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Full Length Research Paper

A novel system of telling the time: The case of midday and midnight as focal points in a home sign language

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Previous studies on clocks have mostly worked on the development of clock knowledge. It is implicitly assumed that there seems to be no basic difference in the way people read a clock. This study highlights a big difference found in the language of a home signer. She reads the clock by referring to midnight and midday. For example when we say "nine o'clock (in the morning)" she would say - or rather gesture - "three to midday", or when we say "two o'clock in the morning" she would gesture "two after midnight". This study looks for the root of this difference and will suggest that it is influenced by religious beliefs.

Key words: Home sign language, clock, midday, midnight, prayer.

INTRODUCTION

Language, through representations of the world, gives us some hints about the way human beings interact with the world. Sometimes there are linguistically significant situations which can tell us a little more about us. Among these are the home sign systems, that is, the languages which come into being spontaneously in the absence of spoken and sign language input (Padden and Humphries, 1988; Tervoort, 1961). Deaf children, who are born in hearing families and are not exposed to standard sign languages, start to invent a system of (basically manual) signs to interact with the world. Because their system lacks history, the signs are fresh and can show us a lot about cognition and conceptualization (Goldin-Meadow, 2003). We have observed the sign system of a home signer, Fatemeh, and above all, the way she tells the time seems very informative. Fatemeh can read and tell the clock, but not in the way which we are usually taught to. The subject of this study reads the clock according to two focal points: midday and midnight. Accordingly, when we say "ten o'clock (in the morning)" she would say - or rather gesture - "two to midday", or when we say "four o'clock in the morning", she would gesture "four after midnight". We wonder why she has chosen these two points. In order to shed light on this case, we must first turn to the acquisition of knowledge and the expression of time by children. Some researchers have already observed the development of the child's knowledge of time. For example, Ames (1946) studied the generic sequence of the development of the sense of time by analyzing the spontaneous verbalizations and answers to a series of questions, such as, "What day is today?" and "what time is it now?" She came to the conclusion that concepts of time come into use in a relatively uniform sequence and at the same relative period in the life of every child. As an example she stated that children know morning or afternoon by age four, the days by five and the time by seven (cited in Springer, 1952: 83). Springer studies the child's knowledge of clock time and the operation of the clock. In this study, eighty - nine children, from four to six years old, with no schooling, were asked in individual interviews to tell the time of certain activities, to tell the time using a clock, to set a clock, and to answer some questions about the clock's hands. Springer summarizes the results as follows:

First, the child is able to tell the time of activities which occur regularly in his daily schedule. Initially, descriptive terms are used, or a sequence of activities is cited; next an unreasonable time is given; next, a reasonable, but

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incorrect, time is given; and finally, the correct answer is forthcoming. Second, the child is able to tell time by a clock; the hours, then the half and quarter hours. Third, he is able to set the clock; the hours, then the half and quarters hours. Fourth, he is able to explain why the clock has two hands and how each operates (Springer, 1952: 95).

Davidson, Bock and Irwin (2003) worked on the relationship between eye movements and time expressions which are produced by speakers. Analyzing the fixation patterns, they found support for the previous finding that speakers can apprehend the visual –conceptual information in a clock display very quickly, and that this is followed by relatively slow, incremental formulation of the time expressions.

They showed that when speakers produce absolute expressions, they appear to locate the hour hand region quickly (within the first or second fixation). This is usually followed by a series of fixations that reflect the order of the words that participants produce. They concluded that even with highly formulaic expressions and a fixed and finite vocabulary the eyes seem to foreshadow the path of speech.

Meeuwissen, Roelofs and Levelt (2004) investigated the interplay of conceptual operations carried out on the hour and minute information from digital input using a repetition priming paradigm. Their study suggests that determining the reference point and its value are different operations for analog and digital clocks. It also suggests that determining the distance from the reference point in minutes for an analog clock helps to determine the distance from the reference point in minutes for a digital clock. At the end they state that naming analog clocks conceptually facilitates naming digital clocks. The facilitation is observed for the minutes but not for the hours. This means that in analog and digital clocks, the reference point is determined in a different way, whereas determining the minutes relative to the reference point has certain aspects in common for analog and digital clocks.

