LANGUAGE AND CONCEPTUALIZATION IN AUTISM: A STUDY FROM THE PERSPECTIVE OF COGNITIVE SEMANTICS

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Candidate of **Doctor of Philosophy** at the National University of Modern Languages do hereby declare that the thesis **Language and Conceptualization in Autism: A Study from the Perspective of Cognitive Semantics** submitted by me in partial fulfillment of PhD degree, is my original work, and has not been submitted or published earlier. I also solemnly declare that it shall not, in future, be submitted by me for obtaining any other degree from this or any other university or institution.

I also understand that if evidence of plagiarism is found in my thesis/dissertation at any stage, even after the award of a degree, the work may be cancelled, and the degree revoked.

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ABSTRACT

Title: Language and Conceptualization in Autism: A Study from the Perspective of Cognitive Semantics

This thesis looks at the language and conceptualization in autism from the perspective of embodiment offered by Cognitive Semantics – concepts are embodied and are mirrored through language. Thirteen verbal children with autism were treated as thirteen cases and their behaviour and linguistic data were analyzed to investigate following three interests: 1) the nature of their embodiment (sensory-perceptual experiences); 2) the disposition of their conception regarding real-life events; and 3) the relation between their embodiment and their conception of events as revealed through their discourses. The study is delimited to two real-life events: School Routine and Birthday Party. The former is experienced by the children five days a week, while the latter is experienced once a month. The study is further delimited to three modalities: visual, auditory and proprioception. The visual, auditory and proprioceptive embodiments of children with autism were explored through Sensory Profile Checklist Revised (SPCR) (Bogdashina, 2005), while their conception and processing of real life events were identified and determined after analyzing their discourses through Cognitive Discourse Analysis (CODA) Tenbrink (2015). The qualitative analysis of linguistic data revealed the expected association between absence and presence of concepts, and sensory processing of verbal children with autism. The findings were discussed in the perspective of Cognitive Semantics that offers a relation between embodiment, conceptualization and language.

The study concluded with the proposition that autism be viewed from the perspective of embodiment. This offers a more flexible and developmental approach towards individuals with autism and treats them just like neurotypicals – the perception and conception (of events schemas) are determined by their unique embodiment (sensory-perceptual experiences). The proposed cognitive theory of autism “theory of embodied processing” also seems to resolve the issues of universality, specificity and uniqueness that already existing cognitive theories of autism – Theory of Mind Deficit, Theory of Executive Functioning and Theory of Weak Central Coherence – have been trying to resolve.

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DEDICATION

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CHAPTER 1

INTRODUCTION

1.1 Background

The culmination of mind/body dualism and resultant paradigms of behaviourism were the dawn of cognitive revolution which Miller (2003) defined as "cognitive counter revolution" (p. 142) in response to "behavioural revolution", and which Kertész (2004) defined as "cognitive turn in linguistics" (p. 1). Hence the cognitive shift of mid-1950s proved to be the point of convergence for language, thought, brain, mind, body and the world. This revolutionized the understanding of how language and cognition operate, and marked an explicit paradigm shift from considering mind as tool to process information without recourse to body, to establishing the foundations of mind-body interaction. A large body of research started to realize that sensory motor and perceptual processing are not merely input and output apparatuses that work without having an interaction with cognition; they establish the roots of cognitive activity.

By 1980s, the cognitive shift had also refashioned the research trends of varied fields like computer science, philosophy, linguistics, psychology, neuroscience and anthropology by offering a multidisciplinary approach. This interaction of different sciences thus embarked interdisciplinary research trends between and among the following fields of inquiry: psycholinguistics, computational linguistics, artificial intelligence, cognitive linguistics, to name the few.

Cognitive Linguistics (CL) emerged on the landscape of linguistics in 1970s due to discontentment with the existing formal approaches to language (Allwood & Gärdenfors, 1999; Evans & Green, 2006) and objectivist orientation to meaning, mind and body (Brdar, Gries, & Fuchs, 2011; Johnson, 1987; Lakoff, 1987). It rejects the formalist's notion of language as an abstract system of signs and mentalist's notion of innateness, because if language were just an abstract and mental phenomenon, there would be a pure single meaning of an utterance and thoughts would have universal patterns of conceptualization.

Cognitive Linguistics views and studies language as an ‘embodied experience’ because apart from being linguistic beings, we are also embodied beings. The language we use on semantic, syntactic (grammatical) and lexical level delineates our thought process. Janda (2010) adduces in her significant article that cognitive linguists regard linguistic cognition as general cognitive faculty, so they expect patterns of concepts/thoughts “observed by psychologists and neurobiologists to be reflected in language” (p. 6). In other words, linguistic structures are an index to cognitive structures. On this premise, CL thus negates the Chomsky’s assertion that language is disengaged from other modes of cognition (Taylor & Littlemore, 2014) and studies the relationship between “human language, the mind and socio-physical experience” (Evans, Bergen, & Zinken, 2007, p. 2) against the backdrop of embodied cognition and embodied experience: how concepts, first evolved from percepts, have bodily bases – Cognitive Semantics.

1.2 Cognitive Semantics: An Embodied Approach towards Experience, Mind and Language

Cognitive semantics is an approach in the movement of Cognitive Linguistics which rejects ‘objectivist semantics’ and endorses that the ‘semantic content is mediated by how speakers construe and conceptualize the world’ (Taylor & Littlemore, 2014). It furthers the assertion that linguistic constructions are meaningful constructions and that meaning is constructed at conceptual level as it is tied directly to meaningful perceptual, embodied experience (of which language is a part) (Lakoff, 1987). The word ‘semantics’ in cognitive semantics specifically refers to conceptual organization of and in language (Talmy, 2000b) as opposed to traditional perspective of truth conditions (Evans & Green, 2006).

1.2.1 Experience as Having Bodily Bases

Cognitive Semantics studies mind (cognitive processing) and language in relation with embodied experience, and explains and establishes human beings as “embodied beings” – our bodies negotiate with the world to construct our own versions of reality in the contexts of our varied bodily, sensory, perceptual experiences (Tyler & Evans, 2003). This dynamic experience where body is the prime mediator is referred to as “embodied experience” (Lakoff, 2013/2015) and this perspective of viewing subjective experience as the determining factor in the construal of relative reality is the empiricist approach where "human mind – and therefore language – cannot be investigated in isolation from human embodiment" (Evans & Green, 2006, p. 44). This perspective dismisses the idea of mind as a machine which only stores and retrieves information; it is an active being that constantly interacts with the outer world via our bodies. What we hear, see, etc., determine our knowledge. This process of taking in information via senses has been described as perception by Bogdashina (2005): "Perception is the process by which an organism collects, interprets and comprehends information from the outside world by means of the senses" (p. 44).

The story of embodiment does not end here. The nature of the corresponding experience motivates the level of content the concepts form. Hence our concepts are embodied, and the embodiment provides a non-arbitrary link between cognition and experience (Lakoff, 1987, p. 154). This experientialism perspective allows us to understand meaning of any event or action "via real experiences in a very real world with very real bodies" (p. 206). We interpret and comprehend any meaning through negotiation with the world around us. So, in words of Lakoff (1987) our everyday comprehension is inevitably embodied: "Since bodily experience is constant experience of the real world … stringent real-world constraints are placed on conceptual structure" (p. 268). As concepts are experiential in nature, our sensory experiences form the bases of our subjective experiences which help us establish our knowledge structures while interpreting and comprehending the world around us. Hence, concepts are embodied.

Likewise, language is never a disembodied phenomenon. The concepts arise and are organized through our bodily experiences and are reflected through the medium of language. Hence, the relationship between our sensory experiences and conceptual structures is quite robust. Our interaction with the external world of 'sensory information' renders our mind and body a combined status of 'embodied cognition' – an integral phenomenon to the view of embodiment and experientialism (Evans & Green, 2006):

> Human conceptual system is a product of human experience, and that experience comes through the body. There is no direct connection between human language and the world as it exists outside of human experience. Human language is based on human concepts, which are in turn motivated by human experience. (Lakoff, 1987, p. 206)

Given the thesis of embodiment, our sensory-perceptual experiences determine and/or delimit our embodiment. This in turn determines conceptual systems. The conceptual development or dormancy is based upon intact or dormant sensory-perceptual processing and this is the very postulation of embodied cognition thesis: concepts have perceptual base.

1.2.2 Experience Determines Concepts, Concepts Shape Language: Cognitive Linguistics Analysis

Evans and Green (2006) explain semantic structure as including all linguistic units – that include both lexical items (nouns, verbs, adjectives) and grammatical items (a bound morpheme, an active/passive construction, etc.) (p. 159). Talmy states them as “open-class systems” and “closed-class systems” respectively. To look for the patterns in which they interact in which and the processes by which conceptual content is organized in language, he analysed the semantics of grammatical and lexical subsystems and the ways.

Talmy regards semantics as inherently cognitive in nature. The research orientation in the same vein, in both volumes (Talmy, 2000a; Talmy, 2000b), has established his theoretical framework of conceptual structures. He announces that the ultimate aim of his research enterprise is to understand general character of conceptual structure (patterns and processes) in human cognition.

Talmy, in Voulme I, established the foundations of conceptual structuring in language by identifying relation of grammar to cognition – lexical forms are open-class (nouns, verbs, adjectives) and grammatical forms are closed-class categories. Moreover, grammatical items are semantically constrained and determine conceptual structure while lexical items are not semantically bound and provide conceptual content to any language. The grammatical forms, the closed class system of the language, trigger cognitive representations (CR) – an experience complex – and provide the most fundamental and comprehensive conceptual structuring system.

Talmy rejects the idea of language, reasoning, perception, attention, and motor control as independent modules, as suggested by Fodor, and endorsed that they share some fundamental features. The structural overlap that these systems experience are what Pulvermüller (2005) defines as “distributed interactive systems”. He also compared language structure to the structure in visual and kinesthetic perception in his work on fictive motion and ‘ception’ – he coined ‘ception’ after combining conception and perception. He looked at the differences and similarities across cognitive systems in the context of the ways these systems structure perceptual, conceptual and cognitive representations. He looked at them after analyzing language across a taxonomy of sources of motion – orientation, sensation, emanation, coextention, radiation and advent – for fictive motion scenes. To him, all these categories entail “Access Path” expressions where spatial schemas (the words like ‘across’, ‘from’, ‘toward’, ‘away’, ‘around’, etc.) have motion input – something departs from one point, passes through some surface and reaches to some other point. In other words, we perceive and conceive motion visually and kinesthetically and express linguistically. Hence, our visual and kinesthetic ception (perception and conception) do not just structure the cognitive representation, but the semantic structure also gives an insight into how ception is structured.

In another work of language and conceptualization, he looked at the cognitive process of “windowing of attention” in a situation of “event frame” where the aspects of the event/situation that are foregrounded are “windowed”, while the aspects of situation that are backgrounded are “gapped”. He illustrates that language tends to exclude and include the aspects depending upon the way people perceive and conceive situations. How our perception and motor experience structure ‘windowing of attention’ – window or gap any frame of the event – and how that attentional windowing structure language was examined in five generic event frames: path, cycle, causal chain, participant interaction and interrelationship. Relevant to the work of attentional windowing is Talmy’s work of how figure and ground is structured in language through many structures (like single clause, complex sentences, self referencing event) and lexical expressions (like prepositions and conjunctions). Moreover, his work on modal and force dynamic verbs and semantics of causation also revealed the interrelatedness of language and cognition.

Though the above cited research works looked at the variety of and complex abstract relations between language, conceptualization and experience, they have established the presence of an interaction and relation between all three in terms of their causality and interdependence.

1.3 Language and Conceptualization in Autism – A Story of Embodiment or Information Processing

With the refinement of the core features of the disorder, the sensory experiences of individuals with autism also received increased attention – generally and with specific reference to the impact these behaviours/experiences have on the daily lives of people with autism. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders classifies Autism Spectrum Disorder as a neurodevelopmental disorder that is characterized by following dyad of impairments: limited and affected social communication and interaction (both verbal and non-verbal); and limited repetitive patterns of interests, behaviours and activities (American Psychiatric Association, 2013). The DSM-5 thus pronounced sensory behvaiors of individuals with autism as direclty associated with the diagnostic of Autism Spectrum Disorder (ASD) and besides different psychometric scales, sensory and perceptual checklists and/or questionnaires are being employed as tools to assess sensory behaviours (Elwin, Schröder, Ek, Wallsten, & Kjellin, 2017; Neil, Green, & Pellicano, 2017) so that autistic-like traits are identified and appropriate intervention strategies are suggested.

These sensory experiences are usually explained as sensory processing (Baker, Lane, Angley, & Young, 2008; Brown, Morrison, & Stagnitti, 2010; Cesaroni & Garber, 1991; Tomchek & Dunn, 2007). Sensory processing refers to the way sensory input – visual, auditory, proprioceptive, etc., is managed and then used later for action. Individuals with autism face difficulties with processing sensory stimuli. Ayres (1985), as quoted in (Ben-Sasson, et al., 2009), proclaims human brain as a “sensory processing machine” – 80% of our nervous system is engaged in processing and/or organizing sensory information. The way we humans process sensory input (visual, auditory, proprioceptive, tactile, etc.) varies based upon the modulation, integration, organization and discrimination of sensory information – and varied sensory information results in varied sensory experiences which lead to varied embodiment.

Dunn (2007) asserts the relationship between sensory processing and human behaviour, and reiterates the environment and the body as the primary sources of sensory input to the brain. He further explains sensory processing as a neurological process and the outset of sensory experiences as "neurological thresholds" – the personal range of these sensory thresholds (for noticing and responding) vary from person to person and the nature of these thresholds (low and high) may differ for each sensory input (p. 85). Viewing form the perspective of embodiment, what we do or come across becomes part of our sensory processing experience and lays the foundation of our conceptual knowledge regarding the world around us. Referring to the embodiment of people with autism, Bogdashina (2003) endorses that although "they live in the same physical world and deal with the same 'raw material', their perceptual world turns out to be strikingly different from that of non-autistic people" (p. 44). She further defined their bodily attitude (Monticelli, 2013) and bodily resources under 20 categories: gestalt perception, intensity of perception, sensitivity to and fascination with certain stimuli, inconsistent perception, fragmented perception, distorted perception, sensory agnosia, delayed perception, sensory overload, monoprocessing, peripheral perception, systems shutdowns, compensation by another sense, resonance, daydreaming, synaesthesia, perceptual memory, associative memory and perceptual thinking. She refers to these as 'autistic experiences' which bring "a different stock of knowledge about the world" (p. 44). Their limited resources and unique/different bodily attitude render them a leeway to a different world of experience. That different experience reslts in different embodiment.

Whether to regard the sensory perceptual experiences of people with autism as mere information processing or as a result of their relative embodiment, depends upon how their interaction with the world around them is being interpreted. The psychological approach has been used in the research in autism to analyze language and thought against parameters that would include perception, attention, memory, etc. The langauage in autism has been studied from different perspectives: lanaguage and communication abilities (MacFarlane, et al., 2017; Matsushima & Kato, 2013; Naigles & Tek, 2017; Hudry, et al., 2010; Ray-Subramanian & Weismer, 2012; Siller & Sigman, 2008; Wodka, Mathy, & Kalb, 2013), pragmatic language (Volden, Coolican, Garon, White, & Bryson, 2009); relation between language and repetitive behaviours/sensory, motor experiences (Ashburner, Zivian, & Rodger, 2008; Baker, Lane, Angley, & Young, 2008; Ceponiene˙, et al., 2003; Howe & Stagg, 2016; Kasari, Paparella, Freeman, & Jahromi, 2008; LeBartona & Landaa, 2019; Luyster, et al., 2005; Luyster, Kadlec, Carter & Tager-Flusberg, 2008; Thurm, Lord, Lee, & Newschaffer, 2007); and conceptualization (event schemas) (Falter, Elliott, & Bailey, 2012; Loth, Gómez, & Happé, 2008; Loth, Gómez, & Happè, 2011; Loth, Happé, & Gómez, 2010; Loveland & Tunali, 1991; Maras & Bowler, 2011).

In Pakistan, autism awareness regarding its symptoms, behaviours and intervention is on its rise (Arif, Niazy, Hassan, & Ahmed, 2013; Mian, 2014; Rauf & Anis-ul-Haq, 2014). According to an estimate, over 350,000 children are affected with autism in Pakistan (The Nation, 2012). There has been a recent drive in autism centers in Pakistan (Tariq, 2016). One of the biggest centers in Asia and the biggest autism center in South Asia is Autism Rehabilitation Center initiated by former Cultural Minister Sindh, Sharmila Farooqi (2018). The center is government owned. Even government has now realized the importance of autism centers in Pakistan (Pakistan Today, 2018). In the special child centers, there was no separate center for Autism. At present the special education centres in the Federal region that fall under federal education and professional training ministry have also established their own Autism unit (Rehabilitation Centre for Children with developmental disorders). Several schools have initiated the drive towards inclusive education.

The concept of inclusion implies that instead of being segregated in special education classrooms (Mesibov & Shea, 1996), students with autism or special needs should be educated in the same environment as typically developing students with appropriate support services. The terms integration or mainstreaming are different from inclusion, as those terms assume that students have a special education setting as their home base and they are only placed into the regular classroom when educators believe they can succeed in the activities taking place. The concept of inclusion means that students with special needs are placed in the regular classroom and this is considered their home base, not a placement that needs to be earned (Mesibov & Shea, 1996).

In Islamabad, the Head Start School, Kuri Campus has initiated inclusive education. Picture autism, an initiative stared by a mother of autistic child at Kuri Road, is the basis for this inclusive drive. They have encouraged the idea of differentiated learing in the mainstream schools through Academic Behavioural Support (ABIS) Team and through Individual Education Plans (IEPs) (Headstart School, 2019; Picture Autism, 2016). This is considered to be a very good inititaive by all those who are associated with autism either as parents or speech language pathologists or psychologists, and the like. Since health care professionals are reported to have different impressions of the autism condition (Imran, et al., 2011; Pakistan Today, 2017; Rahbar, Ibrahim, & Assassi, 2010), those who deal with autism still feel the need for further awareness in terms of its etiology, and misconceptions regarding its salient features, so that educators can develop positive attitude towards inclusive education of children with autism (Kofidou, Mantzikos, Chatzitheodorou, Kyparissos, & Karali, 2017) and with appropriate support services. There is another drive on the site of autism and that is to form new laws for these differently-abled population (Pakistan Today, 2018).

Moreover, there is a rise in RBT (Registered Behavioural Technicians) therapists. They are certified professional technicians working towards acquiring full ABA (Applied Behaviour Analysis) status. In autism centers and in their clinics, these professionals also employ methods like PECS (Picture Exchange Communication System) and TEACCH (evidence-based) for the education and communication ehnacement of children with autism. SLPs in Pakistan have introduced and started using AAC (Augmentative Alternative Communication) therapy for people with autism. In AAC, SLPs work on the core vocabulary of children with autism so that important schemas related to daily interaction are constructed. Both pictures and words are used to improve vocabulary. Moreover, visual timetables are in use in autism centers since people with autism are found to have better visual perception. However, the documented work on autism is still in its infacny. Health care practitioners (Imran & Azeem, 2014), and psychologists are also reporting about autism in terms of how parents of children with autism get affected too (Rauf, Anis-Ul-Haque, & Aftab, 2017; Rauf, Anis-ul-Haq, & Khan, 2018).

Autism is the story of embodiment. It is a state where peculiar bodily experiences of individuals with autism and their peculiar physical interaction of the world determine the way they perceive and conceive things and events. This physical interaction with the world around us through all available senses develop our embodiment. In other words, sensory perceptual experiences define embodiment. Embodiment in turn determines the nature of knowledge structures. Knowledge structures are the concepts that we are able to construct in the light of our bodily experiences with the world around us. The nature of embodiment and knowledge structures can be the two potential predictors and precursors of the language in autism. Hence, their language use mirrors their varied embodiment and the nature of their knowledge structures. This is the first study of its kind, specially in Pakistan, where autism awareness and interventions only in the fields of psychology and speech language therapy are on rise. No linguist has ever tried to dig deep into this area, specifically through the perspective of embodiment – Cognitive Semantics.

1.4 Establishing Research Focus & Value of the Study

1.4.1 Statement of the Problem

The determining effects of sensory perceptual experiences of autism should be studied with respect to their language and conceptualization. Language, mind (embodied cognition) and experience are very deeply related to one another. This developmental (bottom-up) approach will be helful in explaining factors that constraint their experiences and in suggesting their processing and conception of the world around them. Milton (2012) asserts the importance of interaction people with autism have with the people and the world around them and stresses the need to consider the "autistic voice" through their subjective, lived experiences, so that autism and its associated behaviours are not reduced to certain objective criteria. This assertion highlights the inadequacy of current cognitive psychological theories to acknowledge the outside world and its determining effects on the inside world of processing and perception among people with autism.

Everyone interacting with autism is cognizant of the sensory-perceptual issues they face throughout their lives, but how do these issues determine the peculiar embodiment of autistics have never been studied, especially in Pakistan. No study has been conducted so far in the domain of Cognitive Linguistics where the peculiar nature of the embodiment of autistics has been studied in relation to their language and conceptualization. There is a need to study the way people with autism perceive things and events, and the way their concepts are organized from the standpoint of embodiment – their peculiar bodily experiences and their peculiar physical interaction with the environment. This different embodiment actuates their information processing, which in turn determines their mental representations. Moreover, besides collecting a behavioural account/evidence of their peculiar interaction with the world, linguistic representations that they utter in each context can reveal a lot about their conceptualization and should be considered for a comprehensive understanding of the phenomenon.

