ISSN No:-2456-2165

Children's Perception of Duration: Lexical and Relative Sense of Time

Sandhya Shankar

Abstract:- This paper attempts to look at how children perceive duration, in their language. Some of the questions explored focus on the relative and lexical sense of duration, with respect to Malayalam language. Duration is often difficult to perceive except for the clock measurements. Even though adults use the lexical terms, 'seconds' and 'minutes' in their day to day conversations, they might not refer to the exact duration but a subjective estimate. Thus, this paper tries to see how in such a scenario, do children understand and make meaning of duration in their language. Two tasks were administered to identify the understanding of duration in children.

Keywords:- *Duration, Time, Cognition, Language Acquisition.*

I. INTRODUCTION

Estimating duration is often a tricky thing to do. At times it feels time is moving too quickly, or else it feels it is excruciatingly slow. As the child grows, a daily routine kicks in. Slowly, she perceives the pattern and draws connections such as a sunset would follow a sunrise and that the loop of time continues, creating a routine for herself. At this stage, time seizes to be a single monolithic event. Rather, it begins to look like a series of successive events. A clock that would have perhaps existed as a visual cue on the wall is now an integral component to her daily life. There is a time to go to school, an allotted duration to how long she would be present at school, to play, to eat, to study and to sleep. The man-made ways to categorize time into minutes, hours, days, weeks, months, calendars are then followed easily.

In conversational discourse, when we use 'today' and 'tomorrow', we are measuring time in succession. Very early on, we have been keeping track of these days using time keeping devices for a number of practical and scientific reasons (movement of celestial objects, agricultural requirements, etc.). Therefore, the earliest clocks relied on shadows cast by the sun. Soon, that gave way to other time-keeping devices such as water clocks, candle clock, hourglass etc. The current sexagesimal[1] system of time that dates back to approximately 2000 BC, was devised by Summaranians. This was followed with calendars, which then became an important source to understand long periods of time. In addition to these devices, some civilisations also used the waning and waxing of the moon and the solar period (i.e. the time taken by the earth to revolve around the sun) to keep track of time. (Rogers, 2013)

It is interesting to note that observing and recording time has led us to believe that a day begins with the sunrise. While most of us view sunrise to be the cue to wake up from sleep, a new day technically begins at midnight. Egyptians, for example, chose dawn for the beginning of their day while the Babylonians and Jews opted for sunset (Whitrow, 1988). Astronomers, like Ptolemy, found midday a more convenient starting point for their calculations. Moreover, it was in 1752 that the United Kingdom adapted the same calendar as that used in most Western European countries. The change was accompanied by considerable furore and cries of "Give us back our eleven days" followed when the Government decreed that the day after September 2 will be September 14. Worried about losing their hard-earned wages, workers protested the new law stating that they had lost eleven days of their lives. Tragically, the protests also led to the loss of several lives. In the wake of such bloodied history and multiple narratives over the measurement of time, what does time mean?

- *Expressing duration can be either absolute or relative:*

Absolute	Relative
1 hour; 10years	a grief ago*, long, short

(* In 'a grief ago' (Cummins), grief acts like a subjective time marker (Narang, 2006, p. 221))

Further, in Malayalam, it can be expressed as in the adverbial markers like –a:ji, -oḷəm, -muzuvən, --ekkə, -il (Asher & Kumari, 1997). In English, again the prepositions are used to denote this: 'for', 'from', 'to', etc.

Example:

əvən	orə	mənɨkur	irinnu	
he	one	hour	sit-PST	(he sat for one hour)
əvən	divəsəŋəḷa:ji		urəŋilla	
he	days-ADVL		sleep-NEG	(he did not sleep for days)

- *Children's Understanding of duration:*

When we tell children that "we will go out in a minute" or "I will come in a second", or "I will be back in a short while" etc., there is no substantial account on how the child comprehends the sentence, considering how imprecise the sentences are with respect to the usage. 'In a minute' might range from 5minutes to half an hour. Additionally, one's perception of passage of time is subjective. Given such dubious meanings, children's ideas are often based on their observations and experiences. The constructivist

[1] Sexagesimal is a numeral system with base 60.

