

Content Words and Their Conceptualization: A Corpus-Based Study of Conversations of Children with Autism

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Abstract

This paper is the corpus-based exploration of the nature of content words used by children with autism in a conversation. It aims to investigate what does the frequency of content words inform about the conceptualization of events and what differences can be seen in the conceptualization of children with severe and mild autism. The theory of embodiment is adopted to analyze the content words related to the conversations regarding birthday and school events. A spoken corpus of the conversation of thirteen children with autism was built for the investigation. The results show the tendency of these children to use nouns and adjectives as compared to verbs in their conversations. Moreover, children with severe autism gave less linguistics responses as compared to children with mild autism. Their distinct sensory-perceptual experiences seem to impact the use of the content words and their conceptualization.

Keywords: Autism, conceptualization, content words, corpus linguistics, and embodiment.

1. Introduction

Autism refers to varied difficulties and functioning level of the affected person. The term autism is a Greek word auto (self). It was first used in 1943 by the well-known pediatrician Leo Kanner (Boksa, 2017). The Diagnostic and Statistical Manual of Mental Disorders (DSM-V) now classify autism as a neurodevelopmental disorder that entails the impairment of social communication and interaction (both verbal and non-verbal), behavior and

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activities (American Psychiatric Association, 2013; American Psychiatric Association, 2022). The abnormalities in social interaction, communication and repertoires of interest emerge in the early years and persist throughout life (Surian & Siegal, 2008). This affects the development of expressive and receptive language skills (Arutiunian, et al., 2021), along with social and communicative functioning in different contexts (Vogindroukas, 2022).

Cognitive semantics divides the vocabulary items into two categories: lexical items (content words) and grammatical items (functional words). The lexical items include nouns, verbs, and adjectives and the grammatical items are like pronouns, prepositions and so on (Evans & Green, 2006). Talmy (2000) further classifies as “open-class system” and “closed class systems” respectively.

Understanding words and their meanings is imperative to language learning, and children are found to be ‘efficient word learners’ (Language development in infancy and early childhood, 2012, p. 344). Word learning abilities in children with autism is determined by the language exposure (Gonzalez-Barrero & Nadig, 2018). Therefore, word learning can help explore the mechanism of language impairment and language delay in children with autism (Luyster & Lord, 2009). The knowledge of words is categorized as open class (lexical items/content words) and closed class (grammatical items/functional words) (Talmy, 2000). As compared to close class words, open class words provide rich details about the nature of conceptualization. The concepts are the foundation for semantic structures in human language which arises through embodied experiences and are being reflected through language. The nature of the experiences determines our concepts (Evans & Green, 2006). Concept building has direct relation to the lexical units/content words.

To explore the nature and frequency of content words and to analyze them with reference to the conceptualization of events in children with autism, this corpus-based study is conducted by using the spoken corpus of the conversations of thirteen children with autism regarding two events – *birthday & school routine*. The study further examines the differences between the conceptualization of children with severe and mild autism. This research is limited to the analysis of content words – noun, verb and adjectives – used

by autistic children in their conversations with an adult. Given their subjective embodiment due to their unique sensory experiences, their meaning making is different and their language use reflects this (Naqvi, 2017). This is what makes them a foreigner in our linguistics culture. This study will help to understand that they are not a foreigner in our linguistics culture, but they have a different subjective exposure of the society.

2. Literature Review

Several studies were conducted on the usage of content words used by people with autism from pure experimental perspective by neurologists, psychiatrists and psychologists. One such study by Han et al. (2014) on the perception of the emotion words looked at the brain images of Adolescents with High Functioning Autism. They suggested that the area in the brain called the fusiform gyrus is associated with both the comprehension of language and face recognition. They hypothesized that people with ASD would have decrease ability to recognize effects through emotional words relative to healthy people. A similar study on emotional words and abstract words carried out by Hobson and Lee (1989) suggested that autistic children have special impairment in grasping words related to emotions as compared to concrete words. On the other hand, Kuhl et al. (2013) examined the children from age 2 and age 6 by using Event related potentials (ERPs) to know the responses of two groups of ASD children on ten selected words. Autistic children showed great variability in outcomes - some individual remained non-verbal on the responses, and some showed average or above average function.

Children with ASD have often been compared with people having other language impairments and with normal children, to know the differences of language impairment at lexical, semantic, or syntactic level. McGregor et al. (2017) found that children with autism revealed age-appropriate word knowledge which help them to construct sentences free of errors, while children with ASD plus concomitant syntactic language impairments (ASDLI) and Specific language Impairment (SLI) both groups were found having partial word knowledge and immature word to word relationship. Children with ASD were found normal in their knowledge about the lexical words and their use as compared to other two groups. Another comparative study on the language development of children with autism and late talking

children was conducted by Weismer et al. (2011). They matched vocabulary and lexical grammatical relationship between these two groups. Their findings reveal that semantic categories of words including psychological state terms were similar between the groups. The study suggests that like late talkers, autistic children too show delay in the learning of vocabulary and their compositional relationship. A case study by Williams (1993) on the modifiers, action words and nominal suggest that nominal appeared first in the English language acquisition as compared to the modifiers and action verbs. Moreover, his study suggests that children with autism use more nominals as compared to action words. Williams (1993) concluded that autistic people's use of vocabulary is quietly abnormal.