1.4.2 Significance of the Study

The present study throws light on the relationship between sensory perceptual experiences of verbal children with autism and their language and conceptualization. Their interaction with the world shapes their experiences which determine their knowledge (structures) and all this is deeply rooted in the nature/origin of their percepts (perceptual styles) and concepts (cognitive styles). This is what makes their meaning making different and this is what makes them an outsider, a foreigner in our linguistic culture. Thus, their sensory-based experiences determine their peculiar embodiment that leads to their distinct verbalization style. How people with autism verbalize thoughts and what these verbalizations inform about their mental representations pertaining to any specific event, object, etc., have not been studied in the context of their peculiar embodiment.

The current study not only highlights their embodiment in the light of their possible sensory-perceptual experiences, but also investigates the way their language displays this peculiarity. The study would also signify that in people with autism, language, mind (embodied cognition) and experience are very deeply related to one another; and that the varied embodiment of individuals with autism determine their perceptual styles, their knowledge and conceptual structures (schemas), and their linguistic representations germane to everyday objects and activities (events). While bringing to fore their sensory perceptual experiences and their varied yet peculiar embodiment, the study will help looking at autism not a mere disorder, but a different way of perceiving and making meaning of the world.

The current study neither attempts to integrate the dominant cognitive theories of autism nor refute their claims and findings; it is a humble attempt to suggest a new perspective that would address the heterogeneity in autism while integrating all the above suggested strands – language, perception, sensory motor experiences – to give a holistic view of autism from a new lense – theory of embodiment in autism. Since experience is always relative (not universal) and unique, the suggested perspective assumes to offer a more flexible approach where uniqueness and non-universality is appreciated as a norm. Moreover, it also expects to suggest the possible route verbal children with autism adopt to perceive and process concepts/information.

To justify the value of the research, following objectives would give rationale for the present study and would provide a focus to the research activity:

1.4.3 Objectives of the Study

1. To determine the nature of knowledge structures/schemas verbal children with autism displayed during the discourse regarding real-life events.

2. To discuss the nature of possible sensory perceptual experiences the language use of verbal children with autism discloses, and that seem to determine their understanding, perception and conceptualization – processing – of the events.

3. To suggest the individual embodiment of verbal children with autism as 'heterogeneous embodied experience' in the light of their peculiar sensory perceptual profiles.

This research focus delimits exploration to the following research questions that set the stage for the current work:

1.4.4 Research Questions

1. What do the discourses of verbal children with autism reflect about their conception (conceptual structures/schemas) regarding real-life events?

2. What do the discourses of verbal children with autism inform about the sensory perceptual processing in general and with specific reference to their perception and understanding of the real-life events?

3. What do the sensory perceptual profiles of verbal children with autism suggest about the embodied experiences of verbal children with autism?

To meet the objectives of the study and to find the respective answers, the sensory motor and perceptual behaviours/experiences of 13 cases have been studied in close integration with their language data regarding their lived experiences. The methodological framework is empirical and falls in the category of Cognitive Linguistics/Semantics – Cognitive Discourse Analysis (CODA).

1.5 Structure of the Thesis / Study

The research undertaking is structured as under:

Chapter 1 provides the backdrop in the context of language, embodied cognition and autism. After establishing the research territory, it announces the focus of the research and raises questions that need to be addressed in the field of autism, language and conceptualization. The chapter concludes with justifying the value of the research and identifying research intent.

Chapter 2 accommodates the issues and the review of literature germane to the purpose and significance of the study. The detailed review of the related literature and researches done in the field from different perspectives give valuable insight into the subject matter at hand and help see the gaps – which aspect is not studied so far. Autism has been studied from the context of neurolinguistics, psycholinguistics and cognitive linguistics, but using experimental methods. The conceptual and embodied perspective of Cognitive Linguistics is the pedestal to view and examine linguistic processing in Autistics.

Chapter 3 illustrates the bricolage of the inquiry by rationalizing research method (qualitative), research paradigm (interpretivism/constructivism) and research design (empirical case study). It furthers the discussion on the criteria of selecting sample, and the choice of framework for data collection and framework of data analysis. The method of data analysis is Cognitive Discourse Analysis (CODA) and the discourses are bifurcated into two layers – first layer of discourse and second layer of discourse.

Chapter 4 explores the sensory perceptual experiences of children with verbal autism in three modalities: vision, hearing and proprioception. While utilizing behaviour data, case-wise analysis is done both qualitatively and quantitatively. However, the behaviour is quantified based on the parameters suggested by the standard sensory profile checklist. Moreover, the chapter identifies the conception of events and their pertinent schemas after analyzing first layer of discourse. The first layer of discourse defines one communicative situation as one unit of analysis – each communicative situation has something to do with either schema of sequence, or object or action. Within each communicative situation, inappropriate/appropriate slotfillers (both verbal and non-verbal) are looked at to decipher the nature (absence and/or presence) of schemas. Furthermore, the chapter deliberates on and explains the possible sensory perceptual experiences their discourses disclosed. This is done after analyzing second layer of discourse. The second layer utilizes the same communicative situations and the presence/absence of relevant schemas; however, the context of possible explanations is the twenty-category standard checklist of sensory perceptual experiences (Bogdashina, 2005).

Chapter 5 debates on the findings of analysis chapter across all 13 cases, in the light of three questions and against three paradigms of Cognitive Semantics – sensory percetual experiences determine embodiment, embodiment determines concepts, concepts are displayed through language. The chapter further establishes the need to change the lenses from existing cognitive theories of autism – cognitive/developmental psychology – towards cognitive semantics theory of embodiment/embodied processing. The chapter also concludes the work by highlighting the contribution of current study to the existing research in autism, by stating the limitations that are intrinsic to this kind of study and by recommending avenues to extend the research in autism towards a more holistic and comprehensive approach of embodiment.

CHAPTER 2

LITERATURE REVIEW

The chapter reviews autism literature concerned with two crucial areas of significance pertaining to the current research enterprise. Firstly, the studies that discussed sensory difficulties of people with autism are reported with an aim to find evidence for their heterogeneous experiences. Secondly, the literature that tried to find and establish a connection between language, communication and sensorimotor skills are identified. The relation between sensorimotor experiences and language in general has been verified by significant research contributions.

The chapter then provides an overview of cognitive approaches towards mind, body and language from the standpoint of Cognitive Semantics, while giving a leeway to the subjective experiences of people with autism and justifying their relative experiences as their individual embodiment. The existing literature/research on sensory perceptual processing/experiences, language and conceptualization in autism helped identify the gap in the existing body of research in autism and suggest a novel perspective that is more flexible and all inclusive.

2.1 Cognitive Theories of Autism vs Cognitive Semantics 'Theory of Embodiment'

2.1.1 Cognitive Theories in Autism – Processing Deficits

The language and sensory processing of people with autism were being studied from pure experimental methods and against cognitive theories like theory of mindblindness, weak central coherence, executive dysfunctionality and sensory integration. On the contrary, what makes our interaction meaningful and/or different is our relative experience and same is true for people with autism. The following section gives the background of the way theories of autism focused on the processing of information (language and cocepts) from the point of view of cognitive psychology – humans as processors of information.

2.1.1.1 Theory of Mind (ToM) Deficit

The theory of mind deficit (Baron-Cohen, Leslie, & Frith, 1985) suggested that some of the core elements of autism might arise from a primary cognitive deficit. It was this domain-specific theory that revolutionized autism research (Tager-Flusberg, 2007) and brought developmental psychologists into mainstream autism research (Rajendran & Mitchell, 2007).

Theory of mind is a cognitive skill (Sorensen, 2009), a 'mentalizing' ability (Koyama, 2009), a "social cognition" (Merin L. Taylor, 2010; Frith C. , 2003), a 'quintessential' human qualification (Baron-Cohen, 2001) that involves the ability to understand others' behaviours (Brewer, Young, & Barnett, 2017) on the premise that others have their own beliefs and desires. Bosco and Gabbatore (2017) explain ToM as a human ability to attribute mental states to oneself and to other individuals. They further explained that "First-order ToM involves the comprehension of another person's belief about a certain state of the world, while second order ToM involves the ability to infer what one person believes about another person's thoughts, meaning to understand nested mental states" (p. 2). It evolves from true beliefs to false beliefs, and from the understanding of first-order beliefs to second-order beliefs; deviation from this normal developmental path induces ToM difficulties (Blijd-Hoogewys & Geert, 2017, p. 2). In autism, this deficit is reported to affect the information processing of individuals regarding mental state of others (Tager-Flusberg, 2007); is enunciated as a core cognitive deficit (Baron-Cohen, 2001); and is also reported to create problems in the execution of joint attention (Mundy, Sullivan, & Mastergeorge, 2009), pretend play and telling lies (Happé, 1999). This "mentalizing-deficit account" (Frith & Happé, 1994) declares people with autism as "mindblind" and this "mindblindness" separates them from other human beings (Duffy & Dorner, 2011).

Tager-Flusberg (2000) establishes a causal relationship between theory of mind deficit in autism and language (pragmatic, syntactic and semantic) impairments. The limitations of cummunicative functions in autism entail instrumental functions of the language; inability to share and/or seek attention, to provide new information, to express intentions or mental states of others; and difficulties in conversational competence. She reviews these varied limitations in autism as inability to distinguish between new and given information, inability to conform to conversational rules and inability to extend the topic. She attributes all of them to impaired understanding of others' minds. Koyama (2005) elaborates the ability of inferring others' emotions through facial expressions as an important precursor to develop ToM. She further speculates that the lack of eye contact and the resultant lack of attention on socially relevant stimuli during early childhood hamper social development and affect higher level social abilities – ToM.

2.1.1.2 Theory of Executive Dysfunction

Executive functions refer to high level functions that include planning, cognitive flexibility, initiation, working memory and inhibition (Koyama, 2009); problem-solving, decision making, self-perception and judgement (Rajendran & Mitchell, 2007); and inhibition, self-monitoring, generativity, mental flexibility (Hill, 2004).

The theory of executive dysfunction was conceived as similar to specific brain injury that often results in eccentric behaviours e.g., need for sameness, difficulty switching attention, lack of self control and tendency to perseverate. This domain general theory accounts for multiple non-social aspects of autism and entails both cognitive and motor characteristics of autism (Rajendran & Mitchell, 2007). Frith (2003) states that a lack of flexibility and an inabilty to control processing resources lead to the disorders of certain executive functions – which are considered to be responsible for the repetitive behaviours and narrow interests of autistic individuals. Frith further reported that studies of executive function contain selective attention tasks. These studies present that selective attention delegate top-down modulation of any activity in the pertinent sensory processing areas – individuals with autism typically perform badly on these tasks (p. 8).

Hill (2004) identified both social and non-social key tarits of autism that manifest executive dysfunction. He reviewed the studies of executive function with respect to autism and discovered following behaviours: planning deficit; poor mental flexibility (rigidity) and repetitive stereotype behaviours; and lack of spontaneity and initiation, speech and action, and pretend play.

2.1.1.3 Theory of Weak Central Coherence

Central coherence is a style in cognitive processing (Frith, 2003), a drive for meaning (Bartlett, 1932), an ability to process incoming information for meaning and gestalt often at the expense of attention to or memory for details (Happé & Frith, 2006). People with autism are reported to process local information (where features are perceived/processed in detail) at the expense of global information (where the gist of any phenomenon is perceived) (Brosnan, Scott, Fox, & Pye, 2004). This perceptual bias for local over global elements (Chouinard, Noulty, Sperandio, & Landry, 2013) or in the words of Happé and Frith (2006) a "detail-focused processing style" – a processing bias for featural and local information and relative failure to extract gist, is referred to as weak central coherence (Frith, 1989).

The weak central coherence theory, a domain general process, explains some non-social as well as some social features of autism such as attention and explains how individuals process information (Rajendran & Mitchell, 2007). Frith (1989) regarded both assets and deficits of autism to have cognitive bases, and attributed autism to a specific imbalance that individuals with autism experience while integrating information at different levels. Happé (1999) appropriated this difference in their information processing to Gestalt perception which causes difficulties in perceptual coherence, visuo-spatial construction coherence, and verbal-semantic coherence.

The three cognitive theories could not give a satisfactory account of varied aspects of autism. The reason was that either some individuals with autism would exhibit the problems addressed by these theories and some would not, or the difficulties were not typical to autism, but could be seen in other disorders too – issues of universality. Frith and Happé (1994) declared that theory of mind deficit can neither explain all features of autism, nor explain all people with autism. Siegal and Blades (2003) also rejected the lack-of-ToM-is-unique-to-autism claim on the grounds that some children with autism passed the ToM test while others did not. Instead, they reported how children with autism find it difficult to extract linguistic information that is received through auditory processing/perception, and established the view that auditory processing deficit might be a key factor in autism.

Happé and Frith (2006) also suggested weak central coherence to be characteristic of only a subset of autism. Frith C. (2003) also 1) denied 'weak central coherence' as the only explanation of deficits in social cognition in autism and suggested to integrate the perspective with ToM and 2) dismissed the idea of 'core deficit in central processing' in autism – the early stages of sensory processing (emphasizing local features) are intact in autism while the top-down modulation of these early processing stages (which would be required to extract global features) do not function properly (p. 9). Frith (2003) identified executive dysfunction as including difficulties with top-down modulation, which furthered the idea of combining both these lenses to explain information processing in autism.

Given the limitations of all three cognitive theories of autism, and the consequent acknowledgement and realization of autism as having multiple capabilities and deficits, the literature suggested replacing the lenses of looking at autism.

2.1.2 Heterogeneity in Autism – An Account of Multiple Capabilities or Deficits

Autism is a bunch of complex and heterogeneous developmental disorder (Chouinard P. A., Noulty, Sperandio, & Landry, 2013; Tager-Flusberg, 2007) and no single cognitive mechanism or cause can explain its variety of symptoms and social-communication impairments. Martin (2012) states that comparison of different individuals with same autism diagnosis has always displayed different personalities, strengths and weaknesses. Since autism entails different cognitive deficits/styles that result in heterogeneous profiles of individuals with autism in terms of their "aetiology, behavioural features, prognosis or response to intervention" (Happé & Frith, 2006, p. 15), Rajendran and Mitchell (2007) pronounced that this might be the reason behind often conflicting results in both intervention and basic reseach studies.

Some robust studies (Baron-Cohen & Swettenham, 1997; Frith & Happé, 1994; Hill, 2004; Pellicano, Maybery, & Durkin, 2006; Skorich, et al., 2015; Tager–Flusberg, 2004) tried to establish the need to address heterogeneity in autism by integrating all three cognitive theories of autism; few studies found a correlation or overlapping evidence between two of the three. For instance, Skorich, et al. (2015), after signaling the role of theory of mind dysfunctionality to explain the social and communication deficits and the role of weak central coherence to explain non-diagnostic features of autism spectrum disorder, explored and postulated a link between both cognitive theories – weak central coherence induces theory of mind deficit. Chouinard P. A., Noulty, Sperandio, and Landry (2013) adduced the evidence of the disparate perceptual processing among people with autism, as compared to typical population, through visual-susceptibility audit of three different visual illusions – Ebbinghaus, Muller-Lyer and Ponzo illusions.

Happé and Frith (2006) proposed a framework that would consider autism as a broader phenotype, as the result of anomalies that are found to and thus validated to affect number of core cognitive processes – global-local processing, social cognition (ToM) and executive functions (p. 17). Nevertheless, they concluded that weak central coherence can neither be reduced to executive dysfunction, nor be linked with social cognition deficits (ToM) (p. 21).

The two alternative theoretical explanations regarding perceptual processes in autism were suggested by Plaisted and Mottron. Plaisted (2001) dismissed the possibilities of ToM and executive dysfunction to explain triad of impairments; of weak central coherence to guide attentional and perceptual abnormalities in autism; and of any causal relationship between central coherence and theory of mind. Plaisted proposed theory of Reduced Generalization which suggests that individuals with autism process unique features without any difficulty as compared to common features (p. 13). This reduced generalization hypothesis is regarded as the reason behind different perceptual processing in autism; this different perceptual processing is noted to result in relative concept formation and category structure (p. 15), and is viewed to explain the difficulty that people with autism face in generalizing newly learned behaviour to another new environment (Daniel, 2011).

Mottron and his colleagues appreciated the weak central coherence theory on the premise that it explains enhanced performance in autism; however, they refuted that the local-processing bias in autism is due to inability to process information globally (Mottron & Burack, 2001). They also accepted the Plaisted's idea of perceptual processing superiorities in autism but dismissed it as the only explanation among other cognitive superiorities that people with autism exhibit (Mottron, Dawson, Soulières, Hubert, & Burack, 2006). Alternatively, Mottoron's theory of Enhanced Perceptual Functioning suggests the presence of superior low-level perceptual processing as a consequence of a specific processing bias in autism and accounts perception a superior and different role in autistic cognition (Daniel, 2011). After refining the model further, Mottron and his colleagues (2006) enunciated the EPF model as a useful framework to study perception in autism, but also acknowledged the need to revisit their framework in the light of new evidences. They proclaimed the idea of enhanced perception as partly responsible for positive symptoms in autism and declared perception as intrinsically informative to understand autistic differences (p. 26).

Rajendran and Mitchell (2007), although discouraged the prospect of subdividing the disorder into further classification, stimulated future researchers to focus on single case studies and/or to devise methodologies that would take into account the heterogeneity of autism. Rajendran & Mitchell (2007) proclaimed that explaining autism as having a specific deficit will not resolve the issues of specificity, universality and uniqueness. To address the matter, at first they dismissed the prospect of any new theory of autism since it “cannot explain all the different aspects of the disorder because of many ‘types’ of autism” (p. 245); later down the road, they suggested the parameters of an ideal new theory that will address multiple cognitive deficits in autism:

> An ideal theory would trace it from infancy through to adulthood and would apply to individuals with autism who have severe learning disabilities as well as those who are higher-functioning. Any new theory would additionally have to integrate the sociolinguistic, perceptual and sensory motor aspects of the disorder. It would additionally need to encompass the disordered movement aspect of autism …. As yet there is no single theory which seamlessly integrates all these strands. If autism is a distinct disorder, then a useful theory would make predictions about the behaviour of everyone so diagnosed. (p. 247)

Besides other cognitive processes like problem solving, local vs global processing and mentalizing, sensory symptoms are also studied in an attempt to find an association with the characteristics of autism sample. However, the inconsistent evidences could not satisfy the issues of uniqueness (different from other clinical diagnoses), universality (presence in almost all individuals with autism) and specificity (different from other core symptoms), and therefore, could not be stipulated as core features of autism (Ben-Sasson, et al., 2009). The studies, nevertheless, validated inherent heterogeneous nature of the disorder. One of the reasons might be that the major lenses to view sensory experiences were also three cognitive theories of autism – that have their own limitations given the heterogeneous nature of the disorder.

2.1.3 Cognitive Semantics ‘Theory of Embodiment’ – Embodied Processing

Language has been studied in variegated contexts and from varied aspects by linguists, sociologists, neurologists, biologists, psychologists, and the like since long ago. From defining language as a behaviour (behaviourist framework) to a cognitive faculty/an innate ability (nativist/mentalist framework), we have now landed to an era that provides us with a set of theories which define language as an embodied, experiential phenomenon – Cognitive Linguistics (CL). Cognitive Semantics is one such theoretical enterprise in Cognitive Linguistics that rejects the objectivist and rationalistic notions of language proposed by structuralists (Saussure) and formalists/mentalists (Chomsky), where linguistic patterns are studied in terms of their syntactical properties independent of mind and body and where only linguistic competence is taken into account.

Besides being non-objectivist and non-generative in its perspective towards language and meaning, another invaluable and distinctive move that cognitive linguistics has been manifesting is its interdisciplinary research orientation. This plausible crossing with other disciplines (anthropology, artificial intelligence, etc.) and the flexibility of the framework have strengthened CL over the years. Cognitive linguistics (cognitive semantics) has a tendency to converge with other fields of knowledge to expand and determine more general aspects of knowledge – one such "tradition of cognitive linguistics is working to determine the more general cognitive structures [patterns and processes] pertaining to conceptual content that will encompass both the cognitive structures known from psychology and those known from linguistics" (Talmy, 2000b, p. 3). The "embodied cognition thesis" of cognitive semantics provides that point of convergence. This convergence allows for the mapping of conceptual structures, that cognitive semantics talks about, on to the cognitive patterns and processes that psychological approach mentioned above offers – perception, memory, attention and reasoning.

2.1.3.1 From Embodiment to Linguistic Meaning

While Talmy (2000) considers cognitive linguistics within the larger framework of perspectives that analyzes language, Evans and Green (2006) herald the use of language as a methodological tool to uncover conceptualization and structure in the realm of cognitive semantics. This renders language as a crucial and a responsible place, and positions language as a prominent pillar in both methodological and theoretical paradigms of cognitive linguistics. Cognitive Semantics further extends the reason and justification to declare embodiment and conceptualization as the two criterion to analyze and assess language.