Friedman and Laycock (1989) have done a number of experiments focusing on age differences to distinguish between different components of clock knowledge and to show the importance of describing the multiple representations and processes that underlie it. They conclude that: Children apparently bring to the task of clock learning knowledge of a number of associations between times and activities as well as representations of when daily activities occur relative to one another. By first grade they apply number reading skills to digital displays and to certain landmark analog configurations. In the next year or two, children develop representations of the relative times of occurrence of hours of the day. By third grade most children have acquired considerable skill in reading the large number of analog times to the minute, though these problems remain difficult at least through fifth grade. The ability to operate on clock times appears relatively late for both analog and digital displays, with some success by third grade but slow improvement in the following years. (Friedman and Laycock, 1989: 369)

The previous studies have mostly worked on the development of the clock knowledge. It is implicitly assumed that there seems to be no basic difference in the way people read the clock. This study highlights a significant difference found in the language of Fatemeh. This home signer can tell us what time it is and uses the relative way of time reading, determining the hours by relating them to the 'mids' (midday and midnight). If we start from midnight, the hours one, two, three, four, five and six would be called one after midnight, two after midnight and so on respectively. The hours seven, eight, nine, ten and eleven would be called five to midday, four to midday, three to midday, two to midday and one to midday respectively. The hours one, two, three, four, five and six in the afternoon would be called one, two, three, four, five and six after midday respectively. And finally the hours seven, eight, nine, ten and eleven at night would be called five, four, three, two and one to midnight. The half is shown by indicating to the half of the forefinger. Smaller than half is usually shown relatively, by dividing the forefinger into smaller parts.

DATA AND BACKGROUND

The subject of this study is a sixty three year-old. She used to live in a small mountain village of Iran. It has been about five years since she has immigrated to the big city of Mashhad in the north east of Iran. She has never been taught or gone to school. She has profound hearing loss (100 dB), but she is not congenitally deaf. According to her family members (sisters and brothers) she lost her hearing when she was about two years old as a result of a serious disease.

Before analyzing her system of time - telling, we should see if it is a common phenomenon in languages. A quick survey on twelve languages shows no regularities; the survey was pursued on: Persian, Turkish, Arabic, English, French, Italian, Spanish, Korean, Chinese, German, Bengali and Wolof. This casual data (these languages were chosen because of accessibility) provides a sample of the way some languages from different families represent the time. The focus of the survey was to see whether or not people from different languages refer to midday and/or midnight as focal points in reading the clock. To check this point, we have asked a native speaker of each language (who were chosen because of accessibility) to read the hours which were written in number. The hours were 2:00; 6:00; 10:00; 12:00; 14:00; 18:00; 21:00 and 24:00. The hours 12:00 and 24:00 lets us know whether speakers of any of these languages read them directly referring to the concepts of midday and midnight or not. The remaining hours were chosen in order to see whether the languages which use the