Apart from experimental and comparative studies on the content words in autism, language in autism has been widely studied from other different perspectives: language and communication abilities (MacFarlane et al., 2017), relation of sensory processing and social interaction (Matsushima & Kato, 2013); relation between language and repetitive behaviors/sensory, motor experiences (Ashburner et al., 2008; Howe & Stagg, 2016; LeBartona & Landaa, 2019). On language acquisition and cognition of autistic children, Parisee (1999) stated that children under observation presented impairments in cognition which caused their language issue. He further posited that lexicon of children with autism is different from normal children. Very few researches have been conducted till date in which language of autistics is studied from the perspective of theory of embodiment and conceptualization. Some studies on embodiment and autism (DeJaegher, 2013; Horder, 2014; Howe & Stagg, 2016) suggest that embodied, sensory perceptual experiences play vital role in connecting to the world. The language impairment in the autistic people is because they have different lens to look at the world than the *neurotypicals* (Bogdashina, 2003). Autistic people have their own way to observe and experience the world due to their varied embodiment (Naqvi, 2017), which plays vital role in their conceptualization of the world around them. Bodily experiences play role in determining human experience (Lakoff, 2003). Every individual experience the world differently; same is the case with autistic people. People with autism live in the same environment and deal with the same raw material, but their perception of world becomes different from other people (Bogdashina, 2003). The nature of their varied experiences defines the nature

of knowledge structures/concepts and are reflected through their distinct use of language (Naqvi, 2017).

In Pakistan, awareness regarding the symptoms, and behaviors of autism is rising. There is much to be known about autism in the field of psychology and speech language therapy but very less studies have been conducted on language in autism from linguistics perspective (Naqvi, 2017). The present study examines the use of content words by autistic children and explores the effect of embodied experience on the language – through which conceptualization is studied using corpus techniques. It further explores the extent to which there is a difference in the use of content words by mild autistic children and severe autistic children.

3. Method

The research design of the study is a plan to answer the research questions of the study (Creswell & Poth, 2018). The present study adopts mixed method approach and the data is examined quantitatively and qualitatively. The corpus findings are first presented quantitatively and are then examined qualitatively in order to see the relation of lexical items (nouns, verbs, adjectives) with the embodiment.

3.1 Participants

Thirteen children with autism (9 boys + 4 girls) were selected for the study. All thirteen children were the diagnosed cases of an autism center (located in Rawalpindi) and were in their middle and late childhood. Diagnostic Statistical Manual of Mental Disorders (DSM-V) (American Psychiatric Association, 2013) and Childhood Autism Rating Scale (CARS-2) were administered by psychologists to diagnosed them. Seven of them had mild-moderate autism while other six had severe autism. The details of the autistic children are provided in Table 1. At the first stage, data was collected in the form of the recordings (audio/visual) of their conversation with their speech therapist. The conversations were centered around the events they had experience of – birthday event & school routine. The language of the autistic children during the conversation was Urdu and code switching in English from Urdu. At the second stage, for building the corpus of spoken text, all of the recordings were transcribed using transcription conventions/symbols.

Table 1: Details of the children with autism (adapted from Naqvi, 2017)

| S.No. | Initials of the children | Age | Gender | Level of autism |
|-------|--------------------------|-----|--------|-----------------|
| 1. | MM | 6.8 | Girl | Mild-Moderate |
| 2. | ZB | 13 | Girl | Mild-Moderate |
| 3. | WN | 8 | Girl | Severe |
| 4. | AA | 10 | Girl | Severe |
| 5. | AZ | 13 | Boy | Severe |
| 6. | IM | 11 | Boy | Severe |
| 7. | MA | 10 | Boy | Mild-Moderate |
| 8. | AS | 9.6 | Boy | Mild-Moderate |
| 9. | HL | 13 | Boy | Severe |
| 10. | AH | 11 | Boy | Severe |
| 11. | IL | 5.6 | Boy | Mild-Moderate |
| 12. | AN | 10 | Boy | Mild-Moderate |
| 13. | RN | 6.5 | Boy | Mild-Moderate |

3.2 Corpus

The small spoken corpus of the conversation of Autistic children was built which contained 22176 tokens. The small corpus was divided into four sub-corpora related to birthday and school events – two sub-corpora for mild-moderate and two for severe autistic children.

3.3 Instruments

The corpus tool AntConc 3.5.8 (Anthony, 2019) was used to analyze the corpus for calculating frequencies of content words (lexical units) like nouns, verbs and adjectives, used by autistic children. The tool was also used to find out the key words in context (concordances). The concordances helped in the contextualizing the frequencies of lexical units by concordance occurrences.

3.4 Procedure

To generate the frequency lists of the content words used by autistic children, the conversation of the adult and speech therapist was removed to

get the frequency of the content words used by autistic children only. A list of top 100 frequent words was generated from each of the sub-corpora and was analyzed and then, the proper nouns (which were used for dialogic format) were removed manually from the frequency lists. Besides this, all functional words were also removed as the focus of the research was on content words/lexical items (nouns, verbs, adjectives). Thereafter, the tables of frequencies of lexical items (nouns, verbs, adjectives) of the two sub-corpora - mild-moderate and severe autistic children - regarding the two discourses were compared to find out the difference in their language. The concordances were provided for the detailed qualitative analysis by contextualizing the findings. They were generated by using the same sub-corpora of conversation of autistic children with the speech therapist.