The two guiding principles, underpinning the theoretical paradigm of embodiment, for the current research are 1) conceptual structure is embodied, and 2) semantic structure is conceptual structure (Evans & Green, 2006, p. 153). The two fundamental approaches that explain these guiding principles for the dominant research in language and conceptualization are Johnson's research on the embodied basis of conceptual structures – theory of image schema, and Talmy's research on the ways language reflects conceptual structures which are inherently embodied. The Figure 1 adapted from Evans & Green (2006, p. 177) not only guides us through the framework of standard embodiment theory, but also informs us about the causal relation and interdependence among all three phases of the framework. The process illustrated in Figure 1 is not linear; it is cyclical. Talmy (2000) clarifies that "if one's area of scientific study is linguistic meaning, one must go to where the meaning is located. And meaning is located in conscious experience" (pp. 5-6).

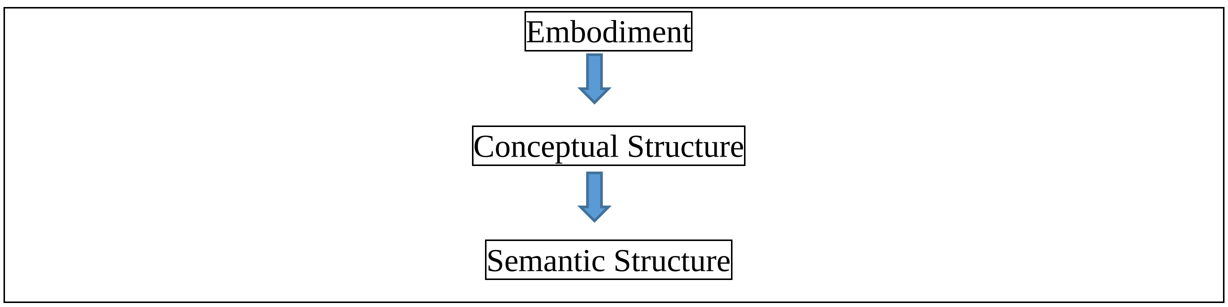

Figure 1: From Embodiment to Linguistic Meaning (adapted from Evans & Green, 2006)

Lakoff and Johnson (1999) establish this relation in terms of causality and interdependence:

> Our sense of what is real begins with and depends crucially upon our bodies, especially our sensory motor apparatus, which enables us to perceive, move and manipulate, and the detailed structures of our brains, which have been shaped by both evolution and experience (p. 17).

What mediates the relation between language and experience is our body. The two eminent researchers in the mainstream world of embodiment and conceptual structures are Leonard Talmy and Mark Johnson. Their works on conceptual structures, embodiment and semantic structures created the bases for future research in the realm of cognitive semantics.

The succeeding section will shed light on the works related to both strands of Cognitive Semantics – concepts have bodily bases and semantic structures are conceptual structures.

2.1.3.2 Language as Both Tool and Data: Cognitive Discourse Analysis (CODA)

Cognitive Linguistics, as usage-based linguistics, ensures "a form of linguistic analysis, …, that takes into account not just grammatical structure, but that sees this structure as arising from and interacting with language use" (Geeraerts & Cuyckens, 2007, p. 17) and given the diversity of analyses, the word 'discourse' has almost become a synonym for 'language' (Schiffrin, Tannen, & Hamilton, 2001). Chilton (2005) classified discourse as a "situated, embodied, and speaker-oriented linguistic performance" (p. 79), which excludes the notion of non-situated speaker knowledge.

Cognitive linguistics is now a larger (Talmy, 2000) and an influential framework (Evans & Green, 2006; Janda, 2010; Tendahl, 2009), a "conglomerate … of linguistic research" (Geeraerts, 2006, p. 2) that offers a bunch of approaches/theories (Taylor & Littlemore, 2014) to discover and examine the patterns of conceptualization through the dynamic workings of the language. These linguistic theories have been influenced by cognitive sciences, particularly psychology and neurology, since they share mutual perspective. Given that embodiment is a prime mediator in cognitive linguistics that provides an infrastructure for the concepts and the language to build on, its relation to language and conceptualization has been studied in varied contexts under the umbrella of cognitive semantics. Taylor and Littlemore (2014) fortify the idea of cognitive in Cognitive Linguistics by enunciating that its different conceptual approaches to analyze language – categorization, metaphor and metonomy, image schemas and embodiment, mental spaces and conceptual blending, construal and encyclopedic knowledge – "attempt to ground language description in well-established and well-documented aspects of cognition" (p. 5). One such methodological approach is Cognitive Discourse Analysis (CODA) (Tenbrink, 2015).

The relation between language and conceptualization is very systematic – the relation guides us about the nature of processing the speaker might have undergone while interacting with and storing the information (Tenbrink, 2008; Tenbrink, et al., 2012). Cognitive Discourse Analysis (CODA) penetrates deep into cognition via language and brings to surface the apparently-unaccessible-workings of cognition in terms of mental representations and complex cognitive processes. Tenbrink (2015) emphasizes the systematic nature of this relation and declares that "language use reflects crucial aspects about the speakers' concepts, mediated by their understanding of the communicative situation, at any given moment" (p. 100). While retaining the essence of "conceptual approach" (Talmy, 2000a), CODA combines "psychological approach" but in less constrained experimental settings through unrestrained linguistic choices.

The aspects of cognition that language renders access to via CODA entail mental representations and complex cognitive processes. Tenbrink, in her works to access cognitive processes through language, not just analyzed verbal reports, but also discovered patterns of linguistic structures that emerged across different speakers. She claimed that the linguistic structures displayed not just different strategies that the speakers employed to deal with problems at hand, but also the constraints that were quite implicit to them. Even individual speakers were not aware of the complex cognitive processes that they went through while they were verbalizing their own thoughts out loud.

With reference to mental representations, a series of empirical studies were conducted across varied contexts (situations and tasks). Regarding spatial information/schemas and spatial configuration, Andonova, Tenbrink, and Coventry (2010) looked at the linguistic choices of speakers in terms of description length (number of words and number of utterances by individual speakers) and found out that they seem to configure space in terms of atypical trajectory type (visual cues were mapped onto background knowledge) to attend the spatial information. Moreover, they found that visual cues and contextual information affected the way speakers described object orientations in space.

Tenbrink and Seifert (2011) explored the cognitive processes and strategies in a planning task. The individual experiences of participants in term of travel mode (car or bike), the shape of the environment or other predefined goals intrinsic to the tour planning happened to affect the cognitive processes. They analysed data on both behavioural and linguistic information. The behaviour data included their drawings of the possible route they wished to take, whether by car or bike, on the map given to them before the task. The behaviour data was analysed in terms of shape of the trajectory, the crossing lines and detours. On the other hand, the linguistic data included the written descriptive text to guide a good friend if he/she ever planned to visit the place on his/her own (Crete was the place in that route planning task). The linguistic data was analysed through their conceptual layers in terms of presence of underlying agent either as traveller or planner; nouns, verbs, adverbs/adjectives as planning or travelling activity; and relevant temporal markers. The spatial strategies that their linguistic choices brought to light were spatial vicinity, mental visualization of the trajectory, regionalization, etc. Their behavioural data in terms of travel mode they chose and the trajectories that they drew established the possible nature of their experience in the context of which they described respective route planning. Resultantly, their linguistic data indicated conceptual layers and spatial strategies accordingly. Tenbrink and Ragni (2012) conducted two studies and looked at the patterns in conceptual perspectives and reference frames in abstract settings. This study gave complementary insights regarding spatial description strategies.

With reference to linguistic analysis and mental representations, some other studies (Bateman, Tenbrink, & Farrar, 2007; Brunyé, et al., 2014; Cialone, Tenbrink, & Spiers, 2017; Cuay´ahuitl, Dethlefs, Richter, Tenbrink, & Bateman, 2010; Gralla & Tenbrink, 2013; Gugerty & Rodes, 2007; Hölscher, Tenbrink, & Wiener, 2011; Moratz & Tenbrink, 2006; Shi & Tenbrink, 2009; Tenbrink & Andonova, 2010; Tenbrink, Bergmann, & Konieczny, 2011; Tenbrink & Hui, 2007; Tenbrink & Weiner, 2009; Tenbrink & Taylor, 2015; Tenbrink & Winter, 2009) used CODA and established the relation between language, conceptualization, and embodiment.

The functional approach to study language looked at language and brain as two enclosed modules which operate separately, independent of any interaction between each other (Lichtheim, 1885) – mental and physical are mutually independent and exclusive ontological categories (Vicari, 2008). Cognitive neuroscience now gives evidence of situated and embodied cognition through the connection between motor capabilities and cognitive skills – action and language work in conformity with each other. Contrary to the amodal view of cognition, neuroscience now provides evidence that language processing regions, Broca's and Wernicke's areas, are linked with action and language (Pulvermüller, 2005). Pulvermüller studied the relation of action verbs (lick, pick, kick, etc.) with the parts of the body and found an automatic, rapid activation of sensorimotor cortex. He ascribed these activations to the cortical systems that are distributed over the brain and that work in close integration with each other.

The modern research trend has also denounced the traditional human information processing approaches, where action and perception are treated as two independent, isolated systems. Hommel, Müsseler, Aschersleben, and Prinz (2001) suggested the interface between perception (perceived events) and action (to-be-produced events), while Markman and Brendl (2005) and Wilson (2002) emphasized the importance of motor and perceptual representations in cognition.

The mind constitutes the body and body shapes the mind is the prime tenet of embodied cognition thesis. Hence, the embodiment theory in cognitive semantics provides the framework for the linkage between "low" cognitive processes such as perception and action (sensorimotor experiences), and "high" cognitive processes such as language and thought (Jirak, Menz, Buccino, Borghi, & Binkofski, 2010). The successive sections review the literature pertaining to embodiment, language and conceptualization with specific reference to autism. It further signifies that the experiences of autism are as relative and embodied as are the experiences of any other individual. It also reinforces the idea of experientialism with respect to autism and fortifies that (the presence and absence of) concepts have bodily bases. For a systematic exploration, the three phases of the framework have been used as three steps and the succeeding sections will discuss them to seek for the answer of interdependability and causality in autism.

2.2 Autism: A Dyad of Impairments

Since DSM III (1980), autism evolved in terms of classification and diagnostic criteria. DSM III identified autism as infantile autism and categorized it as a developmental disorder named Pervasive Developmental Disorder. The infantile autism was characterized as "pervasive lack of responsiveness to other people", "impairments in both verbal and nonverbal communication", and "bizarre responses to the environment" (p. 87). In DSM III-R (1987), it was named as Autistic Disorder and was declared as severe form of pervasive developmental disorder; its diagnostic criteria were developed with respect to the presence of "qualitative impairment in reciprocal social interaction", "qualitative impairment in verbal and nonverbal communication", and "markedly restricted repertoire of activities and interests" (pp. 38-39).

In both DSM-IV™ (1994) and DSM-IV-TR® (2000), the criteria to diagnose Autistic Disorder remained the same; nevertheless, Asperger Disorder was included under the main category Pervasive Developmental Disorder. Both versions of DSM-IV identified Asperger Disorder as having "severe and sustained impairment in social interaction" and "restricted, repetitive patterns of behaviour" (p. 76) – both features were reported to be typical of autistic disorder. The latest edition of the diagnostic manual, DSM V (2013), excluded Asperger syndrome from the list altogether and combined its traits with Autistic Disorder under the clinical title Autism Spectrum Disorder (ASD). Furthermore, it was classified as a neurodevelopmental disorder.

Autism Spectrum Disorder (ASD) is now recognized as a neurodevelopmental disorder that affects social communication and interaction (both verbal and nonverbal) and that restricts interests, behaviours and activities to certain repetitive patterns (American Psychiatric Association, 2013). This new classification now reduces autism to the 'dyad of impairments' in contrast to the previous notion of 'triad of impairments' (Frith & Happé, 1994). This boils down the state of autism to language difficulties and sensory sensitivities.

Autism research in the past couple of decades focused on the difficulties people with autism face in terms of both language/communication in autism (Hudry, et al., 2010) and sensory interaction with the world (Joosten & Bundy, 2010). However, the less researched area is the relation between these dyad of impairments (Baker, Lane, Angley, & Young, 2008; Bhat, Galloway, & Landa, 2012; LeBarton & Iverson, 2016; Matsushima & Kato, 2013; Ray-Subramanian & Weismer, 2012; Wodka, Mathy, & Kalb, 2013).

2.2.2 Language in Autism: An Embodied Experience

The Oxford Learner's Dictionary, eighth edition, defines experience under entry 2 and 4 as follows:

> **experience *noun*: …** *2*. [uncountable] the things that have happened to you that influence the way you think and behave" … *4*. **the … experience** [singular] events or knowledge shared by all the members of the particular group in society that influences the way they think and behave. (Oxford Advanced Learner's Dictionary, 2010)

We thus interact with the environment and construct knowledge in the light of our experiences. Lakoff (1987) underlines experience as "the totality of human experience and everything that plays a role in it – the nature of our bodies, our genetically inherited capacities, our modes of physical functioning in the world, our social organization, etc." (p. 266). This totality of experience is unique in people with autism in terms of the way their bodies interact with the world and construct their physical realities. Kanner (1943) in his first ever historical paper on autism identified some symptoms of their physical realities:

> There is from the start an *extreme autistic aloneness* that, whenever possible, disregards, ignores, shuts down anything that comes to the child from the outside. Direct physical contact or such motion or noise as threatens to disrupt the aloneness is either treated as "as if it were not there" or, if this is no longer sufficient, resented painfully as distressing interference. (Kanner, 1943, p. 242)

Kanner also highlighted hypersensitivity to sound and moving objects and fascination with light as sensory behaviours of the disorder. Watling and Hauer (2015) pronounced these sensory behaviours as "sensory features" and after penetrating deep into the pertinent literature, reported some studies – on visual focus, hypo and hyper-reactivity to visual, auditory and tactile input by Ornitz, 1974 and Wing, 1969; disturbance by loud sounds and fascination for visual stimuli by Dahlgren and Gillberg, 1989; and insensitivity to pain and tactile defensiveness by Rapin, 1991 – that highlighted differences in sensory responding that ranges from hyporesponsiveness to hyperresponsiveness to fluctuation in sensory responsiveness.

The literature on sensory perceptual experiences of individuals abound in heterogeneous findings, thus highlighting varied experientialism that this population also possesses like neurotypicals. The sensory integration theory explains the sensory processing difficulties and deficits in autism

Regarding sensory experiences of people with autism, Joosten and Bundy (2010) informed about increased and decreased sensory thresholds. Likewise, Shoener, Kinnealey, and Koenig (2008) signified the prevalence of sensory deficit in people with autism from 80 to 90% and shared the sensory processing experiences of their case (David):

> Perception of senses: the senses all don't work right and I struggle to think, Really each time I use my body I can't feel my body; it feels stiff. I can't move how I want; no muscles work; they are really cement. The ears work but the sounds are mixed up with

> all the sounds around the room, Sounds are accosting me, I see but my body really can't move in response to each hard thing around me, Taste is ok; it's extreme; smell is all inside the room and that's overwhelming to my head and brain. (p. 550)

Literature on visual processing of individuals with autism hinted towards heterogeneous visual experiences. Behrmann, Thomas, and Humphreys (2006) reviewed the perspective of visual perceptual impairment studied from the lenses of ToM deficit, weak central coherence and evidenced perceptual diversifications in autism spectrum disorder. Rondan and Deruelle (2007) explored visual processing in adults with autism and asperger syndrome, and found mixed evidence of both global and local processing. Vandenbroucke, Scholte, Engeland, Lammea, and Kemner (2009) studied visual processing in autism from the perspective of enhanced perception and found imbalanced visual processing. On the contrary, Remington, Swettenham, Campbell, and Coleman (2009) found enhanced perceptual capacity and superior visual search ability in autism and Ashwin, Ashwin, Rhydderch, Howells, and Baron-Cohen (2009) reported better visual acuity in individuals with autism as compared to control subjects.

Similarly, Alcántara, Cope, Cope, and Weisblatt (2012), Jones, et al. (2009), O'Connor (2012), and Siegal and Blades (2003), studied auditory behaviours in autism and reported varied experiences among their sample. Arduino, and Zampini (2013), Collignon, et al., (2013), Occelli, Esposito, Venuti, Arduino, and Zampini (2013), Occelli, Esposito, Venuti, Keane, Rosenthal, Chun, and Shams (2010), and Russo, L.Mottron, J.A.Burack, and B.Jemel (2010) studied auditory and visual sensory and perceptual behaviours and audio-visual integration in autism. They concluded that in autism, these two senses work independently since shift of attention from one modality to another slows down the processing. On the contrary, Keane, Rosenthal, Chun, and Shams (2010) reported unimpaired auditory-visual integration in high-functioning adults in autism.

The varied sensory-perceptual processing in autism plays an important role in determining their embodiment which regulate their daily activities. Referring to the relationship between sensory issues of individuals with autism and their cognitive styles, Bogdashina (2003) proclaimed that their challenging behaviours are only the tip of the iceburg – they indicate a lot about the underlying problems regarding communication, socialization, imagination, concepts and sensory experiences. Experience of any nature shapes concepts accordingly, and different sensory perceptual experiences provide different contexts for the concepts (mental representations) (Evans & Green, 2006, p. 21); language is one of the media to explore the nature of these concepts. The interesting fact about our sensory perceptual experiences is that they depend on the type of bodies we possess.

In terms of sensory/motor profile checklists that have been used, though only to diagnose autism severity, all standard checklists provide clues to few areas of sensory problems. For example, Mullen Scales of Early Learning (Mullen, 1995) can analyze sensory modalities in terms of vision and gross/fine motor areas. Vineland Adaptive Behaviour Scales is a 149 item checklist that offers insight into the domains of communication, socialization, daily life skills and motor skills (20 points). The sensory issues are categorized as maladaptive behaviours (33 points) in the scaling. Sensory Profile – 2 (SP-2) (Dunn, 2014) is a 125 item checklist and is devided into three main sections: sensory processing in different modalities, integration of sensory modalities and behavioural and emotional responses. The Glasgow Sensory Questionnaire (Robertson & Simmons, 2013) is a 42 item questionnaire that can help investigating only hyper and hypo sensitivities in all seven modalities: vision, hearing, tactile, proprioception, touch and smell. The literature on sensory processing in autism suggests only hyper, hypo sensitivities and integration difficulties have been given due attention. This brings to fore the need to have a more comprehensive criteria to dig deep into their sensory experiences. Only then their relation with the language can be studied more comprehensively and in detail. Sensory Profile Checklist – Revised (SPCR) by Bogdashina (2003) is a comprehensive checklist of 232 items (Appendix C). All seven sensory modalities can be studied via following 20 categories: gestalt perception, intensity of perception, sensitivity to and fascination with certain stimuli, inconsistent perception, fragmented perception, distorted perception, sensory agnosia, delayed perception, sensory overload, monoprocessing, peripheral perception, systems shutdowns, compensation by another sense, resonance, daydreaming, synaesthesia, perceptual memory, associative memory and perceptual thinking. The observation of all or required sensory modalities can reveal diverse interactions they have with the outside world (Kékes-Szabó & Szoloksvy, 2012; Robinson, 2010).

Literature pertaining to autism and langauge has yielded knowledge and development in terms of the way autism is being understood. Besides marking a clear line between autism and typically developing people, the research in autism has also been done to explore the mystery behind contributing factors that cause heterogeneous language outcomes; the most converging point is the exploration of both sensorimotor difficulties/repetitive, restricted behaviours in terms of learning and social interaction. Nonetheless, almost every autism research is bound to converge towards ToM, WCC and Executive Dysfunctionality.

Hudry, et al. (2010) examined expressive and receptive language skills in 152 pre-school children with autism using three assessment scales: Preschool Language Scales, Vineland Adaptive Behaviour Scales and MacArthur-Bates Communication Development Inventory. The findings of all these language measures suggested that receptive language was more impaired than the expressive language skills. What might have caused that was neither studied nor talked about in the study. Moreover, the nature of expressive language was not discussed. They only contributed to the autism literature that shares the stories of impairment. The interesting thing that they discussed was variation in comprehension and production skills. Davidson and Weismer (2017) suggested age as an important determinant for lower comprehension as compared to production, while Kwok, Brown, Smith, and Cardy (2015) found no disparity in expressive and receptive skills of children with autism across developmental stages. Despite varied findings, a significant relationship has been declared between language and sensory difficulties – less repetitive behaviours indicated more receptive and expressive language skills (Ray-Subramanian & Weismer, 2012). Ray-Subramanian and Weismer (2012) conducted a longitudinal study on 106 children with autism, aged between 2 to 3. The language and sensory development were assessed quantitatively through Autism Diagnostic Observation Schedule, Mullens Scale of Early Learning and Preschool Language Scale, Fourth Edition.

Leitan and Chaffey (2014) elucidated that body neither serves the mind nor does it perceive its workings as a passive recipient – body is an active architect of mind. Foglia and Wilson (2013) also suggested body and the physical context as the underlying factors that constrain, shape and regulate mental activity. James (1890) considers attention and interest as two fundamentals of the experience:

> Millions of items of the outward order are present to my senses which never properly enter into my experience. Why? Because they have no *interest* for me. *My experience is what I agree to attend to*. Only those items which I notice shape my mind – without selective interest, experience is utter chaos. Interest alone gives accent and emphasis, light and shade, background and foreground – intelligible perspective, in a word. (p. 915)

Furthermore, he quotes Mr. Spencer, an empiricist writer, who regards "creatures as absolutely passive clay, upon which experience rains down. The clay will be impressed most deeply where the drops fall thickest and so the final shape of the mind is moulded." Hence, experience shapes the mind; therefore, the attention style of people with autism might be a determining factor in developing their minds accordingly.

