are three main types of such time periods: time units (*hour, day, month, year*), calendar unit names (*January, Sunday*), and qualitative periods (*spring, morning, April*). The difference between the first category and the other two is that the former can be used to express both temporal locations (*in a day*) and temporal extents (*for a day*), while the latter cannot (*in April* is OK, but *for two Aprils* is not³).

² It is interesting to note how much variation we observed in the data. Most of the time-related signs have more than one variant (except for the names of the months which usually have one sign). Usually we found 2-3 variants for a sign, while there are at least six signs for ‘hour’; however, the latter are not all synonymous, as we discuss throughout the paper.

³ According to Haspelmath (1997:27).

Whatever classification we apply, it is clear that RSL has lexical signs of all of these types of temporal expressions. For instance, it has terms for both absolute time: YESTERDAY, TOMORROW, NOW, and for relative time: BEFORE.⁴ Both time-based time intervals, e.g. HOUR, and event-based time intervals, e.g. WINTER can be named. Following Haspelmath's classification, RSL has signs for time units: MINUTE; calendar units: MONDAY, and qualitative periods: SUMMER. In this respect RSL is similar to Russian as well as other European languages.

Going into more details, RSL has signs for clock-based time units of different durations: CENTURY, YEAR, SEASON, MONTH, WEEK, DAY, HOUR, MINUTE, and SECOND. In addition, there are signs for seasons (WINTER, SPRING, SUMMER, AUTUMN) for the months of the year (JANUARY – DECEMBER), and for the days of the week (MONDAY – SUNDAY). Various parts of the day can also be named, including such signs as WHOLE-DAY, MORNING, EVENING, NIGHT, MIDDAY. Some events that are also used for time measurement, such as SUNRISE and SUNSET also can be expressed by lexical signs. RSL has signs that can be used to express temporal location, such as YESTERDAY or duration, such as YEAR or MINUTE. Sometimes an expression is specialized to express either duration or location through either a combination with additional signs (e.g. OVER HOUR 'in an hour') or through numeral incorporation, which we discuss in the corresponding section.

In addition to the "canonical" time expressions, RSL also has signs for concepts that are not necessarily time-related but can also be used for time description, such as signs for historical periods (MEDIEVAL, RENAISSANCE), for holidays and celebrations (BIRTHDAY, EASTER), and for work- and study-related time intervals (LESSON, BREAK, SEMESTER).

5. ICONICITY AND METAPHOR IN CALENDRIC TERMS

There are various approaches to iconicity in sign languages. For instance, one can look at separate components of signs (e.g. handshape, location, movement) and analyse whether these components can be characterized as iconic (Pietrandrea 2002). However, it is desirable to define what iconicity is and how to analyse it systematically.

An influential proposal was developed by Taub (2001; 2012) who argued that iconicity is a resemblance between the form and the meaning of a sign defined by mappings (correspondences) between the two. Taub further suggests that iconic signs involve two levels of correspondences: between the form and the image (that is, the visual representation created by the sign) and between the image and the concept.

As for the former mappings, one can for instance distinguish object mapping (when the hand represents an object), handling mapping (when the hand represents a hand handling the object), contour mapping (the hand represents a boundary of the object) and tracing mapping (the hand moves to trace a boundary of the object).

As for the latter mappings, there is a variety of ways how the concrete image depicted by the sign can map to the concept that it is expressing. Often the sign is an image of a prototypical object while referring also to non-prototypical objects of this kind (e.g. a house with a pyramid roof is depicted to express the general meaning 'house'). Sometimes the sign depicts only a part of the object that it refers to (e.g. the whiskers of a cat to express the meaning 'cat'). In other signs, an action associated with a particular object is depicted (e.g. turning of a key to express the meaning 'key'). Sometimes,

⁴ **Annotation conventions:** We use SMALL CAPS to gloss RSL signs. If a single sign is translated by more than one word, we use the dot to separate the words: LONG.AGO. If multiple distinct signs are glossed with the same word, we use letters after a hyphen to distinguish them: CENTURY-A, CENTURY-B. Parts of compounds are connected by the "^" symbol: WHOLE^DAY. Incorporated numerals are connected by the ":" symbol: 2:HOURL.

to express one concept, a different concept that is strongly associated with it is depicted (e.g. depicting the circles of the Olympic logo to refer to the Olympics). All these types might be characterized as metonymy: the image is not directly encoding a concept, but it is encoding a part or some important characteristic of the concept.