The frequency of the words used in the conversations of mild and severe autistic children were generated to look at the frequency of lexical items related to the discourses of two events: School Routine and Birthday Party. The frequency helped to examine how frequently some words occurred in the conversations of the autistic children. The tabular analysis provides the frequencies of content words used by the Autistic children in their conversation with the Speech language therapist and with the researcher. Then the concordance occurrences are presented. Concordance occurrences helped to analyze the conversation of children qualitatively from the perspective of embodiment and conceptualization. The concordances also helped to know the use of content words in the context as it was observed that frequency only presented the quantitative results of the content words - whether the words were used by the children themselves in response to the adult or as a repetition of adult speaker. The use of the nouns, verbs, adjectives by mild and severe autistic children is analyzed comparatively.

4. Results

The corpus-based analysis of the use of the content words in conversations by verbal autistic children is delimited to the use of content words (noun, verb, adjectives) only. The language that is used by the children is Urdu and English.

4.1 Frequency of content words related to two events

Four different lists of highest ten frequent nouns, verbs and adjectives used by mild and severe autistic children on two different discourses (birthday and school) are listed in the tables below. Moreover, detailed lists of frequency of content words are provided in appendix.

4.1.1 Frequency of content words related to birthday party

Table 2 provides frequency lists of the use of the nouns, verbs, and adjectives by autistic children in the conversation of birthday party event. It reveals differences in the use of content words by autistic children. Nouns and verbs seem to be more frequent than the adjectives, while in comparison to verbs, nouns can be seen as used frequently by children with autism.

The frequent use of the nouns related to the particular event such as *birthday*, *cake*, *chocolate*, *gift*, *candle* and *balloon* is observed in Tables 2 and 3.

In table 2, it is found that mild autistic children frequently used *birthday* (33) and *cake* (31) while severe children use *cake* (21), *chocolate* (16) and *birthday* (11). *Chocolate* is used six times only and other nouns like *candles* (5), *gifts* (4), *candle* (4), *balloons* (3), and *gift* (2) occurred in the conversations of mild-autistic children. Whereas, Table 3 depicts that severe autistic children used noun related to the birthday event are *gift* (5), *baba* (4), *toy* (4), *toys* (4), *time*(4), *balloon* (3), and *biscuits* (3).

Table 2: Frequency List of content words used by mild autistic children about birthday event

| Nouns | Frequency | Verbs | Frequency | Adjectives | Frequency |
|-----------|-----------|---------|-----------|------------|-----------|
| Birthday | 33 | Khaya | 8 | Happy | 9 |
| Cake | 31 | Hota | 7 | Acha | 3 |
| Mama | 8 | Kiya | 5 | Pasanad | 1 |
| Baba | 7 | Kata | 5 | Pink | 1 |
| Chocolate | 6 | Diya | 3 | Mazay | 1 |
| Candles | 5 | Aai | 2 | goo:d | 1 |
| Gifts | 4 | kaattay | 2 | Theek | 1 |
| Candle | 4 | Lai | 2 | | |
| balloons | 3 | Diay | 2 | | |
| Gift | 2 | phook | 2 | | |

Table 3: Frequency List of content words used by severe autistic children about birthday event

| Nouns | Frequency | Verbs | Frequency | Adjectives | Frequency |
|-----------|-----------|----------|-----------|------------|-----------|
| Cake | 21 | Hota | 12 | karwa | 4 |
| Chocolate | 16 | Kiya | 8 | Happy | 2 |
| Birthday | 11 | Kaattay | 6 | Meetha | 2 |
| Gift | 5 | Lagatay | 6 | Saath | 1 |
| Baba | 4 | Hotay | 6 | Theek | 1 |
| Toy | 4 | Khata | 5 | | |
| Toys | 4 | Daitay | 4 | | |
| Time | 4 | lagaya | 4 | | |
| Balloon | 3 | khailtay | 4 | | |
| Biscuit | 3 | Sleep | 3 | | |

The most frequent verbs related to the birthday event in the conversation of mild autistic were *Khaya* (8) *hota* (7), *kiya* (5), *kata* (5), *diya* (3), *aai* (2), *kaattay* (2), *lai* (2), *diay* (2), *phook* (2). While the verbs that are used by severe autistic children are *hota* (12), *kiya* (8), *kaattay* (6), *lagatay* (6), *hotay* (6), *khata* (5), *Daitay* (4), *lagaya* (4), *khailty* (4), *Sleep* (3). Both Mild and severe autistic children had different with variety of verb usage. Severe autistic children also used verbs related to the event, other than these, as shown in the Table 3.

Adjectives are used in very less quantity by both mild and severe autistic children having less frequency as compared to nouns and verbs. Mild autistic children used the adjectives such as *happy* (9), *acha* (3), *pasand* (1), *pink* (1), *mazay* (1), *good* (1), and *Theek* (1), whereas severe autistic children used adjectives *karwa* (4), *Happy* (2), *meetha* (2), *sath* (1), and *theek* (1).

4.1.2 Frequency of content words related to school routine

Frequency lists 4 and 5 related to the event of school routine disclose the fact that adjectives are less common in number than nouns and verbs; however, less use of verbs is identified as compared to noun in the conversation in school event.