Hellendoorn, Wijnroks, and Leseman (2015) endorsed the idea of having a developmental approach towards learning in autism. From the standpoint of situated cognition, they posited that the world we are surrounding with has invariant properties and selective attention, invariance detection, is an economical way of processing the environment. Moreover, they also argued that invariance detection gives order to our perceptual experiences and inability to attend the stimuli selectively/economically induces sensory overload (Bogdashina, 2003; Bogdashina, 2005). They boiled down their argument to 'invariant detection' and announced this processing style as a determinant for sensorimotor, language and communication development. Thus, they suggested that since children with autism from birth onwards cannot use this processing style economically, this results in impaired sensorimotor systems, language and communication. This provides a converging point towards individual embodiment – where subjective, relative experiences influence our thinking and behaviour; this in turn develop our understanding of the world around us and hence construct our knowledge structures accordingly. The following studies validated this convergence towards individual embodiment in autism.

Howe and Stagg (2016) studied four sensory modalities (vision, hearing, touch and smell) in 14 adults with autism and explored the effect of their sensory experiences on their classroom learning. The adult participants with autism reported to experience reduction in concentration – some reported distraction and loss of concentration while listening and some while looking at the visual stimuli, and some in other two modalities. The distraction, whether auditory or visual, etc., is reported to cause participants lose focus of the classroom and to miss sections of their lessons. They also found inconsistent sensory profiles of all 14 adults – some reported problem in only one modality and while some others in two or all. Another significant finding that they highlighted was that even when some participants reported to experience sensory problems, they shared that they do not lose focus and concentration.

Relevant to proprioceptive processing, individuals with ASD showed proprioceptive difficulties though the results are mixed. Blanche, Reinoso, Chang, and Bodison (2012) studied proprioception in 32 children with autism through their behaviour data. They used Comprehensive Observations of Proprioception (COP) scale and found out distinct patterns of proprioceptive processing. They concluded that proprioceptive difficulties negatively affect participation in daily tasks. LeBartona and Landaa (2019) examined motor skills in 140 ASD toddlers in two different studies using Peabody Developmental Motor Scales – 2 (PDMS-2) to test gross motor and fine motor (stationary, grasping, and visual-motor integration); Mullen Scales of Early Learning (MSEL) to measure developmental level in terms of visual and fine motor skills and receptive and expressive language; and Autism Diagnostic Observation Schedule (ADOS). First study suggested that difficulties while integrating visual-motor system affect action and learning in ASD and poor proprioception (posturing and grasping) could disturb object exploration and affect language input (p. 44). The second study suggested that this impacts social communication, especially expressive language. They also claimed to provide important cues in favor of situated and embodied cognition. This is an endorsement of no direct connection between human language and the world as it exists outside of human experience. Human language is based on human concepts, which are in turn motivated by human experience. (Lakoff, 1987, p. 206)

The modern theoretical perspective has offered the idea of "distributed interactive systems" – different cortical and motor systems that are distributed across brain are not dissociated from one another and/or each other. Pulvermüller (2005) figures out that in neuroscience literature, these distributed systems have been referred to as "cell assemblies", "neuronal ensembles", "distributed functional networks", "neurocognitive networks" and "cognits" (p. 576). Pulvermüller further establishes that the motor and cortical areas of language and action, and the correlation between them "allows for fast, interactive processing of multimodal information across cortical areas". Besides this, the neuroscience research also identified the automatic, rapid linkage of sensory and motor information (Hommel, Müsseler, Aschersleben, & Prinz, 2001; Jirak, Menz, Buccino, Borghi, & Binkofski, 2010; Liberman, Cooper, Shankweiler, & Studdert-Kennedy, 1967) and of perceptions and motor movements (Markman & Brendl, 2005).

Jirak, Menz, Buccino, Borghi, and Binkofski (2010) shared two evidences derived from patients with sensory motor impairments and from the early activation of sensory motor system. Regarding patients with motor impairments, two different studies found a correlation between motor system and verb processing, and the resultant selective difficulties while processing verb due to motor system damage. With reference to timing, few studies detected the early neural activation while processing lexical items and the evidence asserts the crucial role of sensorimotor areas for langauge comprehension.

Despite this confluence of mind and body in both mainstream and autism research, research in autism is still under the influence of functional approach to study language – mental and physical are mutually independent and exclusive ontological categories (Vicari, 2008). Wodka, Mathy and Kalb (2013) examined relation between delay of fluent speech or phrase speech and the primary deficits of autism in 535 children with ASD of around eight years of age. The parents were interviewed about the behaviours of their child on Autism Diagnostic Interview-Revised (ADI-R) and Child Behaviour Checklist, while their language, social interaction and play were assessed through a standardized, semi-structured clinical observation checklist. They announced high non-verbal IQ and good social communication as determinants for speech fluency and phrase speech. The study revealed that 70% of the children had good attainment of phrase and 47% had acquired fluency in speech at or after four years of age. Theory of "Enhanced Perceptual Functioning" (EPF) (Mottron L. , 2017) proposes that "perception influences overt behaviour and contributes to intelligence to a much greater extent in autistic than non-autistic individuals" (p. 819). Bogdashina (2005) defines perception as "the process by which an organism collects, interprets and comprehends information from the outside world by means of the senses" (p. 44).

Cognitive psychology explains this experience of "perception" in terms of "information processing". Lindsay and Norman (1972) describe the information processing as a process of gathering, interpreting and comprehending of information. They further postulated sensory messages as "external signals [which when arrive] at the sense organs are converted into meaningful perceptual experiences" (p. 1). This declares behaviour and language as output of information and sensory experiences as input of information. The process further hypothesizes the following cycle of information: attending, encoding, storing and retrieving of information where sensory signals are external signals – the implied meaning is of mechanical process. Mottron L. (2017) declares restricted interests and repetitive behaviours (RIRBs) in autism as "manifestation of sophisticated information processing" (p. 819).

Cognitive semantics, on the other hand, defines this experience of "perception" as "embodiment". Embodiment is "how we are, the way we are, our manner of being, a bodily context … context for which we feel, for which we think, for which we perceive the world, for which we relate and take action." (Walsh, 2013). In general terms, embodiment can be regarded as interaction with the world – the interaction that entails both action and experience.

Another claim put forward by Wodka, Mathy, and Kalb (2013) is that sensory interests and repetitive/stereotyped behaviours are not linked with speech acquisition delay in children with autism. If social communication is a primary predictor of language acquisition according to Wodka, Mathy, and Kalb (2013), then impairments in social communication inform about impairments in language. In other words, language will not take place. But if social communication is predictor of fluent speech, some factor might be regarded as predictor of social communication. Matsushima and Kato (2013) found that atypical sensory patterns are found to affect social interaction in individuals with autism (Matsushima & Kato, 2013). With specific reference to sensory processing in autism, Baker, Lane, Angley, and Young (2008) investigated to look for the sensory processing patterns and their impact on emotional, behavioural and social responsiveness in autism. They studied 22 children with autism, between the age of 2.9-8.5 years, with the help of few standard checklists – SSP (Short Sensory Profile); VABS (Vineland Adaptive Behaviour Scales); and DBC – P (Developmental Behaviour Checklist – Parent). A total of seven areas of sensory processing dysfunctionality was reported to be 82% along with presence of specific patterns of sensory functioning. The marked impairment was seen in the areas of hyper/hypo sensitivity and visual and auditory filteration. Hence, perception affects intelligence and sensory difficulties affect social interaction. This then falsifies the claim of Wodka, Mathy, and Kalb (2013) that sensory behaviours and stereotyped, repetitive interests are not associated with speech acquisition.

Horder, Wilson, Mendez, and Murphy (2014) showed that the traits of autism are associated with sensory experiences and found similar correlation in both genders. They used three different questionnaires, the relevant scores of which correlated with the traits of autism. They further proposed a probable integration of sensory processing abnormalities into the diagnosis and assessment of the disorder. The sensory modulations across ages and levels of severity are also investigated and the problems are also reported (Ben-Sasson, et al., 2009; Elwin, Ek, Schröder, & Kjellin, 2012).

Merin and Taylor (2010) underline the description of human mind (suggested by Harland Randolph, late education theorist and social critic) as “a property of the brain that serves to connect the corporeal with the cosmic” (pp. 35-36). Merin and Taylor further assert the dynamic image of the body on the whole, established in the brain through processing and integration of multiple sensations, as the reference center that facilitates meaningful contact of realities external to the body.

MacFarlane, et al. (2017) studied pragmatic language use of 115 children with speech language impairment, typical delay and autism (age range 4 to 8) through Autism Diagnostic Behaviour Schedule. A total of 51 children with autism that were studied displayed higher rate of disfluent language characterized with repetitions, revisions, stuttering, false starts, fillers, etc. when their speech sessions with the examiner were transcribed. MacFarlane, et al. (2017) ascribed this excessive disfluency in autism to executive dysfunctionality. Colle, Baron-Cohen, Wheelwright, and Lely (2008) studied narrative discourse in highfunctioning adults and confirmed pragmatic deficits in their social communication. Ochs and Solomon (2004) identified that people with autism display pragmatic deficits in some pragmatic dimensions of the language. Hale and Tager-Flusberg (2005) examined a core deficit in the discourse of individuals with autism – an off-topic response.

Naigles and Tek (2017) studied form-meaning disconnection among 30 plus children with autism and established the consistency of challenges people with autism face in comprehending meaning in context – pragmatics. One strength of this population is informed as out-of-the-context, like nouns, verbs, etc. In other words, they are good at building vocabulary, but cannot integrate word with the meaning. Moreover, putting words in a specific order, e.g. in the form of a sentence, is hard for them.

Regarding autistic voice, few studies tried to report the first hand accounts of people with autism to better understand their condition/state of being autistic. Chamak, Bonniau, Jaunay, and Cohen (2008) did the content analysis of 20 autobiographies of people with autism and deduced three main themes: unusual sensory perceptual experiences, cognitive and emotional functioning. Despite variation in all these three areas, all of them showed signs of all these three. The unusual perceptual sensitivities, different information processing (detail-focused processing style) and emotional regulation problems were reported by autistic persons as the primary impairments that dispose their language, communication and restricted, repetitive behviors. Autistic people thus reported these primary factors as contributors to language and communication difficulties. The authors thus concluded with the proposition that the autistic voice, as mentioned above, should be considered by professionals who deal with autistic people.

Likewise, Jones, Quigney, and Huws (2003) conducted discourse analysis of five web-page narratives of people with autism. The narratives pertained to their unusual sensory perceptual experiences. The analysis brought forward four categories of their experiences – turbulent sensory perceptual experiences, coping mechanisms, enjoyable sensory perceptual experiences, and awareness of being different. The narratives affirmed the sensory perceptual experiences of autistics as an integral determinant of their unique embodied selves.

The next section, the second step towards linguistic meaning (as illustrated in Figure 1), reviews the bodily bases of concepts and the way these embodied concepts structure our linguistic expressions, which through further analysis display relative meanings. This is not mere subjectivism; it is experientialism. (Lakoff, 1987)

2.2.3 Conceptualization (of Events) in Autism: An Embodied Experience

Zacks, Speer, Swallow, Braver, and Reynolds (2007) asserted that perception and processing of events involve integration of information through sensory modalities (p. 3) and entail “a pathway whose input is a set of sensory representations and whose output is a set of perceptual predictions” (p. 2). They argued that already existing knowledge structures and sensory cues in the environment affect perception of events in terms of segmentation (boundaries between events), object and place (location) identity, action of agents and movements involved. Due to the unique sensory behaviours, people with autism screen, code and evaluate stimuli differently which leads to different processing. The research in autism and event schemas til now has been using the perspective of theory of mind deficit and weak central coherence, and the reported results are mixed.

Falter, Elliott and Bailey (2012) studied temporal event structure of 17 adults and adolescents of mean age of 24. The participants were shown visual stimuli on a 16 inch desktop from a distance of 60 cm. The picture graphics and the ambience were taken into account to avoid any visual disturbance or distraction. They were given a span of time to process two/three visual stimuli to see the processing. Since ASD sample started observing the small details of the stimuli and took a lot of time in comprehending the situation globally, they were reported to have abnormal coding of temporal event structures as compared to typical developing children. The findings were ascribed to their weak central coherence.

In another study, Maras and Bowler (2011) compared the processing of bank robbery event schema of 16 individuals with autism (2 female and 12 male) with 16 neurotypicals. The neurotypicals were used only as witnesses of the same event for the sake of comparison. The event was shown on slides in a sequence. The screen size was 17 inches and there were 27 slides in all. Both populations were given only 4 seconds per slide to watch the sequence of events. The participants were then asked 19 questions to recall the event. Ten questions (referred to details) were deliberately made wrong to check if misinterpretation of event was caught by people with autism or not. The rest of 9 questions were filler questions (related to information on slides) and they were also intended to misrepresent the information. Then, they were asked to read a story from newspaper regarding bank robbery they watched in the form of slides. The information that they recalled was coded against the original transcript for slides.

The findings were that autistic people were not able to provide accurate details. However, the positive finding was that both populations committed errors in terms of schema typical details. Moreover, ASD population did show few signs of global processing along with more signs of local processing, and also showed some understanding related to causal relationship between events, persons and actions. In the light of these findings, Maras and Bowler (2011) argued that local processing style might not be reduced to global processing impairments.

The theory of event perception and conception by Zacks and Tversky (2001) define event in terms of a perceptual experience: a segment of time at a given location that is conceived by an observer to have a beginning and an end. The segmentation of human behaviour into events, also referred to as breakpoints (Newtson et al., 1977 as cited in Hard, Tversky & Lang, 2006), as "scenes" (Schank & Abelson, 1977) and as "behaviour episodes" (Barker & Wright, 1954) is seen to correspond with the way observers perceive others' movements. If others' movements and/or the instances of inactivity determine the discontinuity in the flow of information regarding event structure, there is a clear evidence of embodiment – others' actions determine our perception in the light of which we divide it into segments or subgoals:

> Breakpoints in human activity do correspond to burst of change in body position (Newtson et al., 1977) suggesting that a physical basis for segmentation can be detected in the absence of event schemas, even for actions entailing articulated movements of the body, and not just paths of motion. (Hard, Tversky, & Lang, 2006, p. 1232)

Behaviour episodes and scenes provide partonomic structure while the nature of event itself provides a taxonomic structure to the events. Besides others' movements in an activity, Zacks and Tversky (2001) identified another determining factor – people tend to divide activity at locations that correspond to maximal perceptual change: change of physical features in a scene or behaviour episode. The information through different modalities not only inform us about movements in and location of an activity that require segment, but also gives an order to the chaos in the form of sequencing of subparts.

> The human mind has a gift of bringing order to chaos. The world presents nothing but a continuity and flux, yet we seem to perceive activity as consisting of discrete events

> that have some orderly relations. This ability guides our understanding of what is happening, helps control our actions in the midst of it, and forms the basis of our later recollection of what took place. (p. 4)

Wynn (as cited in Zacks and Tversky, 2001) also shared the evidence where young infants were found capable of using perceptual event boundaries even in the midst of continuous activity.

Loth, Gómez, and Happé (2008) defined event schemas as generalized knowledge structures of what happens at common real-life events, and attributed abnormalities in event knowledge to the theory of mind (ToM) deficits and weak central coherence (WCC) in autism spectrum disorders. To test the role of ToM, twenty-one individuals with ASD (4 girls and 17 boys between 8 and 28 years of age) were subgrouped according to their ToM abilities. The group of 13 who passed the false-belief test were grouped as ToM passers while the other group of 8 was labelled as ToM failers. Both subgroups were then compared separately with the controlled group of typically developing children on the basis of their verbal mental age, since the narrative task had a high verbal component. To examine the role of WCC, three tests were administered. In Block Design Task (to rebuild a design using blocks of different patterns) and Embedded Figures Test (to locate a small shape in a complex design), both children and adult versions were used accordingly, and accuracy and speed were recorded. These two tests informed the authors about the central coherence through the domains of vision and space. The third and last test was Sentence Completion Task. The interviewer would ask questions about ‘going to a restaurant’. In case of no answer or pause, the child was given neutral prompts to complete the correct answer. ToM failers were reported to display significant impairments on all three tasks. ToM passers showed temporal-causal order in terms of core events, but showed rigidity pertaining to flexible aspects of events.

The interesting finding of Loth, Gómez, and Happé (2008) study was considerable differences in terms of event knowledge. Therefore, they suggested to inquire about the mechanism and processes that determine the understanding and experience of real-life events in autism. Bogdashina (2005) alleged that “[w]e are not born with ready-made strategies to interpret and comprehend the world around us. Through interaction with the environment, we … learn how to connect sensory images with meaning” (p. 47).

Hence, our interaction with the concrete environment helps us proceed in a systematic way, as far as interpretation and comprehension of a concept is involved. Event schemas are basic level concepts – physical knowledge structures – that are directly meaningful since they have preconceptual foundation in bodily experiences – they are directly and repeatedly experienced via the nature of the bodies and their mode of functioning in the environment (Johnson, 1987; Lakoff, 1987). We impose part-whole structure on real world objects and deal with them via gestalt perception and motor movement. They entail conceptualization of past experiences (Chan, Chiu, Lam, Pang, & Chow, 1999). Bogdashina (2005) further suggested four stages, as illustrated in Figure 2 that help us making sense of and establishing knowledge of the world around us.

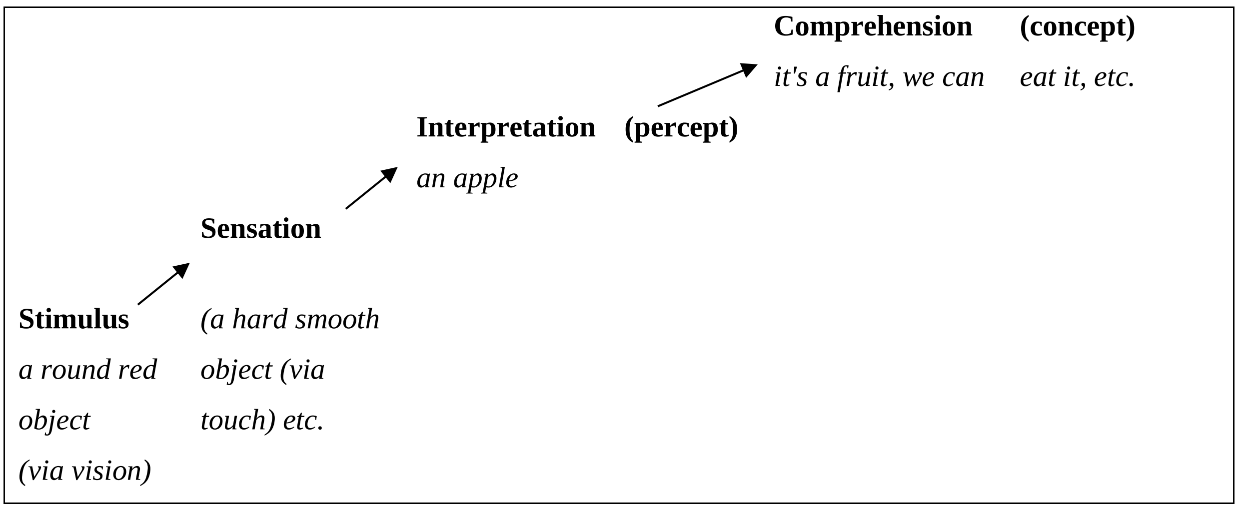

Figure 2: From Stimulus to Concept (adapted from Bogdashina, 2005)

Since we can not process all incoming information, our cognition structures our concepts/knowledge structures so that we can make meaning out of the continuous flow of comparable information (Sridharan, Levitin, Chafe, Berger, & Menon, 2007). Schemas are such cognitive structures – they screen, code and evaluate the stimuli that impinge on the organism (Beck, 1976, p. 283) and "act as screening templates to determine what is processed and what is not" (Riso, Toit, Stein, & Young, 2007, p. 12). In psychopathology, cognitive schemas are continuously evolving, active structures that construct personal realities (Rijkeboer & Boo, 2010).

Hilvert (2015) studied event schemas through narrative language in 19 children with ASD (mean age 10.3) and compared their findings with 26 neurotypicals of almost the same

IQ level (≥70). Both groups performed on two story-retelling tasks, where they first listened to the experimenter telling the story and were then asked to retell the story. The prompts were given where required and the responses were audio recorded. Their pragmatic language was assessed through Children's Communication Checklist, Second Edition (CCC-2), receptive vocabulary was assessed through Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4), and theory of mind was tested via two standardized story telling tests "The Birthday Puppy" (Sullivan, Zaitchik, & Tager-Flusberg, 1994 – as cited in Hilvert, Davidson, & Gamez, 2016) and "The Strange Stories Tests" (Happe, 1994 as cited in Hilvert, Davidson, & Gamez, 2016). The former was used to test second order false-belief and the latter was used to test advanced mentalizing ability (see Section 2.1.1.1). The findings revealed that children with autism could not make causal connection between events of the story. Moreover, they were poor at lexical diversity, connectors, syntactic complexity, references, etc. As for event schema, they could retell the core elements of the event but could not recall about flexible elements of the event. The findings were announced to support ToM account of autism.