The situation becomes even more complex with signs expressing abstract notions. According to Taub, in such cases, iconic mapping is supplemented with metaphorical mapping. That is, an abstract concept is mapped to a more concrete concept through conceptual metaphor (Lakoff & Johnson 1980), and this concrete concept is then encoded iconically. For instance, the sign ANSWER in RSL is based on the metaphoric connection between communicating (giving information) and giving objects; the concrete concept of giving a small object is iconically represented by the sign.

Time is of course necessarily abstract, so one could expect that all signs that are iconic in this domain are also metaphoric. However, it is sometimes very difficult to distinguish metaphor and metonymy. We think that it is insightful to discuss what the concept-image association in iconic time expressions is based upon.

Firstly, a number of signs represent an associated astronomical event, such as movement of planets. For instance, the sign YEAR-A represents the movement of the Earth around the sun (Figure 1). In the signs DAY, EVENING-A, and NIGHT (Figure 2), the hands depict dimming of the light. In the signs MORNING and EVENING-B (Figure 3), the hand depicts the sun rising or going down. In all of these cases the connection between the concept and the image is probably metonymic because it is not the case that the abstract concept is understood in the terms of the more concrete concept; instead, the abstract concept (the time expression) is expressed by a crucial property of this time event, namely by an associated astronomical event. The event associated with a time expression is not always astronomical: for instance, the sign SPRING depicts melting of snow (Figure 4), and the sign AUTUMN-A represents falling leaves, and the sign WEEKEND depicts arms crossed on the chest (that is, resting).

INSERT FIGURES 1-4 HERE

A similar case is the signs SUNRISE (Figure 5) and SUNSET: here the sign depicts the sun rising or going down, and these are clearly non-metaphoric iconic signs (they refer to the astronomical events themselves, but the meaning can be extended to refer to the time of the event).

INSERT FIGURE 5 HERE

Another concept-image association concerns several signs for the concept 'hour'. In some of these signs (HOUR-B, HOUR-D, HOUR-E), the hand moves in a circle representing the movement of the hand on a clock. In sign HOUR-A (Figure 6), the hand also represents the hand on a clock, but it moves back and forth, not in a circle. Finally, in the sign HOUR-F (Figure 7), the hand represents a hand watch. All of those cases are again probably metonymical: it is not the case that these signs are based on a conceptual metaphor *an hour is a clock*, but on the metonymic association, namely that hours are measured by clocks.

INSERT FIGURES 6-7 HERE

Finally, for some signs we can postulate that the *TIME IS SPACE* metaphor is underlying the iconic representation (see also Arik 2012). For instance, in the sign SEASON-C (Figure 8), the hand represents a small interval. This interval can be directly interpreted spatially, but in this case, it is interpreted as referring to a time interval metaphorically. A number of signs (YESTERDAY, TOMORROW, NEXT.YEAR, etc) contain forward or backward movement which is based on a very common metaphoric use of space known as timelines (Baker-Shenk and Cokely 1980; Pfau, Steinbach & Woll 2012). These signs use the timeline stretching from behind the body forward over the signer's shoulder; however, the lines

running from right to left or vertically in front of the signer can also be used in talking about time: for instance, days of the week or any other expressions referring to time events can be localized on a timeline. This goes beyond the lexical level (the signs themselves are not lexically associated with the timelines, but can be localized on a timeline), so we do not discuss this issue further.

INSERT FIGURE 8 HERE

Another manifestation of the *TIME IS SPACE* metaphor is illustrated by the fact that some spatial adverbials can be used in the temporal sense. Specifically, the sign CLOSE (iconically representing closeness in space) can also mean 'soon' in RSL.