Table 4: Frequency List of content words used by mild autistic children about school event.

| Nouns | Frequency | Nouns | Frequency | Verbs | Frequency | Adjectives | Frequency |
|-------|-----------|-------|-----------|-------|-----------|------------|-----------|
| | | | | | | | |

| | | | | | | | |
|----------|----|-------------------|---|---------|----|--------|---|
| Teacher | 38 | Chair | 2 | Kiya | 14 | Theek | 4 |
| Time | 23 | Hira | 2 | Ai | 8 | Pasand | 2 |
| School | 16 | Tahira | 2 | Khaya | 5 | Fine | 2 |
| ma'am | 11 | home ^o | 1 | Kertee | 4 | Saaf | 2 |
| Ot | 10 | Kanghee | 1 | Kiay | 4 | Paas | 1 |
| homework | 9 | Cycling | 1 | Jana | 3 | Dus | 1 |
| Gar | 8 | Sahiba | 1 | Giya | 2 | | |
| Name | 7 | °dhoop° | 1 | Hotee | 2 | | |
| Work | 7 | Ibrahim | 1 | Keratee | 2 | | |
| speech | 6 | Cake | 1 | Hota | 2 | | |

As can be seen in Table 4, first five most frequent nouns used by mild autistic children related to school event are *Teacher* (38), *time* (23) *school* (16), *ma'am* (11), *ot* (10); and five most common verbs are *kiya* (14), *ai* (8), *khaya* (5), *kertee* (4), and *Kiay* (4). The only adjectives used are *theek* (4), *pasand* (2), *fine* (2), *saaf* (2), *paas* (1), *dus* (1).

Table 5: Frequency List of content words used by severe autistic children about school event

| Nouns | Freq uenc y | Nouns | Freq uenc y | Verbs | Freq uenc y | Adjectiv es | Freq uenc y |
|---------|-------------------|-------------|-------------------|--------------|-------------------|-----------------|-------------------|
| Book | 18 | Bacha | 1 | Kerta | 6 | Ik | 2 |
| Work | 14 | Poem | 1 | Perhta | 4 | One | 2 |
| School | 13 | Billee | 1 | Peena | 3 | Mazaida | 1 |
| Teacher | 12 | English | 1 | Khailt | 3 | ar °twinkle° | 1 |
| Time | 12 | Bazaar | 1 | aa Kertee | 3 | | |
| Ghar | 9 | Pesha | 1 | Karate | 3 | | |
| Color | 7 | war Urdu | 1 | Love | 3 | | |
| Picture | 6 | Stories | 1 | Khol | 2 | | |
| Park | 6 | Tamata | 1 | Kerate | 2 | | |
| Zoo | 5 | r Chaada | 1 | e Bana | 1 | | |
| | | r | | | | | |

According to Table 5, five highly frequent nouns related to the school event conversation of the severe autistic children are *book* (18), *work* (14), *school* (13),

teacher (12), and *time* (12); and five frequently used verbs are *kerta* (6), *perhta* (4), *peena* (3), *khailtaa* (3) and *kertee* (3). Only few occurrences of adjectives are found: *ik* (2), *one* (2) *mazaidar* (1), and °*twinkle*° (1).

The high frequency words like *birthday*, *cake*, *teacher*, *school*, *time* and *work* revealed about the availability of concepts related to events and indicated that autistic children had knowledge of these concepts with reference to both events. The frequent use of the words shows their experience and conceptualization of the two events. The frequency lists do not reveal much about the conceptual use of the words. Concordance list and use of words in the context further help about the conceptualization of the event and language related to it. For that purpose, concordance lists are discussed to evaluate further about use of the words in the context of their conceptualization of both events.

4.2 Embodied Conception of two events in Autistic Children

The concordances of each event are observed by using the node words such as *birthday*, *cake* for the birthday event discourse sub-corpus, and *teacher*, *school* for school event discourse sub-corpus. These node words are chosen because of their frequency: they are highly frequent words in the corpus of the conversations of autistic children. The generated concordance lines are discussed below.

4.2.1 Embodied Conception of “Birthday” in Mild Autistic Children

The concordance lists of Birthday discourse by mild autistic children help in understanding lexical knowledge and conceptualization of the event by these children. The open-class semantic structure nouns are used as search word. Content words such as nouns provide rich details about the two events and conceptual structures. Two node words *birthday* and *cake* are selected to know whether the children had concepts about the particular nouns and other words that collocated with them or is it that they just repeated the utterance of the other speaker. Their ‘silence’ instead of ‘response’ is a result of lack of lexical knowledge, revealing lack of conceptualization regarding the event.

Birthday party is celebrated in the Autism Center once or twice a month, depending upon the birthdays of children. for the event, hall is decorated with balloons and cake is cut by the birthday boy/girl. Less experience of

and exposure to the event did not let them have access to the related concepts – of cutting cake, eating cake, giving gifts and so on. Therefore, when SLP inquired from children about the event by asking questions like *Birthday pay kiya hota hai* (*what happens on birthday*), some children gave relevant responses (Fig 1, concordance lines 1 to 9) while some remained silent or were repeating the question. Their verbalization shows limited perception and conceptualization of the event. The concordance lines 1 to 6 in Figure 1 indicate somehow relevant response about the word *birthday*. Some children responded by uttering one word *birthday*; one child gave paralinguistic response of clapping; and one child said *happy birthday* instead of responding to the question.