What Piaget announced as sensorimotor schemas are referred to as sensory-perceptual motor experiences by Lakoff (1987), since "Basic level concepts are directly meaningful because they reflect the structure of our perceptual-motor experience and our capacity to form rich mental images" (Lakoff, 1987, p. 372). He debates about how these sensory-perceptual experiences, that structure both basic level concepts (and kinesthetic image schemas), are themselves structured by our interaction and negotiation with the outside world. This elaborative depiction of an infant's negotiation with the outside sensory world asserts what Piaget refers to as "the child as agent" (Piaget, 1952), and manifests a close connection between the development of action and perception capabilities (Guerin, 2012).

Talking about the dynamic nature of events, Hard, Tversky, and Lang (2006) announce events to be either goal-directed or behavioural in nature where in individual events, people first perceive objects and then their simultaneous and/or alternate movements in a given context. The movements of objects give a hierarchical structure to individual event. This implies that objects, relevant actions and the sequence of these actions are what constitute an event. By this definition, individual event schema entails three sub-schemas – schema of object, schema of action and schema of sequence. They consider schemas as explicit knowledge structures.

Loth, Gómez, and Happè (2011) compared top-down processing of event schemas in autistic children and adult with typically developing children and adults; this was done through two different tasks of immediate recall and delayed recall. In immediate recall experiment, the participants included 25 boys with autism spectrum disorder (ASD) and 20 typically developing (TD) boys; both groups listened to a brief story and were afterwards showed a relevant picture for 30 seconds. They were then asked to recall immediately. Participants with ASD could not recall context-relevant objects. In delayed recall experiment, the participants were 11 ASD and 14 TD adults. This time, they had to read stories and then to see picture to find out all important items; they were not told about recall activity. Through the picture, the people with autism correctly identified relevant items for the event they had read few minutes ago. The findings replicated the first study. They could not recall context-relevant information. Bogdashina (2005) argues that what is relevant for us might not be relevant for them. This can be regarded as different processing style (Hellendoorn, Wijnroks, & Leseman, 2015). In another study, Loth, Happé, and Gómez (2010) found that high-functioning individuals made significant errors when they were asked to rate occurence of variable aspects regarding stories about everyday events. This difficulty to distinguish between essential and variable aspects of familiar events is attributed to ToM deficits and WCC. On the contrary, Loveland and Tunali (1991) and Volden and Johnson (1999) reported almost intact competence of event knowledge structures.

Human conceptual system is a product of human experience, and that experience comes through the body. The way our body interacts with the world, plays a central role in the structuring of concepts (Lindsay & Norman, 1972, p. 437). The above mentioned all four studies did not take into account the sensory perceptual experiences which are the other half of the story of autism (American Psychiatric Association, 2013). The difference among the findings, in terms of announcement of deficits and reporting of intact knowledge structures, is quite interesting and hints towards the embodied nature of concepts which cannot be ignored. One of the strengths of the study was the natural data elicitation regarding real life event. The availability of sensory perceptual profile could have elaborated the factors behind this style of selection of information among people with autism.

Zacks and Tversky (2001) declared “actions” as dissimilar from “events” – events are tied to actions in the world, but arise in the perception of observers. They called the process of beginning, end and their relation as “event structure perception and conception”. Zacks and Tversky studied a large body of research regarding event categorization, segmentation and definition; they contended with the idea of event as “gestalts in the stream of activity that flows through time” (p. 9) and “as dynamic (concrete) objects” (p. 8). They further explained that both events and objects have perceptual boundaries in space – objects are perceptually identified in terms of their distinct shape, colour, texture, tactile properties and motion; events are perceptually identified on the basis of not only their component objects and their configuration, but also their temporal structures: beginning and end.

Zacks, Speer, Swallow, Braver, and Reynolds (2007) described event schemata in terms of their theory of event segmentation – which they proposed in tems of information processing. They substantiated that sensory inputs are transformed by perceptual processing to produce multimodal representations. They called a set of such representations as event models. Besides immediate sensory-perceptual input, event models also receive input from event schemata – previously learned information about the sequential structure of activity. Zacks and his colleagues argued about the partonomic structure of schema of the events, since “[t]he information they store includes distinctive physical features such as object and actor movement, statistical information about which patterns of activity are likely to follow a given pattern, and information about actors goals” (p. 3).

This implies that we perceive and conceive events in the form of segmentation – scenes, behaviour episodes, or breakpoints. In the same spirit, Sridharan, Levitin, Chafe, Berger, and Menon (2007) studied neural dynamics of event segmentation in music and validated the importance of segmentation to organize continuous stream of undifferentiated sensory information. Zacks, Speer, Swallow, Braver, and Reynolds (2007) suggeted that event segmentation helps our perception and cognition in two ways: it controls “the allocation of cognitive resources [attention] over time” and “the updating of information in working memory by resetting the event models” (p. 5).

Event structures and the related concepts have also been studied in mainstream discipline of CL from the perspective of abstract, metaphorical representations (Gennari, Sloman, Malt, & Fitch, 2002; Slobin, 2005; Talmy, 1983; Talmy, 1985). While validating the role of physical experience in structuring event categories, Tversky and Hemenway (1984) suggest that we impose part-whole structure on events and that our knowledge of event categories is structured in the same way our knowledge of physical object categories is organized. The physical object categories being basic level (Lakoff, 1987) sensorimotor (Piaget, 1952) concepts have their bases in different sensory modalities: vision, hearing, touch, proprioception, etc. Moreover, this validation of Tversky and Hemenway is in spirit with what Lakoff and Johnson (1980) suggested: event categories and other abstract categories are structured metaphorically on the basis of structures from the realm of physical experience. Although the explanation was in the context of abstract conceptualization, the above mentioned explanation by Lakoff (1987) substantiates and warrants the idea of embodied concepts.

The recent studies on brain and language have also started documenting and confirming the link between motor regions of the brain and verb processing (Moseley & Pulvermüller, 2014), and determining role of sensorimotor areas of brain in meaning making and concept building (Pulvermüller, 2013; Pulvermüller, Moseley, Egorova, & Shebani, 2014). These and other embodied accounts of language and cognition render language a feature that is the essence of cognitive semantics. Both lexical and grammatical items and their conceptualization (meaning making) is reported to be grounded in the perception and action systems of the brain. Increase in the size of sensori-motor areas over time through the way humans perceive and then perform actions is indicated as an evolutionary advantage both in terms of linguistic and cognitive capabilities (Garagnani & Pulvermüller, 2016). The account of situated cognition and grounded actions (Barsalou, 2008) answers all 'Wh' questions pertaining to the processing of language in the brain (Pulvermüller, 2018) and thus suggests close functional relationship between language and sensorimotor functions of the brain (Shebani & Pulvermüller, 2018).

The language research in autism can take a point forward to implement the developmental perspective (Hellendoorn, Wijnroks, & Leseman, 2015) and can find better answers if it combines its endeavors with the embodied cognition thesis of Cognitive Semantics.

2.3 The Niche

Language has been used widely as a medium to access cognition via human thought and behaviour (Tenbrink, 2015). These fundamental parameters have enjoyed eminent positions in research in psychology. The three eminent approaches towards analysis of language are formal, psychological and conceptual. The research in psychological paradigm has been using perception, attention, memory and reasoning as fundamental parameters to examine language and thought. The research in autism is found to be mostly influenced by this paradigm. On the other hand, the conceptual approach considers "the patterns in which and the processes by which conceptual content is organized in language …. how language structures conceptual content" (Talmy, 2000b, p. 2).

The language research in autism in the area of event schemas (explored through narrative skills) seems to be still under the influence of top-down approach. Since long, the limitations that people with autism experience during their interaction with the world, both sensory and language, have been tried to understand in the light of various theories of cognitive and behaviour psychology. To better understand the findings of different researches, the results were always interpreted in the light of already established theories that maintain autism as a set of deficits with pre-imposed limitations.

The three most influential cognitive theories of autism – theory of mind (ToM) deficit, weak central coherence (WCC) and executive dysfunctionality have been the major lenses to view sensory experiences and language in autism (Noens & Berckelaer-Onnes, 2005). They offer a non-developmental approach towards perception and meaning making, where "perception is a top-down cognitive process and the construction of meaning is located in the mind of an individual" (Hellendoorn, Wijnroks, & Leseman, 2015). This limitation of perspective cannot account for the heterogeneity in autism because "[h]uman functioning is constrained by the properties of our evolved brains and bodies, and therefore it is embodied" (Schubert & Semin, 2009). Therefore, the theoretical approach of the current study is grounded in the theory of embodiment offered by Cognitive Semantics.

Cognitive Semantics, with its thesis of embodied cognition, seems to provide a more flexible approach towards autism spectrum disorder and the limitations it imposes on people with autism. The limitations entail social communication and restricted repetitive behaviours – the behaviours are sensory in nature. A deep insight into their sensory experiences through both behaviours and discourses could not only explain the factors that probably constraint their experiences, but also suggest their mode of conception and processing of the world around them.

CHAPTER 3

METHODOLOGY

The chapter informs about the scheme of investigation in the light of research questions and objectives. This includes an explanation and justification of qualitative research method and paradigm. This is followed by description of research strategy/design where the descriptive qualitative case study is selected as research strategy/design. As for frameworks of data collection and analysis, cognitive semantics as theoretical paradigm and cognitive discourse analysis as methodological framework guide and inform the investigation at hand. The chapter also informs about the approach adopted towards exegesis of discourses and towards stages of analysis and category construction in the light of selected methodological framework.

3.1 The Bricolage of Inquiry – The Scheme of Investigation

Research is a quest for knowledge to access 'Truth – exactitude'. It is these three words – quest, knowledge and truth – that our inquiry revolves around. Thus, "research is a systematic process by which we know more about something than we did before engaging in the process" (Merriam, 2009, p. 4). In other words, research is a comprehensive activity, "a disciplined inquiry" (Dörnyei, 2007, p. 15) into the research problem and about research questions. The objectives that streamline the significance of the study are listed down in Section 1.2.3 and the research questions that define overall research strategy "in terms of data needed, data collection methods and data analysis" (Sunderland, 2010, p. 9) are listed down in Section 1.2.4. These objectives and questions suggest the scheme of investigation that entails qualitative methods and paradigms.

3.1.1 Research Method and Paradigm

Paradigm is set of methodological and theoretical assumptions, "a comprehensive belief system, world view or framework that guides research and practice in a field" (Willis, 2007, p. 8). Out of the two prominent paradigms of research – qualitative and quantitative research paradigms, qualitative research is motivated by questions and entails exhaustive description of experience in contrast to quantitative research where human experience is tested numerically against a hypothesis (Marvasti, 2004, p. 7). Merriam (2009) notes that in qualitative inquiry "the focus is on process, understanding and meaning; the researcher is the primary instrument of data collection and analysis; the process is inductive; and the product is richly descriptive" (p. 14). Besides viewing qualitative research as bricolage and researcher as bricoleur, Denzin and Lincoln (1998) define qualitative research as "multimethod in focus, involving an interpretive, naturalistic approach to its subject matter" (p. 3).

As highlighted in Chapter 1, the research focus is on the language and conceptualization of children with autism in the light of their embodiment – embodied cognition, hence neither language nor conceptualization can be ascribed as dependent and independent variables as is the norm in quantitative research paradigm. As a matter of fact, it is the subjective experience relative to linguistic background of the speakers that constructs their concepts and it is through language the 'how' of their concept construction/formation relative to their embodiment is mirrored. Hence, it is the subjective experience in the light of personal embodiment that processes linguistic and conceptual information. This linguistic relativism (Medina, 2005) and subjective experience (Evans & Green, 2006) can only be studied through constructivist/interpretivist paradigm of qualitative research method.

Marvasti (2004) magnifies three underlying assumptions of constructionist framework that guide the research task: how people understand and attach meanings out of their subjective experience; how the assumed knowledge about and ideological positioning of people contrasts with research findings; and how meaning people associate with any experience varies in different situations (p. 6). Experience, whether of autistic population or of non-autistic population, is always relative and thus subjective, and is emergent in its very essence (Evans & Green, 2006). We keep interpreting and consequently constructing the understanding of the world around us in the context of our emergent embodiment. The qualitative constructivist/interpretivist paradigm will help justify the embodiment of people with autism and modify the misinterpretations attached to the way people with autism experience the world around them – a cognitive style not a cognitive deficit (Happé, 1999).

Interpretivists regard human behaviour partially a result of their environment. Besides this, the interpretivist paradigm declares that "[h]umans are also influenced by their subjective perception of their environment – their subjective realities" (Willis, 2007, p. 6). Under this paradigm, Corby (2006) establishes that the key role of the researcher is to elicit information from people to ascertain how do they view the world and how does that affect their understanding of the world around them. Corby thus rationalizes the need for the researcher to be an interpreter and to use variety of methods to gather and analyze information – particularly interviewing and observation (p. 58).

3.1.2 Researcher's Theoretical Positioning

The cognitive turn or cognitive counter revolution, as mentioned in Chapter 1, manifests itself in two ways: first, it attempts to redefine or explain the functioning of mind (cognition), language and knowledge using empirical methods suggested by the neighboring discipline of cognitive science; secondly, it encourages multidisciplinary collaboration, of which linguistics is a part, to study mind, language and knowledge (Kertész, 2004, p. 14). Furthermore, defining cognitive linguistics as subdiscipline of cognitive science, Kertész suggests an assumption that covers its overall aim, objective and methods:

> a. its object of investigation is knowledge of language as part of cognition, b. its methods are those of empirical linguistics, and c. its aim is, among other things, to reformulate, to answer or to eliminate classic philosophical questions concerning the nature of the mind and knowledge by dealing with them empirically and interdisciplinarily. (p. 15)

He further establishes the holistic approach which grounds knowledge of language – a part of cognition – and other cognitive processes as a holistic system. One of its claim named thesis of conceptualization announces that "[t]here is no dividing line between conceptual and semantic structures. Semantic structures are determined by the perspective of conceptualization" (p. 20).

In full accordance with the above mentioned holistic assertion, the study is positioned in the theoretical paradigm of cognitive semantics where it converges with the methodological paradigm of qualitative research – constructionism/interpretivism. Both theoretical and methodological paradigms warrant the choice of case study as research design for the current study.

3.2 Research Strategy/Design

The qualitative approach that best suits the current work is case study. Qualitative case study, with its inherent methods of data collection and analysis, allows an in-depth and comprehensive analysis and description of a defined phenomenon. Interpretivists endorse qualitative methods like case studies, interviews and observation, “because those methods are better ways of getting at how humans interpret the world around them” (Willis, 2007, p. 4). Besides these qualitative methods, interpretivists compose detailed reports because context is required to understand the phenomenon of inquiry. Figure 3 illustrates the relation between research method, paradigm and design of the current work. It also gives a brief overview of what type of qualitative research case study is and why this particular methodology has been selected to deal with the problem of the study.

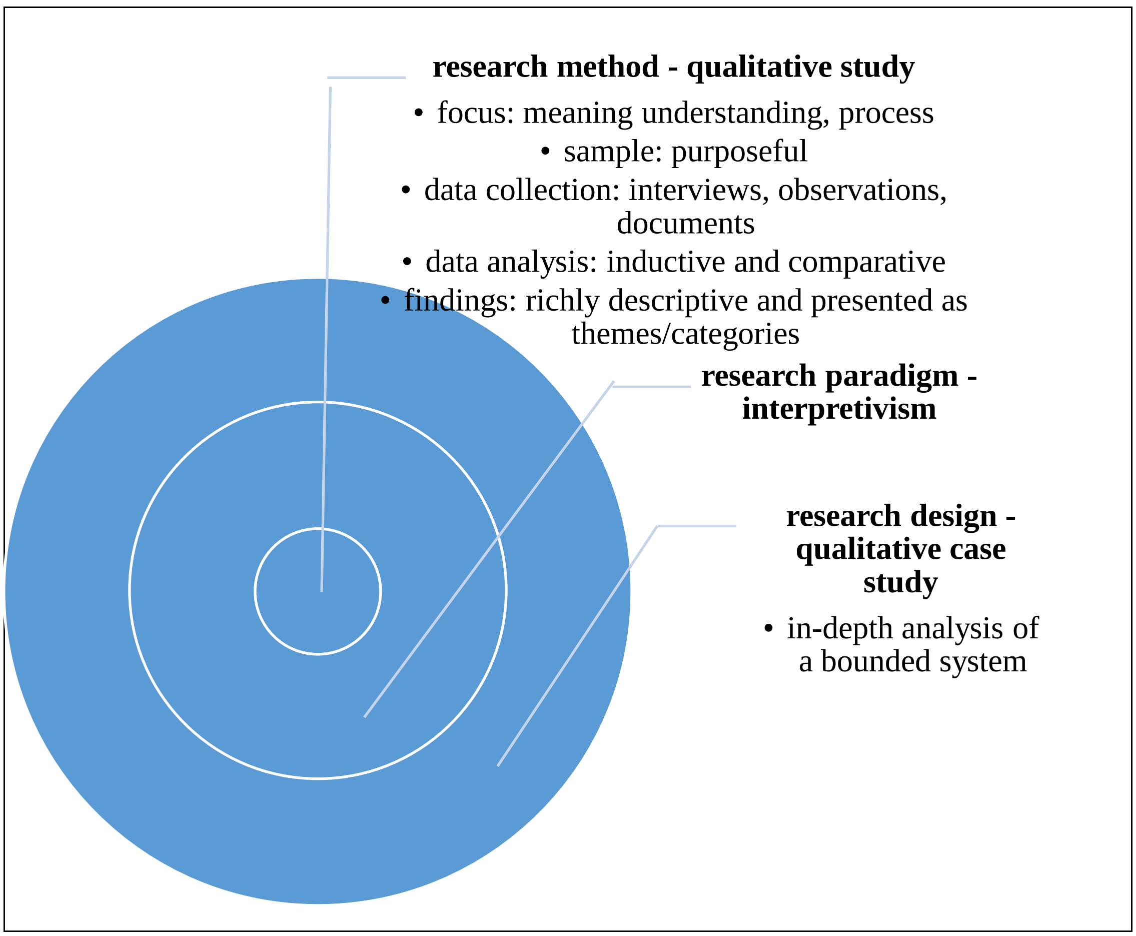

Figure 3: Case Study Research Method (adapted and modified from Merriam, 2009)

Merriam (2009) defines case study in terms of an "in-depth description and analysis of a bounded system" (p. 40). Creswell (2007) sees it as "the study of an issue explored through one or more cases within a bounded system (i.e., a setting, a context)" (p. 73). Robert Yin (2003; 2008), as cited in Suryani, (2008, p. 118) and Merriam (2009, p. 40) respectively, pronounces case study as an "empirical enquiry to investigate a contemporary phenomenon in real-life context, especially when the boundaries between phenomenon and context are not clearly evident." Case studies can be both quantitative (as in anthropology, sociology, medicine, law and psychology) and qualitative (after the evolution of qualitative research methods). Merriam (2009) proclaims that qualitative case studies share the following characteristics with other types of qualitative research: the ultimate search is for meaning and understanding; the researcher is the primary source of data collection and analysis; investigation is inductive; and end product is richly descriptive (p. 39). Creswell (2007) further rationalizes case study as a qualitative research design/approach and a product of inquiry in itself where investigators explore a bounded system (individual case) or multiple bounded system (multiple cases) over a specific time period; collect data through a detailed, in-depth exercise via multiple sources of information e.g., interviews, observations, documents, audio/visual material and reports; and report case descriptions and case-based themes (p. 73).

Hence, the methodological approach used to systematically gather data is qualitative Case Study. It provides in-depth information about a group of 'unique people' (Berg, 2001) i.e. autistics – how do they experience embodiment differently and how does this affect/determine their conceptualization/image schemas. As the research involves the application of a viable theoretical/conceptual framework, the appropriate design for the case study is "Descriptive Case Study". As for generalizability, every single human being is different in terms of experience, knowledge, subjectivity, and hence, embodiment. Same is true for people with autism. Their uneven profiles can never make researchers come to a consensus in terms of one specific method or technique. It will, however, help discover how the world around them is in conflict with their worlds due to their different sensory experiences and perceptual styles. Furthermore, while and after conducting collective case studies (involving instrumental cases) of verbal children with autism, both linguistic and non-linguistic aspects of verbal-autistics are investigated for a detailed understanding.

3.3 Frameworks for Data Collection and Analysis

Cognitive Linguistics falls in the category of conceptual approach to analyse language and encourages convergence with psychological approach towards analyzing language. Although cognitive linguistics suggested a new orientation to study language and cognition, it never claimed to steer the discipline towards a divergent course (Janda, 2010); rather it influenced the sciences/other disciplines by converging and expanding its own scope (Brdar, Gries, & Fuchs, 2011). Its interdisciplinary research orientation allows researchers to converge and expand the theoretical and methodological approaches "to specific areas of inquiry" (Langacker, 2011).

Therefore, Cognitive Semantics believes that "the use of introspection must be recognized as an appropriate and arguably necessary methodology in cognitive science together with the other generally accepted methodologies." Talmy further suggests that it must be executed with rigor and the findings must be correlated with the results of other methodologies – analysis of introspective reports by others, analysis of discourse, observational, experimental techniques of psycholinguistics, etc. (Talmy, 2000a) (Talmy, 2000b).