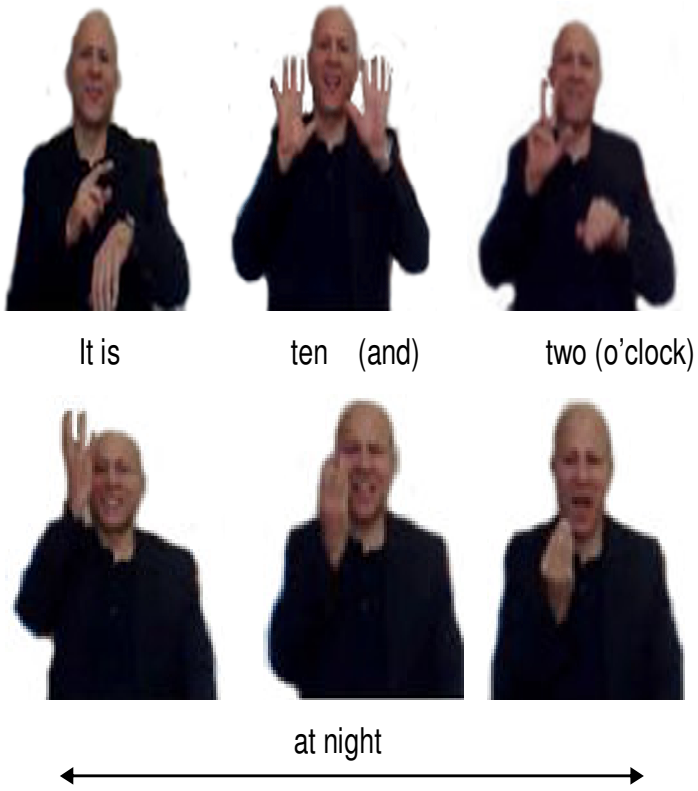

Figure 1. Twelve o'clock at night.

concepts of midday and midnight in clock reading (like Persian, English, Chinese and Bengali among others) refer to any of these points in reading other hours; that is, do they refer to mids in reading hours before and after them? As the data suggested, none of the languages uses the mids as the only points of reference, though in some of them such as Persian and English, midday is mentioned when talking about hours after midday. So we have sentences like the following iv Persian:

"*Saat doye ba'd az zohr ast*"

Which means: "It is two o'clock in the afternoon". The English translation shows the point; in both languages a way of saying that "it is 14:00" is to say that it is two hours past noon (midday). Moreover, a number of languages tended to say 12:00 and 24:00 by referring to the points of midday and midnight. For example in Chinese for 12:00 we have "zhèng wǔ" which literally means midday. Or in Bengali we have "modho rathro" for 24:00 which literally means midnight. In addition, this way of looking at clocks does not seem to have anything to do with the modality. In standard sign languages, clocks appear to be read like spoken languages. For example in Persian Sign Language, they gesture 12:00 at night (Figure 1) or 06:00 in the morning (Figure 2) and so on. The situation is the same with the standard sign languages including American Sign Language, Australian Sign Language, British Sign Language, Arabic Sign Language and some others.

DISCUSSION

Although this home signer is not congenitally deaf, the only means of communication she has is her own invented sign language. Since she did not develop the language of her family (that is Turkish), we assume that she almost completely lacks a language model; in particular what she might have known is of no relevance to the clock system she developed. So we take it for granted that the amount of language which she might have learnt when she was two years old does not give any clues in choosing her clock system. This hypothesis is supported when we see she only encountered a clock after 26 years of deafness. As she explains, she saw a clock (or more exactly a watch) for the first time when she was about twenty eight years old, on the occasion of her marriage when she was offered a watch as a wedding present.

Also, researches show that children usually know the concepts of morning and afternoon at four years (Ames, 1946 cited in Springer, 1952: 83), so Fatemeh would not have probably known the concepts of midday and mid-

Figure 2. Six o'clock in the morning.

night before the age of two. Moreover, research shows that language may not be crystallized even as late as the age of eight. The evidence comes from an fMRI imaging study of Korean adoptees by Pallier et al. (2003). The subjects of this study were eight young adults who had been adopted by French families when they were between 3 and 8 years old. They were reported to have totally forgotten Korean and all had achieved a fully native - like control of French. When they were placed in the scanner and given word stimuli, their activation patterns for Korean and other unfamiliar languages (Japanese or Polish) were indistinguishable, but all were different from that of French. Their activation patterns for French were similar to those of native French speakers, although they were confined to a more restricted area of the cortex. Accordingly, we conclude that for Fatemeh, there is no packaged data provided by spoken language to consume or other kinds of cultural preconstructs for representing time.

Therefore she had to make meaning out of the world around her. To this end, she started to observe the clock at the age of 28, in order to understand how it worked. In order to be able to analyze Fatemeh's system of clock - reading, we need to have a quick look at the way people live in her village. People in the village have subsisted as farmers and gardeners for hundreds of years. In the morning the men set off to their work on the farms and gardens. The women usually stay home doing their housework. The daily time is of little importance by itself; when a man goes out to work he starts working and does not mind what time of the day it is; 8:00, 9:00, or 10:00 are the same for him. He stops his work for two reasons: one is to eat something and rest for a short time to get energy, the other is to pray. He can eat whenever he feels hungry; he can rest whenever he feels tired. But he cannot pray whenever he desires. This is especially true with our home signer. Having observed the clock she had probably soon understood that there is a relation between day and night and the clock. The only thing which would probably be of importance regarding time, was the daily prayers done five times a day; one in the morning before the sunrise, two at noon and two in the evening. She starts to compare the prayer times with the changes in the clock hands. There is some evidence which supports the close interrelation between prayer and time, for example she signs the word midday in a manner similar to someone who is calling people to prayer (Picture 3). In fact, one of the most important features of midday is that, one of the prayers is scheduled at that time. She knows that the noon prayer is done when a part of the day has passed and some roughly equivalent part of it is still to pass. Therefore she concludes that it is done at the middle of the day.