ISSN No:-2456-2165

theory posits that children are an active agent in their own creation of knowledge of the past since they ask questions, explore and assess what is meaningful. Emerging trends in constructivist theories also argue that modern scientific techniques tell us that even the youngest infants know a great deal more than what we might have believed about objects, people and language. (Gopnik & Meltzoff, 1987)

Whitrow (1988) elaborates this further when he describes the situation with respect to Uganda. The children in Uganda have greater difficulty in judging the duration of an event, compared to their western counterparts, since their lives are not dominated by time. He gives an example of a two-hour bus journey was reported to be of a duration of 10 minutes by some children while the other found it to be of six hours. This large discrepancy was also noted in aboriginal Australian children when they had difficulty relating the notion of the time on clock to that of the actual day. This was not because they were less intelligent but because of the difference in the categorization of their lives. A study conducted by Sinha, Sinha, Zinken, & Sampaio (2011) on the small community called the Amondawa people, in Brazil, found that the Amondawa people do not conceptualize time in a linear fashion and that they were an example of a culture or a language that did not function on the concept of measuring or counting time.

The term concept refers to a defined class of objects or experiences having a set of common characteristics which distinguishes them from all the others. The notion of time applies to two different concepts which are (a) succession, that is, two or more events perceived as different and organized sequentially; (b) the concept of duration, which applies to the interval between two successive events (Fraisse, 1984) He further points out that concepts of succession and duration are empirical in origin and that the perception of both is present early on but their combined functioning is achieved by 7 to 8 years of age. (Fraisse, 1984)

Levin (1992) identifies two structures in the concept of time. One is the 'production structure' and the other is the 'temporal limits structure'. In the former, time is defined by the relation between the product and speed while in the latter, duration is defined by the relation between starting and ending times. According to Levin, the concept of time includes the ability to estimate and differentiate between different durations and consequently be able to measure time. Thus, the model proposed by him focuses on children's estimation of time and their ability to compare between different time intervals.

Production structure is determined by the amount produced and the speed attained. For example, the distance travelled by a vehicle and its speed attained is understood by the child when she looks at it from a 3D perspective. Levin explains that these structures start simultaneously in children when they are four years old and reach completion around adolescence. (Levin, 1992)

II. PARTICIPANT SELECTION

For the present study, a sample of 105 bilingual children between the ages of 3 and 10 (preschool to fourth standard) from elementary schools in Delhi participated in the studies. Children were studying in schools where Malayalam is taught as a subject, i.e. Linguistic Minority Schools in Delhi with Malayalam Language. The children were sequential bilinguals who learned Malayalam in the home and had formal exposure to formal English upon entering preschool or elementary school.

III. TASKS

Children form a sense of duration through their experience. They know that not all things take the same *amount* of time. In order to further probe this, two questions were asked regarding duration of time. The first was ‘how long do they think they sleep’ (Q1) and the other was ‘how long does it take for milk to boil’ (Q2).

The following chart represents their responses:

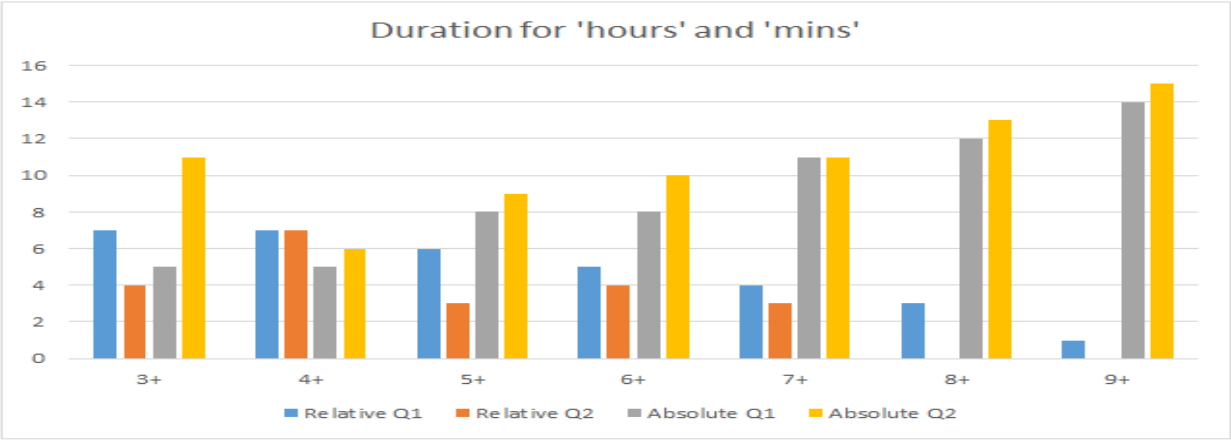

Chart 1.1

Not surprisingly, the use of absolute references is more in the higher age group while relative references are mostly used by the younger children (3-5). What is interesting is the use of absolute references by the 3-year