Returning to Taub's approach to iconicity, we notice that as for the form-image mapping, all signs that we discussed above belong to the object type (for instance, the signers hand represents a clock's hand). It is not clear whether this is a coincidence since little research so far has been done on the distribution of the types of form-image mappings in different sematic fields.

An important finding is that a majority of time expressions in RSL do not appear to be iconic. We have to qualify this claim: in fact, if we do not know an iconic motivation for the sign, it does not mean that it does not exist; it is also known that iconicity can be reduced in diachronic change (Frishberg 1975). Some signs are clearly examples of borrowing from Russian – these are discussed in the next section. However, some signs are neither clearly borrowed nor apparently iconic, e.g. CENTURY-B (Figure 9) and WINTER-A (Figure 10).

INSERT FIGURES 9-10 HERE

As for the correlations between iconicity and semantic subtypes of time expressions, most iconic signs come from signs denoting parts of the day. In contrast, the months of the year and the days of the week are almost never iconic.

6. BORROWING

Quite a number of time expressions in RSL are borrowed from or at least influenced by Russian. The most common case is that the sign involves initialization: the handshape represents the first letter of the corresponding word in Russian. Initialized signs include AUTUMN-A, AUTUMN-C, AUTUMN-D, almost all signs for months, most signs for the days of the week, and also signs HOUR-C, HOUR-D, MINUTE-A, MINUTE-B, and SECOND.

In two signs, namely SATURDAY-A and SATURDAY-B, the corresponds not to the fingerspelled initial letter of the word *c*, but to its second letter *y*, which is the second letter of the corresponding word *cyббoтa*. Whether this handshape is indeed motivated by the Russian word is unclear, but it might be the case because another day of the week (Wednesday) also starts with the letter C in Russian, so using the same letter for SATURDAY would not be informative.

A related but different pattern is when a sign does not contain just one letter of the word, but two or three letters. This pattern of borrowing has also been described for American Sign Language (Battison 1978) which uses fingerspelling very frequently. Specifically, the signs MARCH and MAY in RSL are complete fingerspelling of the corresponding Russian words (*мaрч* and *мaй*); the sign for APRIL consists of the first two letters of the corresponding word, namely *a-п*; and the signs for JUNE and JULY contain the first and the third letter of the corresponding words, namely *и-н* (*июнь*) and *и-л* (*июль*). The latter can be explained by the fact that the third letter in these words is actually distinctive, while the other letters are the same. Sign CENTURY-A is also a full fingerspelling of the Russian word *век*.

Interestingly, borrowing, and specifically initialization, does not automatically imply that a sign will be non-iconic. For instance, the sign AUTUMN-A contains the O-handshape (for the corresponding first letter of the word *осень*), but it also iconically depicts leaves falling. The sign HOUR-D contains the handshape used for the first letter of the word *час*, but the sign also contains circular movement representing the movement of the hand of a clock.

It is important to note that Russian influence is not constrained to the level of individual signs. Some compounds discussed in the next section are likely calques of Russian expressions. In general, the whole system of time expressions resembles very closely the system used in Russian. The fact that RSL uses the same calendric system with twelve months and the same week structure with seven days is unlikely to be coincidental. Another instance of Russian influence might be the use of the *TIME IS SPACE* metaphor in both languages. One should note, however, that this metaphor is extremely wide-spread in spoken and sign language across the world.

On the other hand, there are also obvious lexical differences between RSL and Russian. For instance, some RSL signs have polysemy that the corresponding words in Russian do not have. The sign 24.HOUR.DAY also has the meaning 'outer space', which the corresponding Russian word *космос* does not have. The opposite pattern is also attested: Russian uses the word *период* 'period' to refer both to a period of time and to refer to a moment at which something is due (=deadline) while RSL uses two distinct signs to express these two meanings. Finally, some of the time expressions in RSL do not have a direct one-word equivalent in Russian. For instance, the sign TIME^CLOCK (Figure 11) can be translated as 'some time later'.