To complete our discussion, we must to pay attention to an important point: she is not aware of the 24 h system of clock reading. In fact Fatemeh is not able to read the numbers and is only aware of the 12 equal parts on the clock.

She has found that the sun rises at about 6:00 in the morning and it sets at about 6:00 in the evening. The logical conclusion is that 12:00 o'clock must be the middle of a day. This is understood when we see she believes that the clock is made into half by drawing a vertical line from 12:00 to 6:00. When asked why not from 1:00 to 7:00 or from 9:00 to 3:00 o'clock, interestingly, she showed that we should make things into halves by cutting them from top to down. And this is true - at least for her - because she shows many halves in this way. For example MID in the word midnight is shown by a vertical hand - move coming down the face (Picture 4). Actually, this way of thinking about the concept of "half" seems somehow logical, because it appears to be based on the human face, which is symmetrical.[1]

So far we have a clock which is naturally divided into two halves by a line from 12:00 to 6:00. Therefore Fatemeh has her first focal point: midday. As she cannot read the numbers on the clock, she does not know that the 6 means six or 11 means eleven. All she knows is that the clock is divided into equal parts Picture (5). She can count the parts (hours) and say how many parts are left to midday. She can also say how many parts (hours)

[1]- This is supported when we see that the clocks can be easily thought of faces. There have already been expressions supporting this point; we just need to Google the expression "face of the clock" and check the numerous results.

Figure 4. MID in the word midnight.

Figure 3. Someone who is calling people to prayer.

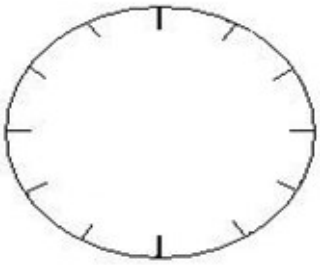

Figure 5. Numbers are meaningless to this home signer. She is only aware of the equal parts.

have passed midday. For Fatemeh, this is enough to determine prayer times. As previously mentioned, people have five obligatory prayers; one in the morning before the sunrise, two at noon and two in the evening. It is very important to pray at the right time. So people are indeed concerned whether the right time has arrived. For the noon prayer this is a matter of special concern. It can be done after the midday. But it is not always easy to determine the midday by looking at the sky. This is where a clock can be of great help. Our home signer just needs to determine midday on the clock and be able to start and refer to noon prayer with great precision. We saw that the fact that clocks are divided into 12 hours and not 24, along with the time of prayer, were the keys to understanding the first focal point: midday. Interestingly these two are also the keys to understanding the second focal point: midnight. Human beings spending long hours observing the sky at night have found that the position of stars is a good indicator for dividing the night in two. But this is astronomical knowledge which most people lack even today. Poor home signers certainly do not have this knowledge. We might well suggest that our home signer has conceptualized the meaning of midnight later in comparison to midday which is easily observable. When clocks come in, it would not be very difficult to make an analogy between midday and midnight. If the day consists of twelve hours (roughly from 6:00 to 18:00) and its middle is 12 o'clock, the night would also have twelve hours, with the 12 o'clock as its middle.