ISSN No:-2456-2165

olds in the second question (how long does it take for milk to boil). Majority of the 3-year olds (73.3%) have used absolute reference to answer this question as compared to the first question (26.6%). This can be attributed to the knowledge of time words, minute and hour. The word minute seems to be common in the vocabulary that children are exposed to, hence they pick that word before the word 'hours'. This also shows that they have an idea that minute is a comparatively shorter time span than hour and hence is not suitable to denote the sleeping duration. Thus, they don't use this word when they want to denote a longer time duration.

The limited use of the word 'minute' to shorter duration, implies that children as young as 3-year olds have some understanding of its semantic properties and in the later years they add more features to it. Out of the 73.3% who answered in absolute references, 36.6% used the term 'minute' to denote the duration. Moreover, the absence of the word 'hours' in their vocabulary led to the increase in relative terms to mark duration in the first question.

The following chart shows the absolute references children used to denote duration:

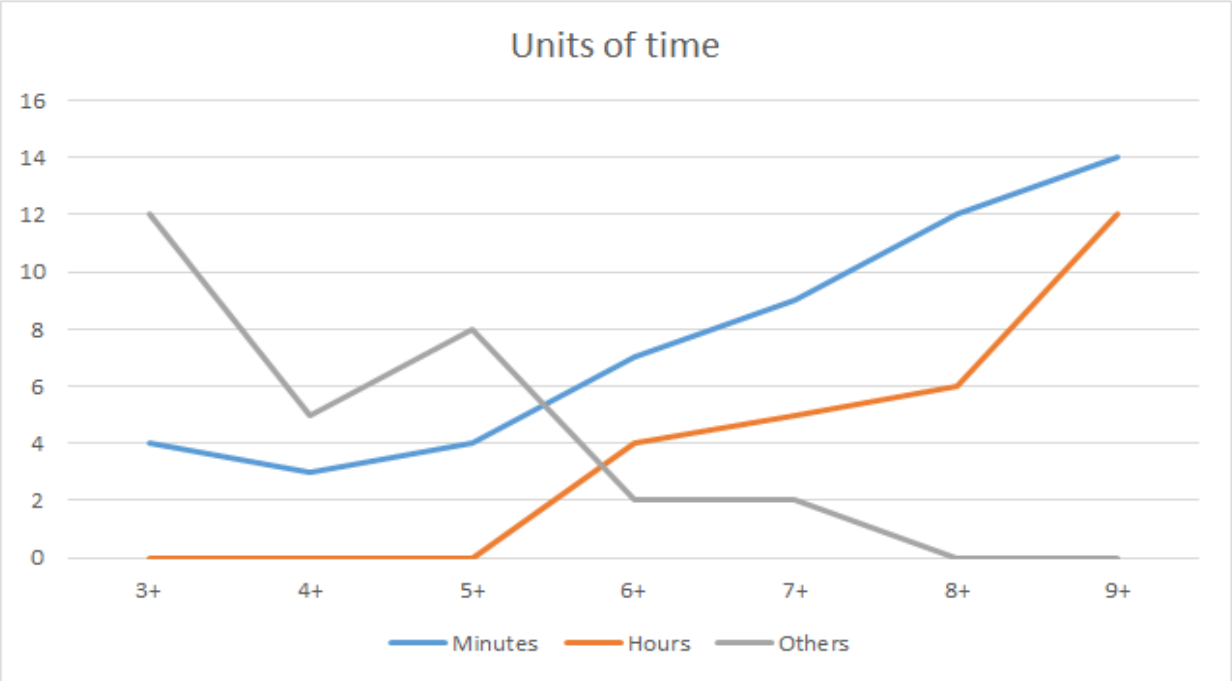

Chart 1.2

The 'others' as indicated in the chart are the other time units, children used, to answer the absolute references for duration. The most common amongst them was the unit 'time' itself. Children who used the absolute references (in the age range of 3 to 5 years) were not always accurate about the duration. They wanted to denote the answer in terms of a number but were unsure of the 'unit' in the first question and thus answered as

S9Y3	a:rə	Səməjəm
	Six	Time

(Q: How long she sleeps; A: 6 time)

S5Y5	Munnə	Səməjəm
	Eight	Time

(Q: How long it takes for milk to boil; A: 8 time)

As their vocabulary of these time words increased, they replaced their responses with these new ones.