Concordances generated by using *birthday* as node word

1. Birthday pay kiya hota hai? AN: birthday pay (.) IS hota hai Adult: nahee.
 2. AS: ((kept clapping)) Adult: happy birthday [to you AS: to you] ((started clapping
 3. Birthday pay kiya hota hai? IL: birthday ((clearly uttered this time with normal tone))
 4. Adult: birthday pay kiya hota hai? IL: birthday ((uttered clearly)) Adult: kiya hota hai birthday
 5. IL: >birthday< Adult: birthday pay aur kiya hota hai?
 6. Adult: birthday pay kiya hota hai RN: °happy birthday°
 7. SLP: MM nay celebrate kee thee apnee birthday? Hoon? MM: [°°kee thee°° SLP: kee thee]
 8. achaa tau phir kiya kiya thaa birthday main? MM: candle () SLP: candles! Cake! Aur?
 9. kon kon thaa birthday pay. MM kee birthday pay kon kon tha? MM: mama
-

Figure 1: Concordances from the sub-corpus of Birthday Discourses by Mild Autistic Children

4.2.1.2 Embodied Conception of “Cake” in Mild Autistic Children

In the Figure (2), adult speaker while inquiring about the birthday event asked a question: *Kia thaa birthday main* (*what was in the birthday*) and received somehow relevant linguistic utterances: *cake kata tha* (line 11, 12); children also gave relevant linguistic responses: *candles* (line 13, 15) and *balloons* (line 13, 14). Lines from 16 to 23 show the use of relevant verbs such as *khaya*, *kata*, *lai thi*, and children also used correct adjectives like *acha* (line 24) and *pasand*. When asked about the type of cake, they responded with correct linguistic choice *chocolate* (line 25, 26). Moreover, they also have schema of person. When the children asked who brought the cake in the party, one of the children responded as *Mama* (line 27)

Some children did not respond instantly on the question; they remained silent (line 28, 29) and gave echolalic responses (line 30, 31,) and inappropriate response (line 32).

By observing both concordance lists (Figure 1 and 2), it is observed that the appropriate responses of children give an idea that they may have lexical knowledge about the event but responded late. Some children did not respond instantly on the question, but responded with inappropriate para-linguistics responses, echolalic responses, and sometimes they remained silent. Their nonlinguistic behavior like *silences* indicate rather the auditory overload or auditory agnosia in the children.

Concordances generated by using *cake* as node word

10. banana thaa, kon saa thaa? AN: (cake. bana.) chocolate cake aayaa thaa
 11. birthday main kiya thaa? MA: °°cake kata thaa°° Adult: cake kaataaa thaa?
 12. birthday main cake kata thaa kon saa cake thaa wo? MA: °°happy birthday kaa°°
 13. Kia thaa birthday main? MM: candle() SLP: candles! Cake! Aur? MM: balloons SLP: wow?
 14. RN: balloons Adult: balloons. Aur? RN: cake Adult: cake. Hoon aur? RN: (balloon).
 15. Adult: haan happy birthday cake kay ooper kiya lagatay hain? RN: candles
 16. Aur? Aur kiya kiya tha? MM: cakekatar: SLP: cake kata! Achaa!
 17. us main kiya kiya thaa? MA: °°cake kata thaa°° Adult: cake kaataaa thaa?
 18. Cake thaa. Aur kiya thaa? AN: (cake khaya) Adult: acha aur? AN: cake khaya tha
 19. Adult: acha aur? AN: cake khaya tha Adult: aur kiya thaa iman kee .
 20. Cake koe laya thaa? MM: (0.3) cake khaya SLP: cake khaya? Achaa.
 21. MM nay cake khaya ya nahee? MM: khaya! SLP: kon sa cake mangwaya thaa MM
 22. Aap nay cake khaya thaa? ZB: kh. khaya thaa ((stammered)) Adult: hmm.
 23. Mama, baba kiya lai thay? AN: wo cake ((looked away from adult)) cake lai thay
 24. Adult: tau cake kaisa tha? AN: cake acha thaa ((recovered eye contact))
 25. Adult: kon saa cake thaa?= ZB:= ch chocolate ((stammered)) Adult: chocolate
 26. MM: khaya! SLP: kon sa cake mangwaya thaa MM nay? MM: chocolate.
 27. idhar daikho (turned her face towards herself) cake, cake kon laya tha? MM: mama
 28. Adult: ahmad kee birthday pay kon saa cake thaa IL: (4 secs) ((silent)) Adult: kon
 29. ((silent)) Adult: nahee cake para huaa thaa. Cake kay saath aur kiya thaa? MA: ((silent))
 30. Adult: kon lataa hai cake? RN: mama cake ((echolalia)) Adult: cake kon lay ker aata
 31. ashar kee birthday pay hum nay kiya khaya thaa? AS: khaya thaa ((immediate echolalia)).
 32. Adult: acha mujhay batao cake kay ooper kiya lagatay hain? RN: laptop
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Figure 2: Concordances from the sub-corpus of Birthday Discourses by Mild Autistic Children

4.2.2 Embodied Conception of “Birthday” in Severe Autistic Children

The concordances in figure 3 and 4, from birthday discourses by severe autistic children, are generated using the same search words – *birthday* and *cake* – as were used by mild autistic children. The same search words are selected to know the differences in the usage of content words by mild and severe autistic children. The concordance lists informed that when SLP/adult speaker inquired about the birthday event by asking questions like *what do we do in birthday?* or *Aur kiya hota hai*, children responded with some relevant content words – *birthday, chocolate, balloon hota hai* (Fig 3, lines 33-36). One child mispronounced the word *balloon* as *bailan* (line 37). Further, line 38 shows one child identified the person AA as guest of the event when asked *who came on the birthday?*

It is observed that sometimes, children did not respond linguistically; instead, they showed their non-linguistics responses, may be because of delayed or hyper audition or auditory overload (Naqvi, 2017). They remained silent or gave echolalic response and whispered the words *birthday*, or *cake* (line 39-44).