Now it is time to show how midnight works with prayers. Among the prayers, the timing of the evening prayer is very easy to determine; it can be done any time after the sunset until midnight. So people do not need to worry about finding the right time; the sunset is a reliable and visible enough indicator. On the contrary, the Morning Prayer can be a problem. It can be done from about two hours before the sunrise till sunrise. So we can see that in this case too - just like the noon prayer time discussed earlier- there is no clear criterion to start praying at the right time in the morning. If a person waits for sunrise he or she would very probably miss prayer time - in fact people are strongly encouraged to pray on time. Now think of our home signer trying to use her clock to keep the prayer time. She can keep her first referring point - that is, midday- and say 'I should pray when it is eight hours to midday' (thinking about tomorrow's

midday) or she could even say 'fourteen hours after midday' (having the yesterday's midday in mind). But she has another choice; why not count from midnight; she can easily determine the time of Morning Prayer by referring to the hours passed since midnight. On the other hand, as mentioned before, midnight is also the extreme end that one can do his or her evening prayer, so it can be used for this aim as well; more specifically, choosing midnight as the reference point has two advantages; she can determine the time of morning prayer by counting the hours past midnight; she can also determine the other extreme end of evening prayer by counting the hours left to midnight. This is practically just what Fatemeh does.

Conclusion

Observing an unusual system of clock reading in the sign system of a home signer, we tried to come up with some logical explanations to make sense of it. We tried to find the reason why midday and midnight have been chosen as the only reference points in reading the clock. We came to the conclusion that they are motivated by the home signer's religious beliefs. Choosing the 'mids' as the focal point can help the home signer successfully refer to prayer times which are of great importance for a Muslim.

There is also another point to consider. We know that there are two ways of telling the time: using an absolute system (as in "ten fifteen") or a relative system (as in "quarter past ten"). Our home signer always uses the relative system. The relative system must have an advantage which attracts a home signer. It seems that this way is more reliable. When we say "it is nine o'clock in the morning" we have set a fluid period called "morning" and then a point within this period called "nine". Here we refer to points which are less stable, because they are anchored to the periods which are not themselves clear - cut. The period which is called morning covers the extent from the sunrise till the midday. But when we use the 'mid' system, we don't present only points but relations. When we say "three to midday" we have set a relatively clear point, midday, then, relative to that point, we indicate when we are. In this way we are anchored to a reliable point; that is to midday or midnight. It seems logical to choose midday as a focal point for a primitive viewer. Studying different cultures, Nilsson claims that all people divide the day at least into three parts: sunrise, sunset and noon (Nilsson, 1920: 55). The concept of midday is a good candidate for being a focal point. Early in the morning and in the afternoon, the border of the day and night is not very clear. But when it comes to mids (midday and midnight), there remains no doubt about being day or night. In other words, midday and midnight can be the best representative points of day and night respectively. From these two, midday is even easier to recognize; it is a fairly concrete concept; the sun is there to help us figure it out. When it is overhead it is noon. In fact, in many cultures midday can be translated literally as "when the sun is overhead" or "when the day is perpendicular". Nilsson (1920) gives us many examples among which are the following:

The Yoruba divide the day into early morning, morning or forenoon, noon' (when the day is 'perpendicular').The natives of the Solomon Islands have a rich terminology. In Buin the following degrees of brightness in the daylight are distinguished: 4 a. m., 'it gradually begins to get light'; 5, 'the brightness is coming on'…; 12 noon, 'the sun has come overhead' (61 and 67). Midnight is also a familiar phenomenon in human history. Nearly all cultures have words for midnight. Nilsson gives us evidence from indigenous cultures: During the night itself time - indications are for obvious reasons scanty. Often the only point distinguished is midnight, e. g…. 'the silence of the land' among the Babwende, 'the back of night' among the Hottentots, 'the time of sleep' among the Hawaiians. Hence arises of itself a threefold division in which the periods of night before and after midnight are distinguished (Nilsson, 87 and 192).

Human beings do not pay attention to every aspect of the world. Rather, they pay attention to those phenomena which are somehow important for them. Some are biologically important, some are culturally important and so on. Beliefs can also highlight a particular phenomenon; especially religious beliefs, which usually have deep effects on human beings, can draw attention to a special aspect of the world. Here we saw how religion has influenced human cognition through highlighting those aspects of the world (the mids) which are directly related to it. There seems to be a convergence between noon as the time of prayer - a practical duty - and midday - a cognitively grounded coordinate; it may be that prayer time activates that cognitively grounded concept in making practical sense of it.

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