Another task was where children had to clap for one minute. They were not told how long one minute is, neither were they allowed to count or look at the clock. They had to use their intuitive knowledge of how long one minute would be. A stop watch was used to measure the time for which they clap. They were free to estimate the time themselves and no prompt was provided from the researcher.

ISSN No:-2456-2165

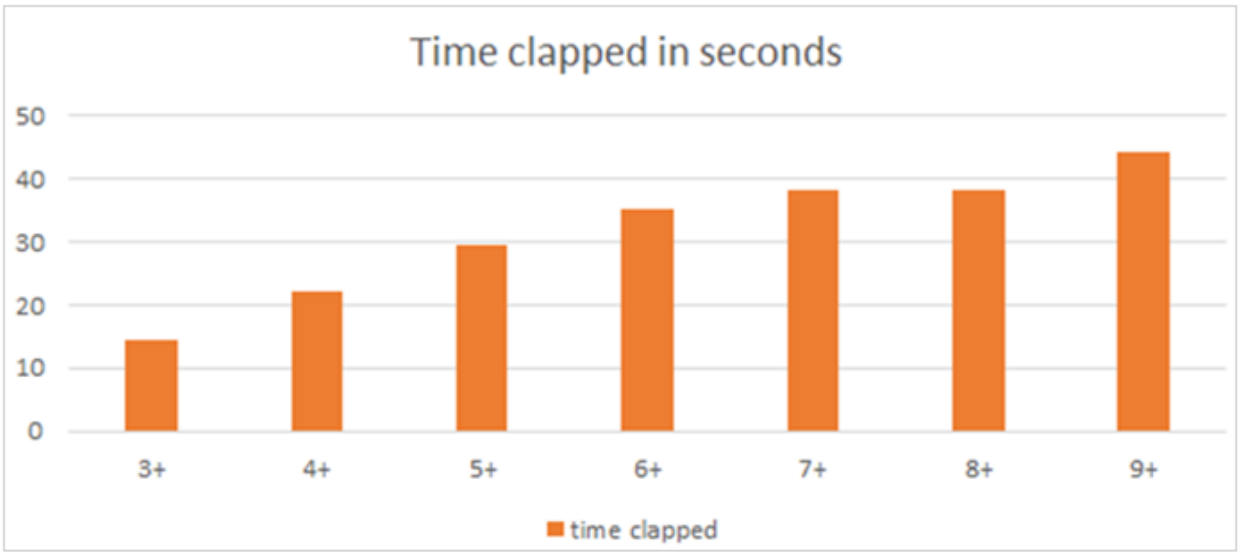

Chart 1.3

The above ANOVA result for 'age' taken as a between factor, shows that there is a significant difference in some of the age groups. A further detailed Q Turkey test elaborated that age is a significant factor in estimating duration.

In the pair wise Q Turkey HSD test, there is a significant difference in age group 3 and age group 6 ($p=0.0004$, for a significance level $p<0.05$). Though there is an increase among all groups in general, the major significant point comes in age group 6, where there is a significant change from that of 3- or 4-year olds.

In case of age group 3 and 4, some children (5 in each group) were not able to do the task. In this case, the researcher had given them a cue by clapping for one minute. After that the child was again asked to clap for one minute and their time duration was noted. The following chart shows the difference in the time duration for both age groups in which they were given the cue and in which they were not given the cue.