| Concordances generated by using <i>birthday</i> as node word | |
|--|---|
| 33. | Birthday main kiya hota hai Aa? AA: <oo: birthday> ((said joyfully but slowly)) Adult: yay birthday. |
| 34. | Do you know what we do in birthday? Birthday [party? AH: birthday] ((whispered)) |
| 35. | Aur kiya hota hai birthday main?= AA: a chocolate biscuit Adult: chocolate |
| 36. | SLP: acha. Aur kiya hota hai birthday per? IS: balloon hota hai SLP: wow! |
| 37. | birthday ((uttered clearly with high pitch)) Adult: birthday. Aur? Bal... WN: bailan Adult: balloons |
| 38. | IS: AA SLP: aur kon aata hai birthday pay? IS: AA SLP: AA! |
| 39. | Adult: AH, what do we in birthday? AH: (3 secs) ((silent)) Adult: birthday? |
| 40. | hota hai Hl aur? HL: ((silent)) Adult: birthday main aur kiya hota hai? HL: ((silent)) |
| 41. | Adult: ((made her sit upstraight)) Wn. Birthday main kiya kertay hain WN: ((silent)) |
| 42. | IS: huee thee (echolalic response) SLP: birthday kee thee? IS: kee thee (echolalic response) |
| 43. | daitay hain? IS: birthday daitay hain SLP: birthday daitay hain? IS: birthday daitay hain (echolalic) |
| 44. | kiya hotee hai? IS: Monday SLP: birthday? Birthday party hotee hai naa IS: °birthday hotee |

Figure 3: Concordances from the sub-corpus of Birthday Discourses by Severe Autistic Children

4.2.2.1 Embodied Conception of “Cake” in Severe Autistic Children

To receive some more details from the children about the event, when SLP asked about the event with reference to the most relevant prompt *cake*, as can be seen in Fig. 4.

Concordances generated by using *cake* as node word

45. AA: ((after 3 secs)) the cake Adult: cake? Wow! Which cake do you like?
 46. Which cake do you like? AA: ((after 3 secs)) oo: >chocolate cake< Adult: chocolate cake. You don't like pineapple
 47. Adult: chocolate cake. Who brings the chocolate cake? AA: ((after 3 secs)) da:dddy Adult: daddy?
 48. IS: cake kaattay hain SLP: cake kaattay hain!
 49. AA: ((after 4 secs)) aisaa kertee hai main cake khaon gee ((uttered in unusual, weird shrill voice
 50. Birthday main kiya hota hai? Cake hota hai. Chocolate cake. Aur? AA: ((silent))
 51. AZ: (silence) SLP: kon laya thaa cake? AZ: (started swinging the chair again)
 52. Adult: kiya hota hai HI? Cake? HL: =cake ((while leaning forward repeated meaninglessly))
-

Figure 4: Concordances from the sub-corpus of Birthday Discourses by Severe Autistic Children

One child gave correct, but delayed response *the cake* (line 45) and *chocolate cake* (line 46). One response showed the schema of person when one child was asked about who brought the cake: the delayed response was *daddy* (line 47). Another child responded about the cutting action by saying *cake kattay hain* (line 48). Action verb *khaon* (eat) (line 49) was also uttered by another child. Besides linguistic responses, high occurrences of para-linguistics responses (being silent) (lines 50 & 51) and repetitions of adult's spoken words can also be seen below (line 52).

4.2.3 Embodied Conception of "School" in Mild Autistic Children

The concordances (Fig. 5 & 6) of school discourse by mild autistic children were generated using search words *school* and *teacher*. Using school and teacher as node words helped in understanding the lexical knowledge and conceptualization of the event. Despite that children would experience schooling five days a week, contrary to the birthday which usually occurred once or twice in month, few children did not have clear concepts of school related activities that would take place from morning till noon.

When children with mild autism were inquired about their position or concept of place by asking *aap ghar main hoy ya school main ho?* (*Are you at school or at home?*) *Kahan aai huay ho? is waqt hum kahaan hain? School main yaa ghar main* (Fig. 5), some children gave correct responses and uttered the noun *school* correctly (lines 53-56). This shows that they had proprioceptive awareness regarding their school.

Concordances generated by using *school* as node word

53. Kahan aai huay ho? ZB: (1 sec) school main ((muffled voice))= Adult:= school main?
54. AS kahaan hai is waqt? AS:[() Adult: School main?] AS: >school mai< Adult: haan school
55. batai gee is waqt hum kahaan hain? School main yaa ghar main? MM: school main
56. RN: ((after a silence of 3 secs)) school main Adult: school main. Very good! School
57. MM: ((sat back on the chair)) Adult: school main hum kiya kertay hain. MM: Khailtay hain
58. ZB school kiya kernay aatee hai? Aap school main kiya kertay ho? ZB: kaam kerte
59. Adult: hoon? Teacher anila kiya keratee hain school main IL: ((looking here and there))
60. Adult: school main. Very good! School main kiya kertay ho aap Rn? RN:()
61. Adult: hoon! acha what's your school's name? IL: (ARC school) ((not clear))
62. (1 sec) aata hai Adult: kiya hai school ka naam? ZB: one class hai
63. Adult: ARS MA: ARS ((repeated)).
64. yaa school main) Adult: ghar main yaa school main? AS: >GAR MAY GAR MAY<
65. Adult: are you at school or at home? IL: °°() at home°°
66. MA: (main) Adult: aap ghar main [ho, school main ho MA: °°ghar main ho°°]
67. Adult: aap ghar main hoy ya school main ho? MM: °book main°
68. AS: °gar main yaa school main° ((immediate echolalia)) Adult: kahaan per ho.
69. Adult: school main? Aap school main ho MA: ((silent)) Adult: acha school
70. As kiya kerta hai school main? AS: (° °) ((unusual body movements))

Figure 5: Concordances from the sub-corpus of School Discourses by Mild Autistic Children

The concept of school related activities, that require action, were found to be present in some of children only. When children were asked *what do they do in school?* Or *what does teacher teach in class?* all autistic children responded with reference to their respective concepts: *Khailtay hain* (line 57), *kaam kartay hain* (line 58). Some children remained silent when they were asked the same questions (lines 59 to 60). The action verbs reveal that all children experienced the school routine differently.