INSERT FIGURE 11 HERE

7. MORPHOLOGY OF CALENDRIC TERMS

7.1 Simple signs and compounds

Many of the signs expressing time in RSL are morphologically simple signs. For instance, all days of the week and all months are morphologically simple. In addition, it seems that the most basic calendric terms, that is, YEAR, MONTH, DAY, HOUR, MINUTE, SECOND are all simple.

Some signs can be analysed as compounds (Meir 2012). For instance, in addition to the simple sign SEASON-C, the same meaning can be expressed by two compounds: TIME-A^YEAR and TIME-A^TIME-B^YEAR. This might be another instance of borrowing, because Russian has a similar expression for season which literally translates as 'time of the year'. The situation is different for the meaning 'weekend': in addition to the simple sign WEEKEND-A (the same sign is used for REST), the following compounds can be used: REST^DAY, REST^CLASS and REST^PERIOD. In contrast to the signs for 'season', these compounds do not follow a Russian model where the meaning 'weekend' is expressed by a simple word with a single stem. Another example of a non-borrowed compound is the sign 24.HOUR.DAY – it is in fact a combination of the signs SUNRISE^SUNSET, which is a coordinate compound – a phenomenon not readily found in Russian.

Some compounds show phonological assimilation processes that distinguish them from simple juxtapositions of separate signs. An interesting case is represented by three signs that are used to express the meaning 'a whole day'. One is a compound which clearly consists of two parts that also occur independently: WHOLE^DAY (Figure 12). Another form WHOLE.DAY is similar, but it appears that the parts have merged together through various phonological processes (Figure 13): orientation of the hand in the first part assimilates with the second part, the movement in both parts is reduced,

the transitional movement⁵ becomes lexical, and the second hand in the second part of the sign is dropped. Finally, the third way to express the same meaning is probably a compound MORNING^EVENING (Figure 14), but the first part of this compound is substantially reduced in comparison to the lexical sign MORNING: the location of the lexical sign is on the face, while the compound is fully articulated in the neutral space: this way the whole compound obeys the phonological restriction that only one major location is possible within a sign. In addition, the non-dominant hand of the second part of the compound has spread to the first part of the compound. Similar assimilation processes in compounds have also been described for other sign languages (Liddell & Johnson 1986; Meir 2012).

INSERT FIGURES 12-14 HERE

7.2 Incorporation of numerals

It has been shown that sign languages favour nonconcatenative morphology, where morphemes are simultaneously superimpose rather than sequentially organized in a linear way (Liddell 1996; Aronoff, Meir & Sandler 2005). One of the simultaneous morphological processes common for most of the world's developed sign languages is numeral incorporation, that is, the simultaneous combination of a numeric sign with a lexical one (Figures 15-16 show incorporation of the numeral 2 in the sign O'CLOCK). In many of world sign languages calendric terms incorporate numbers; numeral incorporation in signs referring to school grades and money is also common, but less frequent (Sagara & Zeshan 2013). RSL has a rich system of numeral incorporation, including, besides calendric terms, a sign for currency (RUBLE), weight measurement (KG) and PERSON.

INSERT FIGURES 15-16 HERE

Numeral incorporation in RSL is highly restricted both phonologically and lexically: not all calendric terms can incorporate numbers, and not all numerals can be incorporated. RSL allows numeral incorporation mostly in time signs (YEAR-A, MONTH, WEEK, HOUR-A, HOUR-E, MINUTE, YESTERDAY, TOMORROW and others). Some time units, however, do not allow numeral incorporation (YEAR-A, WEEK-B, HOUR-B, HOUR-C, HOUR-D, HOUR-F, SECOND, and DAY).

Numeral incorporation in signs referring to historic periods (CENTURY), days of the week (MONDAY), names of the months (MAY) and seasons (WINTER) is not attested in RSL. On the other hand, the sign YEAR-A can incorporate not only number, but also past/future markers (see below).