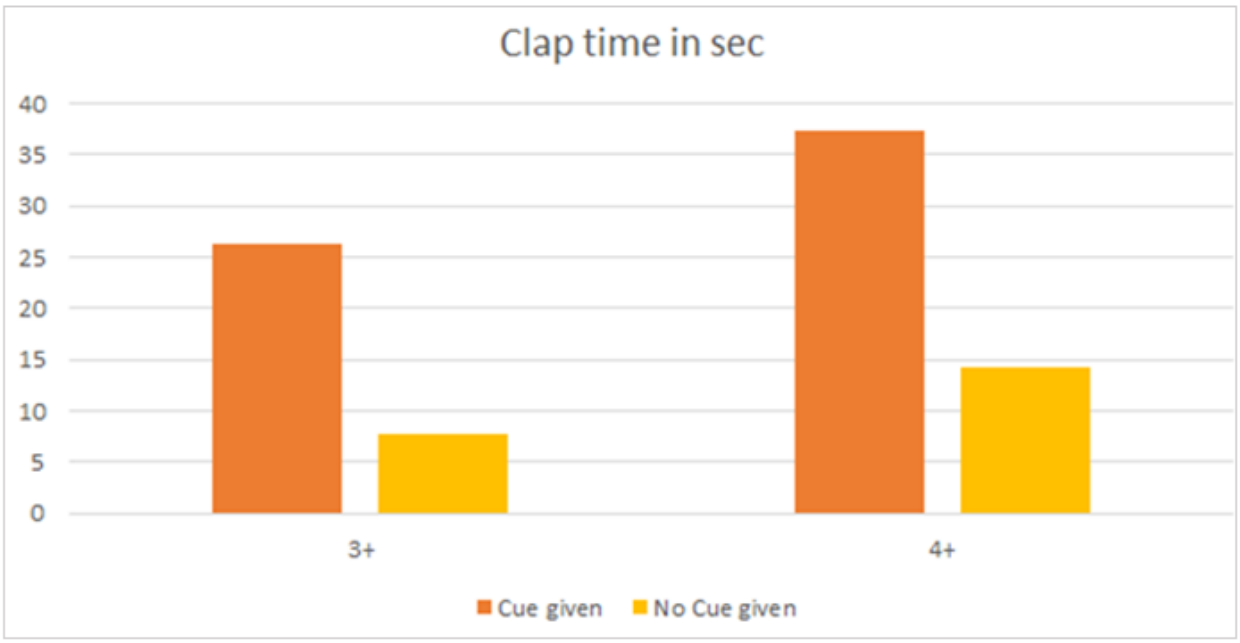

Chart 1.4 Comparison for cue given and ones where no cue was given

As seen from the chart 1.4, there is a significant change in the time perceived as one minute when a cue is given as compared to that where no such cue is given. A one tailed t test corroborated the significance in the result.

Children are very observant of their surroundings. They must have heard adults around them use the term 'one minute' or 'five minutes', etc. They might have formed certain intuitive ideas about how long this one minute might be. Importantly, they all knew that a minute is a comparatively short span of time. When a cue was

provided, they increased the duration of the clap even though they did not clap for one minute in the absolute references.

This activity was taken one step further when older (8-9 years old) students were quick to answer that one minute is equal to 60 seconds. They must have read this in the textbooks and are reading analog clocks. When further probed as to how much they think is one second, they didn't have a clear idea. One of the responses was as follows:

I: How much do you think is one second?

S12Y9:	Orə	sekənd	60	milli:sekənd
	One	second	60	Millisecond

One second must be 60 milliseconds.

It is a very creative answer indeed, because the child has got the idea that unlike, say length, time is divided into sexagesimal units, so that the divisions don't take place in units of tens but instead sixties. Another response was:

S3Y8:	Orə	sekənd	24	manɨkurə
	One	second	24	hours

One second might be equal to 24 hours

They have heard teachers and other adults use these terms, like hours, seconds but they don't yet know the exact meaning, so they experiment by using it randomly. They have learnt the vocabulary but not yet the concept.

This opens up important area in Mathematical Pedagogy, where technical precise terms are often used but the concepts might not be clear to them. Here, pooling in their experiences and prior ideas and assumptions can be helpful as in they can not only help in giving them a better understanding but also helps in eliminating misunderstandings.

IV. CONCLUSION

Children do have an intuitive sense of duration. This is prominently in a relative manner for the children in the age group 3-5 years. They link their time of the activities and its duration to certain visible events. For e.g. it is morning for them because of the sunlight as compared to older children (7-9) who reason it with clocks and alarms. Younger children (3-5 years) tend to quantify duration in relative terms like, lot of time or less time, as compared to older children (6-9 years), who quantify it in absolute terms (10 min, 8 hour). The years, 5 and 6, act as a transitional stage where they are moving from one type (relative) of predominant usage to the other type (absolute).