When asked about the name of the school, only one responded correctly: ARC (line 61); one gave an irrelevant linguistic response: *one class* (line 62); and one gave an echolalic response despite asking again and again (line 63). It is also observed that some of the children gave irrelevant/incorrect response about their positioning as *gar mein* (*at home*) instead of being at school (lines 64-66); one child responded with *book mein* (*in book*) (line 67). Few others gave echolalic response or repeated the adult's words (line 68) and paralinguistic responses (line 68-70). It shows that they might have

either delayed auditory perception or lack of ability to process appropriate proprioceptive information.

4.2.3.1 Embodied Conception of “Teacher” in Mild Autistic Children

Concordances in figure 6 were generated by using a search word *teacher* which gave occurrence related to concept of person identity affiliated with school event.

Concordances generated by using *teacher* as node word

71. Teacher kaa kiya naam hai jo aap ko perhanay aatee hain= AN:= aa: teacher tahira
 72. Adult: ((tapped at his hand)) kon see teacher? AS: teacher fida ((the name is fizza
 73. Adult: what’s your teacher name? IL: (anila) ((in unusual shrill voice))
 74. Adult: yeh kon hain? ((pointed at the teacher aid)) MA: °Ma’am Sumaira° Adult: Ma’am Sumaira
 75. teacher Hira hain naa aap kee classs teacher? MM: teacher °°Hira°° Me: teacher hira
 76. Adult: teacher madiha? RN: >°teacher, teacher madiha°< Adult: ((took hold of his hands))
 77. Adult: kiya kertay hain music teacher? ZB: (3 secs) °°music chair°°
 78. Adult [Teacher aid]: Il what’s your teacher name? IL: ((looking at the adult)) teacher
 79. aap pehlay mujhay batao aap kee teacher kaa kiya naam hai? MM: TEACHER
 80. IL: ((started looking away again)) Adult: teacher? IL: teacher ((repeated meaninglessly in high pitch))
 81. Adult: what’s your teacher name? IL: ((looking at the adult)) teacher name ((repeated in shrill voice))
 82. Adult: look at the teacher MA: look at the teacher (echolalia)
 83. what’s her name? ((kept pointing at the teacher aid)) RN: what’s her name (immediate echolalia)
 84. Adult: teacher fizza kiya keratee hain? AS: (3 secs)
-

Figure 6: Concordances from the sub-corpus of School Discourses by Mild Autistic Children

The children showed the presence of the concept of person when they uttered the name of the teacher (lines 71 to 77). After going through the concordance occurrences, it was observed that some of the children identified in their first attempt the concept of teacher and responded with the correct name of their respective teacher. Lines 78 & 79 show that some children, instead of names, responded with linguistic choice “*teacher*” and repeated adult speaker’s words (lines 80 & 81), while some gave echolalic responses (lines 82 & 83). When asked more about *what does his teacher?* he remained silent (line 84).

4.2.4 Embodied Conception of “School” in Severe Autistic Children

Concordances in figure (7 and 8) of school discourse by severe autistic children were generated by using node words *school* and *teacher* as was done

in the case of mild autistic children. Same node words were used to know the difference in the use of content words and conceptualization of the events through those words. It enables to differentiate who had used the content words at more accurate places. Severe autistic children gave less relevant responses as compared to the mild autistic children.

Concordances generated by using *school* as node word

85. Adult: kahaan ho aap AZ: school Adult: school mai? Very good.
 86. (took his hands in mine) IS: school main Adult: haan! Acha. School main IS
 87. Adult: nahee. Aap school main ho ghar main ho? IS: ghar
 88. Adult: aap kiya kertay ho school main? AZ: chuttee Adult: nahee, school main
 89. Adult: aap school main kiya kaam kertay ho? WN: °°school
 90. Adult: School main kiya kertee hai? WN: (3 secs) school main? Adult: hoon? WN: work time kertee
 91. AZ: hoon Adult: kiya hai Az kay school kaa naam? AZ: peter
 92. Adult: AZ kay school ka kiya naam hai? AZ: teacher
 93. Adult: teacher anum kiya keratee hain school main? HL: ((mumbled something like 'teacher anum'
 94. Adult: school me kon perhta hai? IS perhta hai naa school main! IS: school main perhta hai (echolalic)
 95. Adult: school main yaa ghar main? WN: school main ghar main ((immediate echolalia with high-pitched
 96. Adult: aap school main ho? WN: aap school main ho ((immediate echolalia with high-pitched voice))
 97. Adult: Are you at school or at home? AH: ((silent))
 98. Adult: Teacher anum kiya keratee hain school main? HL: ((looking upward))
-

Figure 7: Concordances from the sub-corpus of School Discourses by Severe Autistic Children

Severe autistic children were also asked similar questions to inquire about their position or concept of place. There were less occurrences of relevant responses about the positioning of children. Only two children appropriately mentioned the noun *school* (lines 85 to 86), while majority of the occurrences were irrelevant or incorrect when asked *what they do in school?* (line 87 to 89). Only one child responded with somehow correct response, as can be seen in line 90. Two children were asked about the name of the school; both of them gave irrelevant linguistics responses such as *peter* (line 91), *teacher* (line 92). Some gave echolalic responses (line 93 to 96), and few remained silent (line 97, 98) when they are asked about their positioning or activities at school? It shows that they might have either delayed auditory perception or lack of ability to process appropriate proprioceptive information.