There are no uniform limits of incorporation across paradigms; however, most signs (such as YEAR-A, WEEK-A, MINUTE) incorporate only one-handed numerals (1-5). Signs MONTH and WORKING.HOUR⁶ also incorporate two-handed numerals (6-9), and limits for the sign HOUR differ across signers, but allow incorporation of two-handed numerals (10 – 13/15). Several time signs (MINUTE, MONTH, HOUR-C) also change the lexical base while incorporating numerals, or exist only as incorporating paradigm (WORKING.HOUR), without any independent lexical base, so the movement can be considered a bound root morpheme. Similar phenomena are also attested in ASL (Jones 2013).

The differences in limits and constraints on incorporation and the use of different base seem to be phonologically conditioned and depend on the complexity of both particular lexical sign and numeral that is (or is not) to be incorporated.⁷ For example, as in DGS and ASL, numerals with internal

⁵ The movement between the two components of the sign.

⁶ This sign refers to the amount of hours per day that a person work, so for examples 6:WORKING.HOUR is used to refer to a six-hour working day.

⁷ The detailed discussion of morpho-phonological rules of numeral incorporation in RSL is beyond the scope of this paper; the details may be found in Semushina (2016).

movements⁸ are never incorporated (Jones 2013; Mathur & Rathmann 2009). On the other hand, signs with complex handshape that have all fingers selected (SECOND, DAY, HOUR-B, HOUR-D) do not allow numeral incorporation, in line with the study of constraints on simultaneous morphology in DGS and ASL (Mathur & Rathmann 2009). The comparison between the signs HOUR-D and HOUR-E (Figure 17) may be used as an argument in favor of the phonological (and not semantic) explanation of numeral incorporation rules. Both signs have the same meaning, both include circular movement that iconically represents the clock, but only HOUR-E allows numeral incorporation (Figure 18), as it has an unmarked handshape.⁹ The sign HOUR-D is initialized and has a handshape Ч (first letter in Russian *час* ‘hour’) that cannot be deleted.

INSERT FIGURES 17-18 HERE

The sign YEAR-A can incorporate not only number, but also past/future markers (Figure 19). The possible explanation may lie in phonology: the location (chin) of YEAR-B is close to the time marker’s location (the shoulder). Other time signs combine with the past/future markers periphrastically.

INSERT FIGURE 19 HERE

Besides phonological, there are lexical restrictions on numeral incorporation. For example, our language consultants showed us the paradigm HOUR that allows incorporation up to 15. Nevertheless, many signers would reject variants like 13:HOUR as improbable, as it is hard to find a context for this form. However, in a particular context (for example, the length of train ride or transatlantic flight) these forms were accepted. Similar restrictions apply to the sign WORKING.HOUR: this construction refers to a period of work without breaks, typical length of working day. Thus, the limits and constraints on incorporation depends both on context and phonology: numbers including internal movement or marked handshape still cannot be incorporated.

Interestingly, it appears that the patterns of numeral incorporation are also influenced by Russian. According to our language consultants, sign YEAR-A (Figure 1) refers to year as a unit of calendar and does not allow numeral incorporation. It is also used in “frozen expressions”, like “New Year”. However, on the Internet and in our own data, we have found the incorporated forms 2:YEAR-A and 3:YEAR-A, 4:YEAR-A referring to a child’s age (where usually sign YEAR-B is used). Although we may predict the incorporation of another one-handed numeral, 5, it doesn’t happen: when the context included 5, the sign YEAR-B was used. This may be related to the fact that in Russian, when referring to age or period of time, the lexeme *год* [got] ‘year’ is used together with numbers 1, 2, 3 and 4, while other numbers require the other lexeme, *лет* [let] ‘year.PL’. RSL also has two paradigms with this meaning, and the pattern of this distribution may have been thus borrowed from Russian.

8. CONCLUSIONS

In this paper, we described lexical expressions of time in RSL. Based on elicited data produced by 15 signers from different regions, we concluded that RSL has a large system of time-related lexemes of all common semantic types. In particular, RSL has signs for relative and absolute time, and for both time-based and event-based time expressions. Lexically the system of time related signs in RSL resembles the system used in Russian, although it does not completely mirror it.