Thus, children initially have a relative view of time. They experience the rising and setting of sun, of light and darkness in the nature. This becomes a way to identify changing time. They slowly realise during the process of their growth that adults quantify this time in terms of numbers. Clocks are one such way to quantify time. Thus, when children hear different units of time being used, they pick up these lexical words and process these words in contexts just like they process language rules in their minds.

REFERENCES

[1]. Ames, L. B. (1946). The development of the sense of time in the young child. *Journal of Genetic Psychology*, 97-125.
[2]. Antinucci, F., & Miller, R. (1976). How children talk about what happened. *Journal of Child Language*, 167-189.
[3]. Asher, R. E., & Kumari, T. (1997). *Malayalam.* Psychology Press.
[4]. Boroditsky, L. (2000). Metaphoric Structuring: Understanding Time through Spatial metaphors. *Cognition, 75*(1), 1-28.
[5]. Boroditsky, L. (2011). How languages construct time. *Space, time and number in the brain: Searching for the foundations of mathematical thought*, 333-341.
[6]. Busby, G. J., & Suddendorf, T. (2010). Production of temporal terms by 3-, 4-, and 5- year old children. *Early Childhood Research Quarterly*, 87-95.
[7]. Carni, E., & Lucia, F. (1984). The Acquisition of before and after reconsidered: What develops? *Journal of Experimental Child Psychology, 37*.
[8]. Clark, H. (1973). Space Time Semantics and the Child. In T. Moore, Cognitive Development and Acquisiion of Language (pp. 27-63). New York: Academic Press.
[9]. Evans, V. (2003). The structure of time: Language, meaning and temporal cognition. John Benjamins Publishing Company.
[10]. Fraise, P. (1982). The adaptation of the child to time. In W. J. Friedman, *The Developmental Psychology of Time*. (pp. 113-140). New York: Academic Press.
[11]. Fraisse, P. (1984). Perception and Estimation of Time. *Annual Review of Psychology*, 1-37
[12]. Friedman, W. J. (1982). Conventional time concepts and Children's structuring of time. In W. J. Friedman, *The Developmental Psychology of time*. (pp. 171-208). New York: Academic Press.
[13]. Friedman, W. J. (1986). The development of children's knowledge of temporal structures. *Child Development*, 1386-1400.
[14]. Gallaghar, S., & Meltzoff, A. N. (1996). The earliest sense of self and others: Merleau-Ponty and recent developmental studies. Philos Psychol, 1-9.
[15]. Gopnik, A., & Meltzoff, A. (1987). The Development of Categorization in the second year and its relation to other Cognitive and Linguistic Development. *Society for Research in Child Development, 58*.
[16]. Hickmann, M. (2002). Children's discourse: person, space and time across languages (Vol. 98). Cambridge University Press.
[17]. Johnson, M and Lakoff, G. 1979. Metaphors We Live By. Chicago and London: University of Chicago
[18]. Lakoff, G. 1987. Women, Fire and Dangerous Things: What Categories Reveal about the Mind. Chicago: University of Chicago

[19]. Levin, J. (1992). The Development of the concept of Time in Children: An Integrative Model. In F. Macar, V. Puthas, & W. J. Friedman (Eds.), *Time, Action and Cognition: Towards Bridging the Gap*. Springer Science + Business Media.
[20]. Narang, V. (1984). *Communication of Situation Time in Hindi.* New Delhi: Garimashri Prakashan.
[21]. Narang, V. (2006). *Contemporary Themes and Issues in Language Pedagogy*. New Delhi: BookPlus.
[22]. Rogers, L. (2013, December 2). *A Brief History of Time Measurement.* Retrieved from nrich math: https://nrich.maths.org/6070
[23]. Sinha, C., Sinha, V., Zinken, J., & Sampaio, W. (2011). When time is not space: The social and linguistic construction of time intervals and temporal event relations in an Amazonian culture. . Language and Cognition, 137-169.
[24]. Whitrow, G. J. (1988). *Time in history: Views of time from pre-history to the present day*. New York: Oxford University Press. 178