Because language is always meaningful, cognitive linguistics is concerned with analyzing the meaningfulness of language in different facets of human communication. For the purpose, empirical research is conducted which is data-driven (the more the data, the better the results). According to Geeraerts (2006), the three fundamental features of Cognitive Linguistics make it an empirical enterprise: a cognitive science (integration of language with other cognitive faculties), a usage-based linguistics (language analysis in 'actual language use') and contextualized conception of language (language in society and culture). To study language in actual settings, spontaneous or elicited form of language (corpus language) is either observed empirically or surveyed or experimented. Furthermore, although an empirical research enterprise, it does not restrict researchers to one method or technique.

By the same token, qualitative inquiry encourages the multimethod/triangulation approach to ensure a comprehensive understanding of the phenomenon under investigation. Moreover, the qualitative research design demands rigor in terms of quality and depth/validity and reliability since investigator is the primary source of information. Hence, "rigor in a qualitative research derives from researcher's presence, the nature of interaction between researcher and participants, the triangulation of data, the interpretation of perceptions and rich and thick description" (Merriam, 2009, p. 166).

To achieve and ensure precision, researchers optimize different lines of sight that uncover somewhat diverse features of the same significant phenomenon. Berg (2001) identifies multiple lines of sight as triangulation. Denzin (1978) defined triangulation as involving diversification in terms of data, investigators, theories and methodologies. Accordingly, he suggested four basic types of triangulation:

> (1) Data triangulation has three subtypes: (a) time (b) space, and (c) person. Person analysis in turn has three levels: (a) aggregate, (b) interactive, and (c) collectivity. (2) Investigator triangulation consists of using multiple rather than single observers of the same object. (3) Theory triangulation consists of using multiple rather than single perspectives in relation to the same set of objects. (4) Methodological triangulation can entail within-method triangulation and between-method triangulation. (p. 295)

Denzin and Lincoln (1998) presented triangulation as an 'alternative to validation.' To validate the findings, data is collected and analyzed using triangulation methods. The data and methodological triangulation are embedded in the study and can be sensed while navigating through the work.

3.3.1 Sample Selection: Data Triangulation

In contrast to quantitative research design where sample choice determines the result and where sample is required to be "large and representative" to avoid "biased results and errors" (Marvasti, 2004, p. 9), the sample in qualitative research design is determined by research focus – questions and problem of the study (Merriam, 2009). While Merriam (2009) asserts the use of purposive/purposeful sampling in qualitative research to augment the significance of the study, Marvasti (2004) explains the importance of purposive sampling in the context of theoretical refinement. This seems to be linked with what Auerbach and Silverstein (2003) mentions as theoretical sampling – to further and expand the theory (p. 92). Therefore, only verbal children with autism were selected using purposeful sampling technique, though their verbal ability cannot be compared with the verbal ability of neuro-typicals. Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013, pp. 53-54) defines verbal functioning or ability in autism as single words or phrase speech to full sentences or fluent speech. However, if the child or adult has no intelligible speech, they are categorized as non-verbal since they use gestures, facial expressions, body orientation or speech intonation – although this non-verbal functionality is either exaggerated or atypical or abnormal. The Speech Language Pathologists (SLPs) were requested to share their observations about the verbalization styles/abilities of all 13 children with autism. All three SLPs shared the respective data in the form of an informal interview. Although they follow a specific speech evaluation form, of which expressive and receptive language skills are two categories, they only shared the documented information verbally. The researcher typed the information in her laptop and then showed it to the SLPs for further confirmation. The filed notes regarding the linguistic styles/abilities of all children with autism are provided in Appendix A.

All children with autism, whether verbal or non-verbal, experience sensory issues but since the focus of the research was to look at their mental representations and processing through language use, the population was delimited to verbal children with autism. To triangulate the data in terms of person analysis (Denzin, 1978; Denzin & Lincoln, 1998; Mathison, 1988), more than one individual with autism having different levels of autism, age and gender were included. Given the variation in language skills people with autism portray, Tager-Flusberg (2004) suggested to adopt within-group individual approach to provide a general explanation for their heterogeneous linguistic profiles. Therefore, all available diagnosed cases of only one autism center, Autism Resource Center, Westridge, Rawalpindi, became the population of the study.

Table 1 below gives a glimpse of the demographics of all 13 verbal children with autism. To hide their identity, the subjects' names were replaced with their initials. The four girls and nine boys were in their middle and late childhood (5-13 years). Six of them had severe autism while the rest of seven had mild-moderate autism. The Clinical Psychologists and Applied Behaviour Analysts [ABA] at Autism Resource Center [ARC] assess the doubtful cases for the diagnosis of autism by using Diagnostic Statistical Manual of Mental Disorders

(DSM V) and by administering Childhood Autism Rating Scale (CARS-2), Clinical Interview and Questionnaire for Parents or Caregivers [QPC].

Table 1: *Demographics of Verbal Children with Autism*

Sr. No.	Initials of Children	Ages	Gender	CARS		
				Raw score	T-score	Level of Autism
1	Mm	6.8	Girl	24	33	Mild – Moderate
2	Zb	13	Girl	22	30	Mild – Moderate
3	Wn	8	Girl	39.5	52	Severe
4	Aa	10	Girl	28	37	Severe
5	Az	13	Boy	26.5	40	Severe
6	Im	11	Boy	33.5	44	Severe
7	Ma	10	Boy	25	34	Mild – Moderate
8	As	9.6	Boy	27	36	Mild – Moderate
9	Hl	13	Boy	30.5	39	Severe
10	Ah	11	Boy	29	38	Severe
11	Il	5.6	Boy	25.5	35	Mild – Moderate
12	An	10	Boy	25.5	35	Mild – Moderate
13	Rn	6.5	Boy	26.5	36	Mild – Moderate

The information collected is documented in the form of ‘Psychometric Assessments’. Since the focus of the current study was not at the personal and medical histories of children and/or parents, but at their experiences as ‘individuals with autism’, the focus of interest in the ‘Psychometric Assessments’ was on subjective evaluation criteria of CARS-2. Out of 14-point evaluation criteria, the information regarding following five criteria were utilized – body use, listening response, verbal communication, non-verbal communication and visual response. See pertinent field notes in Appendix B. The reason for selecting the resource center was that apart from focusing on their academics and speech and language therapy sessions, ARC had set-ups of ‘sensory therapy’ for the kids with hyper/hypo-sensory modalities and of ‘occupational therapy’ for their fine and gross motor training – proprioceptive, vestibular and concept formation activities, etc. Therefore, the staff assigned for each verbal child with autism were a source of detailed information pertaining to the ways the children interact with the world around them. These aspects have been mentioned further down the chapter and discussed in detail in the analysis and discussion. This helped in employing investigator and methodological triangulation with confidence and credibility.

3.3.2 Data Collection: Investigator Triangulation & Methodological Triangulation

To answer research questions, information rich data is acquired not only from the children with autism, but also from their teacher aids, head teachers, psychologists, speech language pathologists and parents. They participated as investigators to triangulate and validate the data germane to the research subjects. To achieve maximum viable results, the case study was incorporated by the ‘triangulation’ method of data collection. The data was collected through 1) observations (of the restricted repetitive behviors/sensory behaviours), 2) recordings (of discourses pertaining to two events), & 3) interview (language and speech pathologists) & 4) documents (psychometric assessments).

The linguistic data of all 13 verbal children with autism, their first-hand perspectives germane to both real-life events, collected through empirical research techniques was recorded audio-visually; the non-linguistic data was collected through observations, informal interview and documents for the analysis to have comprehensive results. To achieve validity, data was collected optimizing investigator triangulation and methodological triangulation as discussed below. For the sake of final analysis and interpretation, only language and behaviour data were selected as two independent measures for methodological triangulation (Jick, 1979; Mathison, 1988). Table 2 provides information about observers of data collection against methods of data collection.

Table 2: *Methodological & Investigator Triangulation*

Sr. No.	Methodological triangulation (methods of data collection)	Investigator triangulation (observers of data collection)
1	Recordings [Videos/Audios of Discourses]	Researcher
2	Observation [Sensory Profile Checklists]	Head Teachers, Teacher Aids & Parents

3.3.2.1 Videos/Audios of Discourses

The discourses on two real-life events of all 13 children with autism were video recorded. Sections 4.1.1 and 4.1.2 provide detailed accounts of the nature of both real-life events and the procedure of their analyses. At first, the researcher was permitted to video record the children's linguistic and non-linguistic data; however, after some recordings, the permission was restricted to video record the discourses while not disclosing their identity.

3.3.2.2 Sensory Profile Checklist

The Sensory Profile Checklist – Revised (SPCR) is an already developed, standard checklist to analyse the sensory perceptual processing in autism (Bogdashina, 2003). To check the feasibility of any study (Morin, 2013) especially the pretesting of a particular instrument (Baker T. L., 1994; Teijlingen & Hundley, 2001) in terms of its reliability and validity, researchers usually conduct an exploratory case study – a pilot study (Zainal, 2007) of the instrument to be used. The SPCR is not a new checklist, rather a standardized one. The checklist is reported to have high internal consistency (Kékes-Szabó & Szoloksvy, 2012) and due to its high correlation with Autism Quotient (AQ) scores (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) it is announced as a valid and reliable tool for evaluating the sensory perceptual experiences of people with autism (Robinson, 2010). Therefore, the piloting of this instrument – SPCR – was not required.

The SPCR observation checklists (Appendix C) regarding sensory experiences of each verbal child with autism were filled in by their Teacher Aids. The checklists were explained to all 13 Teacher Aids and afterwards, they were requested to fill in known information and to observe sensory experiences of children for complete information that they were not aware of themselves. After two months, the filled reports were collected, and one by one all 13 checklists were discussed in detail, for confirmation of information, with the respective Head Teachers. At some places, Head Teachers pointed out difference of opinion in terms of information provided by Teacher Aids. To resolve the conflicts, the respective Head Teacher, the respective Teacher Aid and the researcher had to discuss the areas of conflict to come to a consensus. The process took another one month due to busy schedule of Head Teachers and Teacher Aids. Some of the information, that was even unknown to both Head Teachers and Teacher Aids, was further confirmed by respective parents/guardians of children.

3.3.3 Data Analysis: Unit of Analysis Triangulation

For the sake of analysis, Cognitive Discourse Analysis (CODA) (Tenbrink, 2015) of linguistic data and the findings from non-linguistic data validated the relation between language, conceptualization and embodiment. Both linguistic and non-linguistic data were regarded as the units of analysis to look at the perceptual styles of verbal children with autism and to suggest the model/theory of embodied processing. Table 3 below outlines the units of analysis for the sake of triangulation.

Table 3: *Unit of Analysis Triangulation*

Type of Data	Unit of Analysis	How to Analyze?	What to Analyze?
Linguistic	Language	CODA	Conceptual structures and Processing
Behaviours	Sensory Experiences	Sensory Perceptual Profile Checklist	Embodiment

The primary unit of analysis – language – was analyzed to study the processing, comprehension and production of the discourses of verbal children with autism in the context of their embodiment. The methodological framework of Cognitive Discourse Analysis (CODA) (Tenbrink, 2015) was used to look at their conceptual structures/mental representations. This methodological framework guides the collection and analysis of language data as is exhibited in Figure 4.

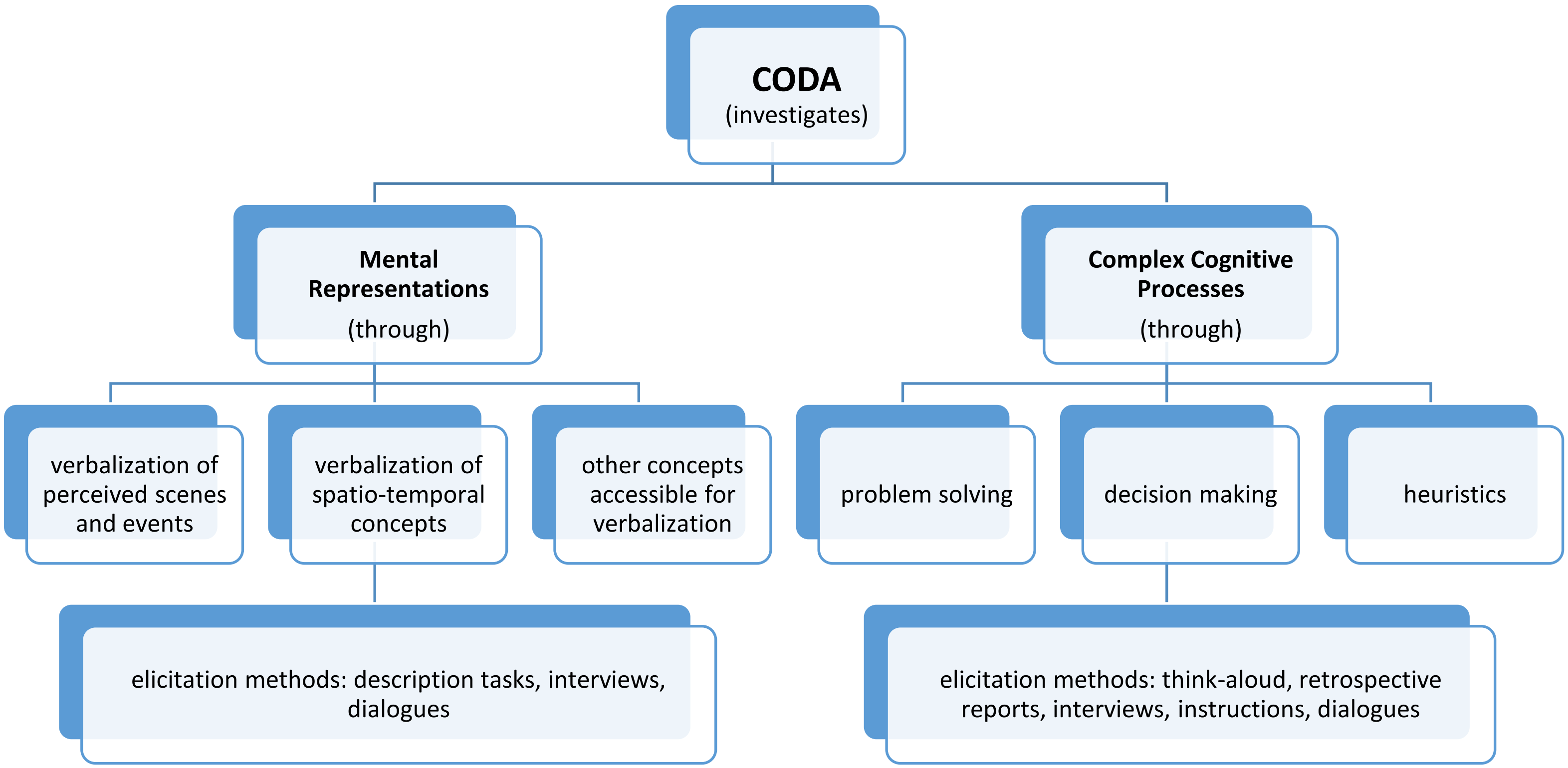

Figure 4: Methodological Framework of CODA (adapted from Tenbrink, 2015)

The embodiment was guided by another unit of analysis – sensory perceptual experiences. Te sensory experiences were classified using Sensory Profile Checklist Revised (SPCR) (Bogdashina, 2003, p. 184), were decoded using the key provided in the Appendix 2 (pp. 196-198) for the Sensory Perceptual Profile (pp. 162-165) and were analyzed to study the possible patterns of perception and processing in autism. The original checklist is a 232-item raw questionnaire (Appendix C) that helps compile all seven systems of sensory experiences of individuals with autism under 20 categories. The Tables 5, 6 and 7 respectively give refined overviews of visual, auditory and proprioceptive behaviours only, which were observed and extracted for data analysis.

Cognitive Discourse Analysis (CODA) provides a complete package to investigate mental representations and complex cognitive processes. Tenbrink (2015) introduces CODA by stating that it "builds on and extends relevant established methodologies such as cognitive linguistics, verbal protocol analysis in cognitive psychology and interdisciplinary content analysis, linguistic discourse analysis, and psycholinguistic experimentation" (p. 98). Mental representations entail 'linguistic representation of conceptualized information, such as perceptually available or memorized scenes' (Tenbrink, 2015, p. 105). Tenbrink (2015) stated that "language use reflects crucial aspects about the speakers' concepts, mediated by their understanding of the communicative situation at any given moment." Hence, to use language as point of access to the cognition/conceptualization/thought of speakers, the methodological framework of CODA suggests "to use unconstrained natural language elicited in purposefully controlled situations as a data source; ideally combined with other modalities or representations of cognitive processes" (p. 100). Tenbrink also stressed that since not all cognitive aspects get verbalized through language explicitly, triangulation of data would be ideal to get a more systematic, valid and reliable picture of the processes of mind and brain.

Henceforth, the triangulation is intrinsically inherent to this methodological framework of CODA and its method of data collection qualifies methodological triangulation, data triangulation and investigator triangulation. For the purpose, besides linguistic analysis, extra-linguistic (eye-contact, pauses, response, etc.) and non-linguistic analysis (knowledge representation, processing, perception, attention, memory, sensory experiences, etc.) of the data were also taken into account. The verbalization of both the events informed about the nature of their mental representations which in turn shed light on the visual, auditory and proprioceptive embodiment.

3.4 Exegesis of Discourses: Approach towards Transcription of Discourses/Transcription Strategy

Since the study aims to figure out mental representations and conceptualization buried under linguistic utterances (as is the convention in CODA), instead of transcribing the data that follows the standard rules/conventions of transcription, an exegesis of discourse is used (and hence proposed) as a coding scheme where main themes are annotated for further interpretation and comparison of the data. As mentioned earlier, the coding scheme/themes opted for exegesis of discourse intends to answer the research questions of the study.

3.4.1 Cognitive Discourse Analysis: Layers of Discourses and their Annotation Scheme

For the sake of analysis, the discourses were annotated and segmented as suggested by Tenbrink (2015) and Tenbrink, Eberhand, Shi, Kubler, and Scheutz (2013), though with some modifications that were appropriate according to the nature of the study. Figure 5 provides an overview of the way analyses were carried out.

The transcribed discourses of all children were segmented according to scenes. Each scene was considered as a separate unit of analysis since the aim was to identify relevant schemas pertaining to the event and the corresponding sensory perceptual experiences that their language use brought to surface throughout the discourse. The 'unit of analysis' was in other words a 'communicative situation'. Different discourses had different numbers of communicative situations based upon the interaction at that specific time with that child. Some took more time and more turns to say something about the concept of the event. The overall interaction with all children with autism revealed that the perception of both events – in terms of sequence, place, object and action – was fragmented, delayed, distorted, etc. Both the events revealed gestalt perception as a whole with some instances of sensory overload that hampered/affected the perception of both events. The schema of sequence was found missing partially from their sensory perceptual experiences. Different discourse markers were used as prompts to elicit the next possible sequence of events that was stored in their memory.

<table>
<tr><th rowspan="2">Discourse segments: Utterances

(Verbalization of perceived Events)</th><th>1st Layer of discourse</th><th>Mental Representations:
knowledge structures</th><th>2nd Layer of discourse</th><th>Sensory Processing</th></tr>
<tr><th>Unit of Analysis:

Communicative Situation</th><th>Event
schemas
(object / place / action / sequence)</th><th>Communicative Status:
Appropriate slotfiller (correct response);
Inappropriate slotfiller (irrelevant response, silence/echolalia); Question repetition</th><th>Visual processing;
Auditory processing;
Proprioceptive processing</th></tr>
<tr><td>Adult: acha ahmad ko pata hai ahmad is waqt kahaan hai?</td><td rowspan="10">S 1</td><td rowspan="10">Schema of place:

Core slotfiller – Place of actions: School</td><td>Question</td><td rowspan="10">Auditory processing:
Delayed perception
Associative (serial) memory

Proprioceptive processing:
Delayed perception
Associative (serial) memory

(delayed processing hints towards ‘slow attention switching’ / ‘deviant attentional pattern’)</td></tr>
<tr><td>Child: silent</td><td>Inappropriate slotfiller (silence)</td></tr>
<tr><td>Adult: abhee aap kahaan per [baithay huay ho?</td><td>Question repeated with Prompt</td></tr>
<tr><td>Child: driver]</td><td>Inappropriate slotfiller (with overlap)</td></tr>
<tr><td>Adult: hoon?</td><td>Prompt</td></tr>
<tr><td>Child: driver</td><td>Inappropriate slotfiller</td></tr>
<tr><td>Adult: driver. <u>Driver kay saath aai ho aap? Abhee aap kidhar baithay huay ho?</u></td><td>Prompt to cue him
Question repeated</td></tr>
<tr><td>Child: silent</td><td>Inappropriate slotfiller (silent)</td></tr>
<tr><td>Adult: kahaan [ho aap</td><td>Question repeated</td></tr>
<tr><td>Child: school]</td><td>Appropriate slotfiller (core) (with overlap)</td></tr>
</table>

Figure 5: Exegesis of a Discourse (an extract)

Each discourse was divided into two levels and the analysis was done accordingly. The first layer of discourse was 'communicative situation' which can be referred to as 'unit of analysis.' This layer is of significant importance since every scene of the discourse entails a sequence of action which has core slotfiller and optional slotfillers. The first layer highlighted the nature of the perception of both events, in terms of their relevant schemas, the children with autism have, and if the event was appropriately sequenced to them or not. In other words, the first layer brought to light if pertinent schema existed or not. Only those communicative situations were discussed and analysed that were important from the point of view of questions and objectives of the present research.