We also looked at iconic motivation of time signs in RSL. Some signs turned out to be iconic, and also involve metaphoric or metonymic mapping: e.g. signs for the concept ‘hour’ either have a circular movement depicting the movement of a clock’s hand, or they depict the clock itself, and some signs

⁸ That is, numeral signs which in non-incorporated forms contain movement.

⁹ Unmarked handshapes are phonologically simple handshapes such as 1 (an extended index finger, B (a flat hand), 5 (a flat hand with spread fingers), and S (a fist).

for seasons depict natural events associated with the seasons. We also found that, similar to most spoken and signed languages, RSL uses the *TIME IS SPACE* metaphor.

However, a majority of the RSL time expressions are not iconic. Some of the non-iconic signs are initialized or contain fingerspelled sequences. This is a manifestation of Russian influence on RSL. The borrowing process is also manifested in some compounds whose structure is parallel to the corresponding Russian compounds.

Morphologically, the most basic time expressions in RSL are simple signs. However, RSL also uses a number of compounds. Numeral incorporation is an important morphological process in this domain, as many time expressions allow it. However, incorporation is constrained both lexically and phonologically.

To sum up, RSL has a rich system of signs expressing time-related concepts. These signs present an interesting phenomenon as they demonstrate various phenomena in RSL semantics, iconicity, and morphology, as well as a possible interaction between RSL and Russian.

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Table 1. Sociolinguistic background of the signers. HoH: hard of hearing.

code	deaf/ HoH	gender	birth year	deaf or HoH relatives	city of schooling	learned RSL at
S1	deaf	male	1989	mother, father, sister, uncle, aunt	Novosibirsk	Home
S2	deaf	female	1994	mother, father, aunt, uncle, brother, cousin, grandfather	Novosibirsk	Home
S3	deaf	male	1991	mother, father, aunt	Novosibirsk	Home
S4	deaf	male	1998	older sister, aunt	Achinsk	School
S5	deaf	male	1996	older sister, niece	Yakutsk	school
S6	deaf	female	1994	mother, father, older sister, cousin	Novosibirsk	school
S7	deaf	male	1987	no	Moscow	school
S8	deaf	male	1985	mother, father, sister, aunt	Moscow	home
S9	HoH	male	1990	mother	Moscow	home
S10	deaf	female	1953	parents, grandparents	Moscow	home
S11	deaf	female	1983	parents, husband, children	Moscow	home
S12	deaf	male	1970	parents, grandparents	Moscow	home
S13	deaf	female	1981	no	Kirov	kindergarten
S14	deaf	male	1980	parents	Samara	home
S15	deaf	female	1980	mother	Nizhny Novgorod	home



Figure 1. YEAR-A (the first and middle frames)¹⁰

¹⁰ All signs in this paper are pictures of one native signer who was asked to reproduce the signs from the database in order to have high-quality pictures (as the original video recordings are of varying quality).



Figure 2. NIGHT (the first and last frames)



Figure 3. EVENING-B (the first and last frames)



Figure 4. SPRING (the first and last frames)



Figure 5. SUNRISE (the first and last frames)



Figure 6. HOUR-A



Figure 7. HOUR-F (the first and last frames)



Figure 8. SEASON



Figure 9. CENTURY-B (the first and last frames)



Figure 10. WINTER-A



Figure 11. The sign TIME^CLOCK 'some time later'.



Figure 12. WHOLE^DAY (the first frame is the sign WHOLE, the second and third frames DAY)



Figure 13. WHOLE.DAY (the first and last frames)



Figure 14. MORNING^EVENING 'a whole day' (the first and last frames)



Figure 15. O'CLOCK (first and last frame)



Figure 16. 2:0’CLOCK (incorporated form) (first and last frame)



Figure 17. HOUR-D (left) and HOUR-E (right).



Figure 18. 7:HOUR-E (incorporated form, contains circular movement of the active hand)



Figure 19. 2:YEAR:AGO (incorporated form) (first and last frame)