4.2.4.1 Embodied Conception of “teacher” in Severe Autistic Children

The concordances in figure (8) were generated by using the search word *teacher* which gives occurrence related to person identity. Most severe autistic children showed presence of the schema when they uttered the name of their teachers (line 99-103). When they were asked what their teacher does in class, they respond with somehow relevant responses like *book* (line 104), *speech keratee* (line 105), *wo karate hain* (line 106), *work kerwatay* (line 107), *work* (line 108). Some children did not respond when asked what do their teachers do in class. Rather they gave paralinguistic responses – either remained silent or did some other things (Lines 110-115). It shows that child lacked the concept of important, relevant actions regarding school event.

Concordances generated by using *teacher* as node word

99. Adult: AA kee teacher kaa kiya naam hai= AA: =<teacher kaa naam hai>= Adult: =hoon?= AA: =sobia
 100. Adult: AZ kee teacher ka kiya naam hai? AZ: Maryam
 101. Adult: In kay ilawa kon see teacher hain? AZ: Fariha Me: teacher... idhar daikhain
 102. Adult: IS kee teacher kaa kiya naam hai? IS: teacher sabeen
 103. WN: (2 secs) ((silent)) Adult: WN kee teacher ka kiya naam hai WN: °°if rah°°
 104. Adult: teacher sobia kiya perhate hain= AA: =book=
 105. Adult: teacher hira kiya keratee hain? IS: speech keratee.
 106. Adult: work time main kiya keratee hain teacher hira? IS: wo karate hain Adult: kiya
 107. Adult: sobia? Teacher soba kiya keratee hain? AA: ((after 2 secs)) <work kerwatay
 108. AZ: work Adult: work keratee hain! Very good!
 109. AZ: teacher Adult: acha AZ kee teacher ka kiya naam hai? AZ: ((silent))
 110. HL: ((silent)) Adult: acha aap kee teacher kaa kiya naam hai? HL: ((silent))
 111. Adult: school main kiya keratee hain teacher anum? HL: ((looking here and there; silent))
 112. Adult: achaa wajdaan kee teacher kaa kiya naam hai? WN: (2 secs)
 113. Adult: what is the name of your teacher? HL: ((looked at the adult, smiled,
 114. Adult: teacher anum kiya keratee hain school main? HL: ((mumbled something))
 115. Adult: HI? Teacher anum kiya keratee hain school main? HL: ((looking upward))
-

Figure 8: Concordances from the sub-corpus of School Discourses by Severe Autistic Children

5. Discussion

Flawless concept formation is imperative to learn and remember words. Knowledge about the nature of concepts can provide significant understanding about the process of meaning making that children with both severe and mild autism undergo (Naqvi, 2017). Moreover, word learning in autism is an important step for the development of vocabulary and to interact socially (Parish-Morris et al., 2007). Since majority of children with autism could not talk about some very basic concepts pertaining to school

routine and birthday party event, partially because of the lack of attention regarding their surroundings and partially because of their abnormal sensory perceptual issues, the findings suggest a need to use picture-word learning as an intervention strategy to improve their limited language skills (Preissler, 2008), to provide them exposure of language to improve their vocabulary and morphological skills (Gonzalez-Barrero & Nadig, 2018).

Besides language learning, the findings have practical implications for engaging children with autism in social activities, by making them pay attention to different concrete concepts that are available, in some form or another, in concrete forms. For example, the findings of school routine discourse suggest that five-day per week interaction made most of them retrieve information regarding important concepts related to academic activities, including their concepts of the place of school and the persona of their respective teachers. On the other hand, the discourse regarding birthday party informed about lack of concepts related to the event, although birthday is the event where all children feel excited and happy. On the contrary, children with autism, due to less frequent exposure to the experience of birthday event, could not store concrete concepts effectively. This calls for intervention strategies to scaffold their learning environment (Chang et al., 2022); (Batool et al., 2022).

6. Conclusion

The present study, on the use of content words (nouns, verbs, adjectives) in the conversations of autistic children, highlights about their embodied experiences and the resultant conceptualization of the events. Besides this, frequency of content words also informs about the differences that can be seen in the conceptualization of children with both severe and mild autism. The high frequency words revealed about the ease to access available concepts regarding both events – school routine and birthday party. The findings also revealed that as compared to the verbs and adjectives, nouns were frequent in the conversations of the autistic children – partially because nouns are more concrete in nature as compared to verbs and adjectives. Moreover, the concordance lines show that severe autistic children provided less linguistics responses as compared to the mild autistic children. Severe autistic children gave either delayed and/or echolalic responses and would remain silent at times during conversations about the events. Reference to

school routine, majority of the responses of mild autistic were relevant, especially about the concept of place and/or concept of person. Almost all the autistic children, both mild and severe, showed that they had concept of person and also identified the name of the teacher correctly. Regarding birthday party, severe autistic children were found to have limited conceptualization, as compared to school routine due to the nature of exposure and experience. It is evident from the analysis that autistic children have distinct stock of conceptual knowledge structures and vocabulary items that they make use of. The findings have implications for the language teaching and learning of this population.

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