The second layer of discourse was regarding 'communicative status' – inappropriate slotfillers (pause, silence), question repeated (with prompt), optional slotfillers, core slotfillers, etc. These verbal cues informed us about the way they perceived the event and its pertinent scenes, and this in turn gave us insights about their sensory perceptual experiences and mental representations. The resultant embodiment revealed through linguistic data was then cross-checked with the embodiments highlighted through behaviour data. Hence, their embodiment (interaction with the environment) brought to fore their sensory processing in terms of sensory perceptual experiences and cognitive styles of verbal children with autism; and their sensory processing revealed the possible route they might have adopted to process the event that they encounter daily (school routine) or at least once a month (birthday party).

3.4.2 Crafting of Transcription

Not all transcription conventions/symbols were used in the transcription of the discourses. Only most relevant features, required for the analysis to answer research questions, are highlighted in transcription of discourses. Table 4 enlists the transcription symbols selected to transcribe the discourses.

Table 4: *Selected symbols for the transcription of discourses*

Sr. No.	Symbols	Explanation
1	( )	A stretch of unclear or unintelligible speech
2	(( ))	Transcriber's description of events rather than presentations of them
3	(guess)	Indicates transcriber's doubt about a word
4	(lit/bit)	Alternate hearings
5	[	Overlap onset
6	]	Overlap termination
7	(.)	A very short untimed pause; micropause – less than 0.2 of a second
8	word	Underline indicates speaker's emphasis
9	?	Rising intonation; not necessarily a question
10	!	An animated or emphatic tone
11	,	Low-rising intonation, suggesting continuation
12	CAPITALS	Especially loud sounds relative to surrounding talk
13	° °	Utterances between degree signs are noticeably quieter than the surrounding talk
14	°° °°	Considerably quieter than surrounding talk
15	< >	Bracketing an utterance indicates that the utterance or utterance-part was slowed down, compared to the surrounded talk
16	> <	Bracketing an utterance indicates that the utterance or utterance-part was speeded up, compared to the surrounded talk
17	::	Indicates prolongation or stretching of the sound just preceding them.
18	(0.5)	Silence in tenths of a second
19	=	At the end of one line (turn) and at the beginning of next line (turn) indicates no break or gap

3.5 Stages of Analysis and Category Construction

In interpretative qualitative inquiry, case study is a methodological approach to gather data by utilizing different methods, namely interviews, observations and documents (Berg, 2001). In cognitive linguistics, cognitive discourse analysis is a methodological approach to analyze language data though it also claims to provide a strategy to collect linguistic data – elicitation of unconstrained natural language (Tenbrink, 2015). For the sake of validity and reliability, Tenbrink (2015) also encouraged to make use of other data sources.

Therefore, the study utilized observations and documents (behaviour data) along with linguistic data to look at the mental representations and possible perceptual styles of children with autism. As Merriam (2009) stipulated the importance of first-hand perspectives of the people being studied to better discover, gain insight and understand the phenomenon, the research sample of current study were made to elicit 'unconstrained natural language … in purposefully controlled situations as a data source' (Tenbrink, 2015).

Merriam (2009) identified two stages of multiple case study analysis: within case analysis and cross case analysis. In with-in case analysis, each case was studied and interpreted as a comprehensive case to "learn as much as about the contextual variables as possible that might have a bearing on the case" (p. 204). The cross-case analysis began once all cases were evaluated. While endorsing the importance of this second stage of analysis, Merriam cited Yin (2009) to elaborate that "[a] qualitative, inductive, multicase study seeks to build abstractions across cases. Although the particular details of specific cases may vary, the researcher attempts to build a general explanation that fits the individual cases" (p. 204).

In line with this qualitative case study approach – within case analysis, the following chapter of analysis has evaluated each case but under a specific theme. The themes/categories are not only responsive to all three research questions, but also to the theoretical framework of Cognitive Semantics. Figure 1 (in Chapter 1) illustrates how concept formation depends upon embodiment and is reflected through language.

CHAPTER 4
DATA ANALYSIS

This chapter interprets and analyses the linguistic and behaviour data qualitatively under two themes. Theme one corresponds with the stance of embodiment as determinant of conceptual structures in autism. Theme two corresponds with the idea of varied experientialism as an explanation to heterogeneity in autism. To access mental representations and the cognitive processes of experiencing and storing information, the natural language data acquired in natural settings is analyzed through Cognitive Discourse Analysis (CODA). The discourses are analysed against the sensory perceptual patterns that are used to deduce the embodiment of children with autism through Sensory Profile Checklist Revised (Bogdashina, 2003). The behaviour data in terms of visual, auditory and proprioceptive experiences is discussed to suggest correlation between the language, concepts and the embodiment of verbal children with autism.

4.1 Theme 1: Embodiment as Determinant for Conception and Processing of Real-Life Events

Merriam (2009) posits that data analysis in qualitative research is seen as a process of making meaning out of the raw data to answer research questions. This section analyzed the discourses of verbal children with autism using Cognitive Discourse Analysis. The objective was to determine the nature of knowledge structures/schemas verbal children with autism displayed during their discourses regarding real-life events in the light of first research question: What do the discourses of verbal children with autism reflect about their conceptual structures regarding real life events?

Cognitive Semantics divide semantic structures into two subsystems – open-class semantics (for example, nouns and verbs) and close-class semantics (for example, prepositions and other grammatical patterns – subject and object relation, class of verbs, bounded morphemes – specific to a particular language) (Evans & Green, 2006, pp. 192-193). As compared to grammatical elements, lexical content provide rich details pertaining to a particular situation (scene, event, etc.) and its conceptual structuring; therefore, the study was delimited to the contentful details through the lexical choices of verbal children with autism. This was done in the light of linguistic levels of the children. Therefore, the data collected in Urdu did not affect the analysis of the lexical content of children with autism. Moreover, since both adult speaker and the children used both codes – English and Urdu, the content words/linguistic units were mostly uttered in English.

Sections 4.1.1 and 4.1.2 give a detailed insight into the conception and processing of both real-life events – ‘School Routine’ & ‘Birthday Party’. Both sections start with a brief description of respective events to help relate them to the respective perceptions of verbal children with autism. To elicit about both the events, most of the time, the events were related to them in a way that they could tell something about the events. Although children with autism were categorized as verbal by the autism center after their assessments, their level of language is way too different form the non-autistic children of their ages (Appendix A). Therefore, the linguistic units that were available and therefore selected to analyse were nouns and verbs. The analysis of open-class semantic structures, that children with autism possessed and displayed through their discourses in two specific contexts, informed a lot about the nature of their concepts and processing.

The Tables 5, 6 and 7 provide the refined overviews, of all three modalities, out of the raw questionnaire of Sensory Profile Checklist Revised (SPCR) (Bogdashina, 2003). The discourse analysis looked for tendency of visual, auditory and proprioceptive experiences that seemed to determine language and conceptualization in people with autism.

Table 5: *Possible Patterns of Visual Experiences*

Sensory Experiences	Behaviours
1. Gestalt Perception (Inability to filter visual stimuli)	1. Resists any change 2. Notices any tiny change in the environment 3. Does not recognize a familiar environment if approaches it from a different direction 4. Does not recognize people in unfamiliar clothes 5. Is not fooled by optical illusions
2. Intensity with which senses work	Hyper: 1. Constantly looks at minute particles, picks up smallest pieces of fluff 2. Dislikes dark and bright lights 3. Is frightened by sharp flashes of light, lightening, etc. 4. Looks down most of the time 5. Covers, closes, or squint eyes at bright light Hypo: 1. Is attracted to lights 2. Looks intensely at objects and people 3. Moves fingers or objects in front of eyes 4. Is fascinated with reflections, bright coloured objects 5. Runs a hand around the edge of the object 6. Perimeter hugging
3. Sensitivity to (disturbance by) some stimuli (Light/colour sensitivity; Disturbance by some patterns)	1. Covers, closes, or squint eyes at bright light 2. Gets easily frustrated/tired under fluorescent lights 3. Gets frustrated with certain colours
4. Fascination with certain stimuli (Fascination with pattern, lights, colours)	1. Is fascinated with coloured and shining objects
5. Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to the same visual stimuli
6. Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. Resists any change 2. Does not recognize a familiar environment if approaches it from a different direction 3. Does not recognize people in unfamiliar clothes 4. Selects for attention minor aspects of objects in the environment instead of the whole thing (e.g. a wheel rather than a whole toy car, etc.) 5. Gets lost easily
7. Distorted perception (Poor/distorted depth and space perception; seeing 2Dd world; distortions of shape, size Distorted perception of body movements)	1. Fears heights, stairs, escalators 2. Has difficulty catching ball 3. Appears startled when being approached suddenly 4. Makes compulsive repetitive hand, head or body movements that fluctuate between near and far 5. Hits/rubs eyes when distressed

8. 'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Feels/acts blind 2. Ritualistic behaviour
9. Delayed perception (Delayed processing of visual stimuli)	1. Response to visual stimuli is delayed (e.g. fails to close eyes when the light is being switched on) 2. Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing
10. Vulnerability to sensory overload (Visual overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli
11. Mono-processing (number of channels working at a time) (Shutting down other senses while seeing)	1. Does not seem to see if listening to something
12. Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1. Avoids direct eye contact
13. Systems Shutdowns (Visual 'whiteouts')	1. Appears to be a mindless follower 2. Surprises with knowing 'unknown' information
14. Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects
15. 'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with lights, colours, patterns)	1. Seems to be absorbed with lights, colours, patterns
16. Daydreaming ('Seeing' thoughts, emotions of other people, events that do not relate to oneself)	1. Seems to know what other people (who are not present) are doing
17. Synaesthesia (Seeing sounds, smell, temperature, etc.)	1. Covers/rubs/blinks, etc. eyes in response to a sound/touch/smell/taste movement 2. Complains about (is frustrated with) the wrong colours of letters/numbers, etc. on coloured blocks, etc.
18. Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory
19. Associative ('serial') memory (Triggered by visual stimuli)	1. Reactions are triggered by lights, colours, patterns, etc.
20. Perceptual thinking (Visual thinking (thinking in pictures))	1. Easily solves jigsaw puzzles 2. Remembers routes and places 3. Memorizes enormous amount of information at a glance 4. Poor at mathematics 5. Learns nouns first 6. Has difficulties with adverbs and prepositions 7. Idiosyncratic patterns in language development (e.g. names one thing to denote the other, etc.)

Table 6: *Possible Patterns of Auditory Experiences*

Sensory Experiences	Behaviours
1. Gestalt Perception (Inability to screen out background noise)	1. Gets easily frustrated when trying to do something in a noisy crowded room 2. Does not seem to understand instructions if more than one person is talking
2. Intensity with which senses work	<u>Hyper:</u> 1. Covers ears at many sounds 2. Is a very light sleeper 3. Is frightened by animals 4. Dislikes thunderstorm, sea, crowds 5. Dislikes haircut 6. Avoids sounds and noises 7. Makes repetitive noises to block out other sounds <u>Hypo:</u> 1. Bangs objects, doors 2. Likes vibration 3. Likes kitchen and bathroom 4. Likes traffic, crowds 5. Is attracted by sounds, noises 6. Tears papers, crumples paper in the hand Makes loud rhythmic noises
3. Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1. Gets frustrated with certain sounds 2. Tries to destroy/break objects producing sounds
4. Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds
5. Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)
6. Fragmented Perception (Hearing 'in bits')	1. Hears a few words instead of the whole sentence
7. Distorted perception (Hearing distorted sounds, etc.)	1. Pronunciation problems 2. Unable to distinguish between some sounds 3. Hits ears when distressed
8. 'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-deafness'; feeling/acting 'deaf')	1. Feels/acts deaf 2. Ritualistic behaviour
9. Delayed perception (Delayed processing of auditory stimuli)	1. Response to sounds, questions, instructions is delayed 2. Echolalia in monotonous, high-pitched, parrot like voice

	3. Any experiences are perceived as new and unfamiliar, regardless of the number of times the child has experienced the same thing
10. Vulnerability to sensory overload (Sound overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli
11. Mono-processing (number of channels working at a time) (Shutting down other channels while hearing)	1. Does not seem to hear if looking at something
12. Peripheral perception (avoidance of direct perception) (Hearing if listening to somebody indirectly)	1. Reacts to instructions better when they are ‘addressed to the wall’
13. Systems Shutdowns (Auditory ‘tuneouts’)	1. Appears to be a mindless follower
	2. Surprises with knowing ‘unknown’ information
14. Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1. Looks for the source of the sound
15. ‘Losing oneself’ in stimuli. Resonance (Merging, getting in resonance with sound)	1. Seems to be absorbed (merged) with sounds
	2. Seems to be able to ‘read’ thoughts, feelings, etc. of others
16. Daydreaming (‘Hearing’ thoughts of other people, events)	1. Complains about ‘non-existent’ conversations, sounds
17. Synaesthesia (Hearing colours, flavours, touch, etc.)	1. Covers/hits ears in response to lights/colours/touch/texture/smell/taste movement
	2. Complains about (is frustrated with) a sound in response to colours/textures/touch/scent/flavour/movement
18. Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)
19. Associative (‘serial’) memory (Triggered by auditory stimuli)	1. Reactions are triggered by sounds/words
	2. Uses idiosyncratic routinized responses
	3. Uses songs, commercials etc, to respond
	4. Cannot keep track of conversation
20. Perceptual thinking (Thinking in ‘auditory pictures’)	1. Composes musical pieces, songs

Table 7: *Possible Patterns of Proprioceptive Experiences*

Sensory Experiences	Behaviours
1. Gestalt Perception (Inability to coordinate body position and movements of body parts)	1. Clumsy; moves stiffly
2. Intensity with which senses work	Hyper: 1. Odd body posturing (places the body in strange positions) 2. Difficulty manipulating small objects (e.g. buttons) 3. Turns the whole body to look at something Hypo: 1. Low muscle tone 2. Has a weak grasp; drops things 3. A lack of awareness of body position in space 4. Unaware of their own body sensations 5. Bumps into objects, people 6. Appears floppy; often leans against people, furniture, walls 7. Stumbles frequently; has tendency to fall 8. Rocks back and forth
3. Sensitivity to (disturbance by) some stimuli (Disturbance by some body positions)	1. Cannot tolerate certain movements/body positions
4. Fascination with certain stimuli (Fascination with certain body movements)	1. Is often engaged in complex body movements, esp. when frustrated or bored
5. Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; ‘in’ – ‘out’)	1. May have different muscle tone 2. Pencil lines, letters, words, etc. are uneven (e.g. too tight, sometimes too faint)
6. Fragmented Perception (Feeling only some parts of the body)	1. Complains about limbs, parts of the body
7. Distorted perception (Distorted perception of the body)	1. Difficulty with hopping, jumping, skipping, riding a tricycle/bicycle 2. Has difficulty catching balls
8. ‘Sensory agnosia’ (difficulty interpreting a sense) (Difficulty interpreting body position, body sensations, etc.)	1. Does not seem to know what their body is doing
9. Delayed perception (Delayed perception of body postures, body sensations)	1. Very poor at sports
10. Vulnerability to sensory overload (Proprioceptive overload)	1. Tires very easily, esp. when in noisy/bright places or when standing

11. Mono-processing (number of channels working at a time) (Shutting down other senses while being aware of body positions)	1. Does not seem to know the position of the body in space/ what the body is doing, when looking at / listening to / talking
12. Peripheral perception (avoidance of direct perception) (Peripheral proprioceptive perception)	1. Has difficulty imitating / copying movements
13. Systems Shutdowns (Proprioceptive 'tuneouts')	1. Does not seem to know how to move their body (unable to change body position to accommodate task)
14. Compensating for unreliable sense by other senses (Checking proprioceptive perception by other senses)	1. Watches her/his feet while walking 2. Watches her/his hands while doing something
15. 'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with movements)	1. Seems to be absorbed with body movements
16. Daydreaming (Experiencing physical movements while being still)	1. Complains about 'non-existent' physical experiences (e.g. I am flying etc.)
17. Synaesthesia (Involuntary body postures in response to visual, auditory, tactile, etc. stimuli)	1. Involuntary postures of the body in response to a visual/auditory stimulus/ smell/ taste/ touch
18. Perceptual memory (Proprioceptive memory)	1. Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)
19. Associative ('serial') memory (Triggered by body positions, movements)	1. Reactions are triggered by body positions / movements
20. Perceptual thinking ('Body positions, movements, images')	1. Mimics the actions when instructions are being given

4.1.1 Embodied Conception and Processing of School Routine

At Autism Resource Center, all children follow a time table from 9:00 am till 1:00 pm. The schedule may vary from child to child in terms of number of activities per day or the sequence of activities. Every time they start a new activity on the schedule, their attention is drawn towards the finished task and the following (next) task. To make sure that children avoid adhering to a specific routine and time slot for speech, they are called for speech sessions randomly. That is why during interaction with most of them, speech session was not included in the questions asked from children. Moreover, the slot which was given for the elicitation/verbalization of both events was of 'speech time'. After finishing or before starting any activity, the verbal children with autism are encouraged to utter the following: 'work time finish … it's snack time' and the like.

Table 8: *Segmentation of 'School Routine'*

Event Schema: Sequence	Event Schema: Action / Object / Place Core slotfillers	Event Schema: Action / Object / Place Optional slotfillers
Schema of Place	Place: School	-------
Name of place	Name: ARC	-------
Name of teacher	Name: XYZ	Name: old teacher
Schema of sequence & action	Action – doing work (Work Time: 1hr 30 mins)	Subjects (objects) – Maths; English; Urdu; Drawing
Schema of sequence & action	Action – performing activities (Circle Time: 1 hr)	Activities: imitation, poem singing/story reading, days of the week, family description.
Schema of sequence & action	Action – eating snack (Snack Time: 30 mins)	Objects – banana, chips, patties, samosa, etc.
Schema of sequence & action	Action – doing gross & fine motor activities (OT Time: 1 hr)	Action – jumping; Object – trampoline Action – walking; Object – treadmill Action – cycling; Object – cycle Action – twisting; Object – twister; etc.
Schema of sequence & action	Action – singing and acting on poems (Music Time: 30 mins)	Action – singing poems Object – Piano (musical instrument)

The discourses of verbal children with autism about the daily event of ‘School Routine’ were segmented into eight communicative situations at maximum. The units of analysis were ‘actions’ and ‘slots’ that were looked for against schemas relevant to the event. The sequence along with respective slotfillers are listed in Table 8 in accordance with the routine (sequence of actions) observed daily, five days a week, by the children. Since the routine of all 13 children varied, the number of communicative situations and the sequence of the above-mentioned actions also varied.

The linguistic units which were identified as ‘actions’ and ‘slots’ were nouns and verbs. In the first step of analysis, the focus was on mentioning or non-mentioning of actions and slots. This informed about the presence or absence of schema or schema specific details. The second step consisted of identifying the possible reasons behind the nature and construct of schemas in the light of embodiment of children with autism. The way linguistic units and items were uttered and the nature of non-linguistic behaviours the children with autism displayed during the discourses in general and during the communicative situations in specific, informed in detail about the conception and processing of the events. The overall interaction with all children with autism revealed that the schema of sequence was found missing partially from their sensory perceptual experiences. The discourse markers like “us kay baad (after that)” & “phir (then)” etc. were used as prompts to elicit the next possible sequence of events that was stored in their memory.

4.1.1.1 Schema of Place

In communicative situation regarding place of action – schema of place, five children managed to display the presence of schema. The schema was found missing in seven children and all of them showed varied reasons of absence.

4.1.1.1.1 Presence of Schema

When Az (severe autism) was asked to tell where he was then, he used four inappropriate fillers (‘silence’, ‘huh’, ‘driver’, ‘silence’) but then with prompts he made sense of the situation and the question and replied with the correct response ‘school’ – that he was in the school. The delayed response, but with correct linguistic item indicated the signs of delayed perception (both auditory and proprioceptive)**.** After acknowledging the fact that he was escorted by the driver, when he was asked again to announce his current location, he realized the difference of the location – that he was in school now and no more in the van with the driver – he replied with correct answer ‘school’. This also indicated that he took time, though few minutes, to change his focus of attention from previous scene (coming to school with driver) to the next scene (entering speech session and talking about the place where he was then). This referred to the delayed auditory and proprioceptive processing. The ‘delayed mental audition’ and ‘delayed processing of body location/positioning’ hinted towards his ‘slow attention switching’/‘deviant attentional pattern’. Moreover, the wrong use of noun ‘driver’ instead of ‘school’ revealed his tendency to not filter irrelevant and relevant linguistic information. However, this acute processing was not auditory in nature; it was proprioceptive gestalt that did not let him background the past positioning of the body in space (with driver in the van) and foreground his current positioning of the body (presence in school). Besides the signs of associative (serial) proprioceptive memory, few instances gave hints towards associative (serial) auditory memory too. The emphasis on ‘abhee kidhar baithay ho? (where are you at the moment?)’ seemed to trigger both auditory and proprioceptive memory resources.

Aa (severe autism) and Zb (mild-moderate autism) responded with correct noun and told correctly where they were at that moment – ‘school’. The mentioning of appropriate linguistic slotfiller showed proprioceptive awareness regarding their school.

When Mm (mild-moderate autism) was asked about schema of place, she displayed delayed auditory perception. She took some time to understand what was being asked of her. In all, she replied five times with inappropriate slotfillers – first she remained silent, then used two paralinguistic behaviours (‘oon’, ‘oo’), then uttered wrong linguistic slotfiller ‘book main (in the book)’ and then became silent once again before replying with the correct answer ‘school main (in school)’. The linguistic utterance ‘book main (in the book)’ indicated some signs of fascination with visual stimuli which hindered her understanding. However, when the book was put aside she repaired her own response. A noteworthy point was that she took a moment of silence and then replied with correct noun for the place ‘school main (at school)’.

In Rn (mild-moderate autism), the communicative situation regarding schema of place (current location) disclosed tendency to process auditory stimuli with delay – delayed auditory processing. He was asked seven times about his current location with following prompts:

'kahaan ho aap is waqat aap, kahaan aai huay ho? (where are you now?)' and 'aap school main ho ya ghar mai? (are you at school or at home?)'. His non-linguistic behaviour included instances of looking away and observing silence, while his inappropriate linguistic behaviours included one instance of immediate echolalia and utterance of out-of-the-context syllable /wa/. In the seventh turn, he responded appropriately with the linguistic item 'school main (at school)'.

4.1.1.1.2 Absence of Schema

Im (severe autism) displayed distorted proprioception throughout the discourse segment regarding schema of place – he was unable to tell where he was at the moment due to his unawareness regarding his body positioning in space. The question pertaining to his location was asked 16 times with prompts and hints. After responding 15 times with inappropriate slotfillers ('silence', 'park', 'ghar main' (at home) & 'sensory play'), he uttered the appropriate slotfiller – 'school main' (at school). After the wrong linguistic response 'park', he got engaged into echolalic responses, both immediate and delayed. This showed his tendency to experience cognitive disorientation which was due to his gestalt perception – the gestalt was either auditory or proprioceptive in nature. Moreover, further down the communicative situation where he was confused about either being in the park or at home or at school, the wrong linguistic choices 'park' and 'home' hinted towards his cognitive confusion that also referred to his distorted proprioception since he, alongwith other children, had to go to park that day but due to rainy weather they had to stay in the center and had to do routine activities. Hence, he was unable to process his current location and was unable to report about it with correct linguistic unit. When he was explained that school and home are two different locations/places and that we spend time with different people at both these places, he managed to respond with correct linguistic item 'school'. This seemed to be an instance of delayed echolalia, instead of delayed processing. It was not clear whether he could link and associate different people with both different places silently in his mind or was only repeating the linguistic option.

The communicative situation regarding awareness about current positioning of Wn (severe autism) in space – schema of place, declared that it was missing. She could not tell where she was at that moment. The question was repeated six times with different hints and prompts, but every time she responded with inappropriate slotfillers (‘(silent)’, ‘oo’, ‘(immediate echolalia with high-pitched voice)’) – high-pitched immediate echolalia was prevalent. In the seventh asking, she was made to repeat the correct answer ‘main school main hoon (I am in the school)’ which she repeated echolalically after the adult speaker. Even after different prompts and repeated askings, she could not tell appropriately if she was at school or at home. Insensitivity to her body positioning hinted towards her hypo-proprioception. Her three instances of immediate high-pitched linguistic echolalia and three instances of silence indicated signs of auditory gestalt – she was trying to manage the auditory overload of linguistic information since she did not know the answer.

Hl (severe autism) showed signs of auditory overload regarding schema of place – he was trying to withdraw himself from the voice of the adult speaker. Moreover, he was evading eye contact. This hinted towards his auditory peripheral processing style. His memory resources did not reveal any traces of awareness regarding his body positioning in space. He did not seem to process consciously his own positioning in space. He was asked 23 times about his current location by first asking ‘where are you?’ and then after giving options to choose from as a prompt: ‘aap school main ho ya ghar main ho? (Are you at school or at home?)’. His only responses were non-linguistic – ‘silence’and ‘sensory and auditory play’. The sensory and auditory play included making rhythmic noises, covering his face with his hands, looking down and keeping silence, playing with his tongue and lips, putting left index finger on his lips, clapping his hands and making some rhythmic noise, tapping his chest for sound, putting hand again in the mouth after giving it a jerk and making some sound. Only after 14th turn, when he was threatened with the mentioning of ‘balloon’ that he was afraid of, he quickly responded linguistically with ‘ghar main (at home)’ which was an inappropriate slotfiller. The adult speaker then used ‘balloon’ as negative reinforcement to check if he was acting deaf or if he had not processed his body in space. Hl did respond out of fear, but with wrong answer. This hinted towards his auditory agnosia where he acted deaf to avoid auditory overload. He was also making some sounds to block out the voice of the adult speaker – hyper audition.

Ma (mild-moderate autism) disclosed signs of fragmented proprioception regarding awareness about his positioning in space – schema of place. He was asked 16 times about his current positioning in space. He could not respond correctly – his inappropriate responses included immediate and delayed echolalia. He was not able to process auditory stimuli meaningfully, so was responding with irrelevant linguistic responses. The instances of echolalia are an indication of auditory gestalt since he was unable to filter meaningfully what to attend to. At first, he mistook the expected response as the 'table' and then got engaged in his echolalic responses which did not have any intended meaning. When the adult speaker gave him the options to chose from, he was blank – his engagement in echolalic utterances, which he was selecting from the questions/utterances of the adult speaker, once again hinted towards his inability to filter out what was relevant and what was irrelevant – auditory gestalt.

The schema of place was found distorted in As (mild-moderate autism). He was unable to tell anything about his current positioning in the space when asked about his current location (schema of place). Even after 17 askings, with different prompts, he was unable to tell anything. At first his inability to recognize his positioning in the space – distorted proprioceptive perception – and then confusing the place with home – distorted visual perception – suggested that his overall perception was distorted. He was extremely busy in his sensory play where his head, hands, and body were in constant yet unusual motion. This tendency to get involved in his stereotypies hinted towards the possibility of proprioceptive overload. His bias towards hearing few words instead of the whole sentence and the resultant immediate echolalia hinted about his fragmented auditory perception. The adult speaker then gave him linguistic hints to pick from. His meaningless echolalia gave hints towards his proprioceptive gestalt since he was unable to filter if he was at school or at home.

Adult: ((gave options to pick from)) acha As school main ha yaa ghar main hai?=
(ok, is As at school or at home?)
Child: = >gar mai ai, gar mai ai< ((while jerking his body))
(at home, at home)
Adult: ghar [main hoo aap is waqat
(are you at home now?)
Child: gar mai gar mai] ((while engaged in unusual movements of the body))
(at home, at home)

The adult speaker tried to give hint while relating his teacher aid indirectly with school. Even this association triggered nothing; this referred to the possibility of not processing consciously his presence/positioning in space. Perhaps due to this lack of awareness regarding his body position in the space, his memory resources had no traces of this awareness at all. Therefore, he kept repeating ‘gar mai gar mai (at home, at home)’. Later, even when the adult speaker explicitly told him that he was at school at that moment, he meaninglessly repeated after her. Throughout the discourse, he was engaged in weird body movements; this hinted towards his probable proprioceptive overload – this might be the reason of his being hypo towards his own body movements in space.

Adult: school main hai As?
(is As at school?)
Child: °°school main hai°°
(at school)
Adult: school main ho aap?
(are you at school?)
Child: °°school main°°
(at school)

In case of Il (mild-moderate autism), the communicative situation regarding awareness of his body position in space – schema of place – informed about his hypo-proprioception. He was asked five times about his current location; he remained non-responsive and uninterested except for two instances of immediate echolalia – ‘kahaan ho (where are you?)’, ‘at home’. At first instance, he gave proper eye contact while repeating last two words of the adult speaker in low volume. Instead of choosing from the options and responding with correct linguistic choice regarding his current positioning in space, he only observed immediate echolalia. At second instance, he tilted to his left and rested his right side on the table and repeated last two words of the adult speaker. In the next three instances, he remained non-responsive and silent as if he had never processed his positioning in space – rested his face on the table, lifted his head immediately and started looking at the adult speaker; looked at the adult speaker silently; then started looking on his right. The series of inappropriate non-linguistic behaviours indicated about the possible reasons of his inability to process relevant proprioceptive details from the environment.

4.1.1.2 Schema of Object Identity

The schema of object identity could be discussed with only five children; out of them, three had the concept of school’s identity. This communicative situation could not take place with the rest of eight children.

4.1.1.2.1 Presence of Schema

As for school's identity – schema of place identity – Zb (mild-moderate autism) referred to her school name as 'one class'. This unique linguistic term to denote school's identity referred to her tendency to have visual perceptual thinking.

Adult: kiya hai school ka naam?
(what is the name of the school?)
Child: one class hai
(one class)

In Ma (mild-moderate autism), the schema of place identity was found intact. He responded with the correct name of the achool – ARS, when he was being asked about what he does at school. However, he seemed to only process the linguistic item 'school' when the adult speaker asked about his school routine.

Il (mild-moderate autism) immediately responded linguistically to the adult speaker when she asked him about the identity of place – schema of object.

Adult: hoon! acha what's your school name?
Child: (ARC school) ((not clear and uttered in shrill voice))

4.1.1.2.2 Absence of Schema

Az (severe autism) was unable to recall/tell school name – schema of object/identity. He interpreted the question partially correctly: although he was responding with nouns at least, they cannot be considered as correct linguistic items.

Adult: kiya hai Az kay school kaa naam?
(what is the name of your school?)
Child: peter
Adult: nahee, school ka kiya naam hai?
(no, what is the name of school?)
Child: ((after 3secs)) Az (he responded with his own name)

This announces that the schema of school was present partially: without its name. Responding with wrong nouns implied that the name of the school was never processed that consciously by him. That is why no traces of the name of school were found in his memory. Moreover, since the intention was to focus on schemas of event (place/object, action and sequence), the elicitation of schema of identity was not given significant attention by the researcher.

The schema of school's identity was found missing in Mm (mild-moderate autism). She remained silent throughout the communicative situation. Her three instances of silence might have been an act to recall like she did in the previous communicative situation, but they were regarded as inappropriate slotfillers. Her deviant attention could have been the reason of her withdrawal towards auditory stimuli – the voice of the adult speaker. This was speculated as the signs of her auditory overload; to avoid this, she was looking for her favourite story book. Two of her inappropriate fillers included irrelevant linguistic items 'khailtay hain (I play)' in response to what she does at school. Moreover, her inability to tell what she did at the school appeared to be due to her distorted proprioception. Mm's fascination towards the visual stimuli – story book – was hampering her visual and auditory processing. She was not able to put the adult speaker in the foreground and the visual stimuli in the background – visual gestalt; hence, she was neither attending to the adult speaker nor replying to the question. Since she was lost in the visual stimuli, it indicated that due to her visual fragmentation, she was processing a bit of the environment – only her favourite stimuli. That was her ritualistic behaviour of getting attracted to any visual stimuli to the extent that she felt/acted deaf – auditory agnosia. Her silence could also be implied as her withdrawal to the auditory stimuli – adult's voice – due to her vulnerability to auditory overload. The adult speaker then started talking about the story book, satisfied the child for few minutes and then used the book as an incentive to elicit information. She got satisfied that her need was recognized and would be fulfilled once she would satisfy the adult speaker. After a gap, when the question answer session was restored, she was able to attend to both visual stimuli – the adult speaker, and the auditory stimuli – her voice.

4.1.1.3 Schema of Person

The schema of person was found present in nine children; the rest of four children did not have the concept of their teacher aids.

4.1.1.3.1 Presence of Schema

For the communicative situation regarding the name of her teacher aid – schema of person identity, Wn (severe autism) responded correctly with the linguistic item 'if . rah' – though she took two silent turns to come up with appropriate slotfiller and told her name in two syllables. This referred to her auditory delay in processing linguistic information – delayed auditory processing. Aa (severe autism) and Zb (mild-moderate autism) were also able to recall and tell correctly the names of their teachers through correct linguistic items. Ma (mild-moderate autism) showed signs of visual and proprioceptive awareness regarding his teacher aid. Before the adult speaker could ask him about her identity, he himself called her by her name the moment she entered the room. In An (mild-moderate autism), the schema of person's identity was also intact since he correctly uttered the name of his teacher.

However, Im (severe autism) responded immediately but with wrong name. Moreover, he was unable to tell the name of his head teacher. When asked about the identity of his teacher, As (mild-moderate autism) only heard and processed the word 'naam (name)' and told his own name. The question was repeated seven times and upon correction and after giving the hint 'teacher', he completed it on his own with the teacher's correct name. The reason was that he at first confused it with his identity and told his own name. The schema of person identity displayed signs of fragmented hearing. After he visually attended the stimuli – his teacher – and after the linguistic prompt 'teacher', he continued the phrase and told complete name 'teacher Fida'. Since he heard only a bit of the information, he took time to process the whole – this hinted towards his delayed auditory perception. His continuous non-linguistic engagements in his stereotypical sensory play (tapping of hands and no eye-contact) appeared to hint towards his proprioceptive overload.

The communicative situation pertaining to schema of person identity, teacher, revealed delayed auditory processing in Hl (severe autism). At first, he responded with the name of another teacher and then filled his turns with four inappropriate slotfillers ('(silence)', 'teacher hira', '(yawning)', (looking down)). While he was silent, he was looking at the rack placed on his left; before uttering wrong name, he looked at the adult, smiled, took his hands off her grip and said 'teacher Hira' in high pitched voice; while he was yawning, he was looking here and there; and while he was looking down, he was acting deaf to what the adult was saying. After fifth asking, he seemed to realize that his response was not accepted by the adult speaker; so, he repaired his answer himself and responded with correct linguistic item 'Anam', though he pronounced the name a bit differently – elongated the first 'a' as /a::/. While pronouncing the name, he was again looking here and there.

Il (mild-moderate autism) was asked 21 times about his teacher aid; he looked at his teacher and repeated the question of the adult speaker (immediate echolalia) which was again followed by immediate echolalia, but this time he was looking away and uttered the question of adult speaker meaninglessly. Later, his inappropriate responses included first being non-responsive; then yawning, tilting to his right lazily; and then again being non-responsive, while looking away silently as if busy in looking at something farther. At one place, he was non-responsive as if lost – deaf and showed uninterested body language and took his hands away from the adult speaker. He did not recognize and announce her as his teacher at the first place and when he was given the linguistic hint 'teacher', he addressed her with wrong name – 'Anum' instead of 'Anila'. His inappropriate responses and wrong linguistic choice evidently displayed his uninterested and non-responsive body language. At the 22nd turn, he repeated the correct name of his teacher aid 'Anila' in an unusual shrill voice. This all informed about his likely tendency to process auditory stimuli with delay – delayed hearing.

4.1.1.3.1 Absence of Schema

The schema of a person affiliated with school, along with her name, was completely present in Az. In the succeeding question of the same scene, the word 'school' was replaced with 'teacher'. Az (severe autism) now had to tell the name of his teacher. Upon listening the word 'teacher', he attended the stimuli visually by looking at her and told her name correctly – 'Maryam'. However, he was unable to mention/recall the name of the current head teacher so after delayed response, took the name of the old head teacher. This delay in recalling revealed the clues of associative (serial) auditory memory. Nevertheless, his inability to come up with correct linguistic choice referred to his distorted vision and proprioception.

Regarding schema of person's identity, Mm (mild-moderate autism) confused the word 'teacher' and instead of telling about her teacher aid, she replied with 'ma'am speech'. While uttering the word 'teacher', she leaned towards the adult speaker and touched her lips with her index finger. Even after enquiring several times, she was unable to tell the correct name. The wrong linguistic choice of 'ma'am speech' could possibly be an indicator of either distorted visual perception or distorted auditory perception.

Rn (mild-moderate autism) had started working with a new teacher aid a month ago. That is why instead of her name, he took the name of his old teacher aid. He was made to visually attend the teacher aid. At first, he silently attended the adult speaker visually instead of attending the teacher aid, then silently attended the teacher aid visually, but then put his head down on the table and mumbled something to himself. He then showed uninterested and non-responsive body language by making swinging movement of his arms while looking down or towards his left. The wrong linguistic choice revealed the signs of distorted vision and proprioception, although he recalled the name of old teacher after a delay. The teacher aid informed that he was fond of animal toys and that those toys could be used as an incentive to make him elicit the responses. So, the adult speaker put animal toys in the visual field of the child. After giving him his items of interest as incentive, the adult speaker made him recall the name of his teacher aid. In response to 'who is she?', he responded with uninterested and non-responsive body language. For next three turns, the adult speaker kept pointing at the teacher aid and uttered nothing. In response to this, the child also imitated the adult speaker and pointed at the teacher aid; however, he was either uttering something unintelligible or mumbling to himself. In the 13th turn, when he was given prompt by uttering first phoneme /t/ of the word 'teacher', he picked it up correctly. However, he could not recall about the name of the teacher aid and responded with unintelligible linguistic items and immediate echolalia in six turns. The teacher aid also informed that he called her 'Kanwal' instead of 'Madiha' as he had not memorized her name by then. However, he could not even respond with 'Kanwal' and was provided with the appropriate slotfiller 'Madiha'. In response to this only, he repeated her name clearly 'teacher, teacher Madiha'.

4.1.1.4 Schema of 1st Action in Sequence

The schema of 1st action in sequence was found present in eight children while it was found missing in five children.

4.1.1.4.1 Presence of Schema

The discourse marker 'sab say pehlay (at first)' could not trigger the first step/sequence of school activities Az (severe autism) performs. After three inappropriate slotfillers ('wo (that)', 'hoon (hunh)', 'chuttee (off time)'), the prompt affiliated with school 'Ma'am Mm' triggered only correct linguistic response – he uttered 'work'. This signalled the prevalence of associative (serial) visual memory – he could not recall what he did at school. However, the mere mentioning of teacher's name initiated the name of the first activity in the sequence of school routine.

In Wn (severe autism), the schema of 1st action (in sequence) was associated with her teacher aid and with the activities she did at school with her assistance. She was attentive to the adult speaker and was trying to respond with her echolalic responses in response to the question: 'what she does at school?'. Her echolalic responses and her attention indicated signs of delayed auditory processing – she was trying to register what was being asked of her. The unit of utterance included the correct action: 'work time kertee hai (does the work time)'; this was uttered in high pitched voice and was followed by two instances of echolalia and one instance of silence. This again seemed to hint towards her own way of processing info, which was delayed in its nature – delayed audition.

In Aa (severe autism), the schema of 1st action (in sequence) was quite intact since she knew what she did with the help of teacher aid. However, the communicative situation regarding her first activity in the school routine, work time, displayed signs of proprioceptive gestalt. Instead of telling about the optional slotfillers, she started mentioning the names of all stationery items that she used during work time. This also indicated her tendency to experience visual gestalt. This indicated her habit of keenly observing, perceiving and attending the stationery items she used, instead of the activities she did. This binding problem that she experienced did not let her view the whole activity as one meaningful task. However, upon asking the nature of books that she studied from during work time, she displayed both visual and proprioceptive awareness, though with fragmentation. Further down the discourse, she displayed signs of deviant attentional pattern since she was stuck with colours and was meaninglessly attaching other stationery items with colours. Instead of responding with optional slotfillers, she responded with following irrelevant linguistic items: 'books and pencils', 'rubbers', 'bag', 'sharpener', 'muggers', 'hand', 'pencil colours', 'marker colours', 'book colours', 'sharpener colours', 'rubber colours', 'colour books'. When she was asked which books she had, she responded with 'work book', 'stories', 'activity book', 'game book', 'reading book', 'answer book', 'house rules', 'picture frame book', 'sound book', 'urdu book', 'english book', 'colouring book'. Few slotfillers she repeated two to three times in alternate turns. After some time of continuous asking by the adult speaker, she finally processed the question attentively and started responding with correct responses but one by one and that also upon asking. This displayed the possibilities of delayed auditory perception. When the adult speaker tried to divert her attention from stationery items that she was mentioning about in the context of work time, she took time to come out of the context of stationery items and to talk about books. The adult speaker then tried to divert her attention from meaningless phrases of colours to books that she read from and did written activites in. She also observed awkward posture during discourse where she was silent too. This hinted towards her auditory gestalt that appeared to lead to her auditory overload. The next discourse segment referred to the delayed auditory processing in Aa (severe autism)**,** since it was difficult for her to switch her attention from stationery items to books. Even when her attention was switched to books, she took some time to elicit about different books that she studied from and did work in during work time. Throughout the discourse segment, she was either uttering something unintelligibly, or making sounds like 'a: a: a:' as if she was trying to recall. There were also few instances of linguistic echolalic responses where she was either repeating her own name 'Aa' or the word 'book'. This could be referred to as her delayed proprioceptive processing – she took time to process what her body did during work time.

Mm (mild-moderate autism) was asked about schema of 1st action (in sequence) after relating teacher aid with the work time. She replied with correct linguistic units, but with wrong pronunciation 'palhaaee kertee (study)'. Upon asking once again, she repaired her linguistic choice with 'work kertee (do the work)'.

Zb (mild-moderate autism) displayed intact proprioceptive awareness regarding school and its activities. She replied immediately with correct linguistic units – 'kaam kertee hoon (do the work)'. However, she displayed fragmented proprioception when she was inquired about schema of 1st action (in sequence). Instead of using relevant linguistic slotfiller 'work time', she talked about optional slotfiller. Even when the adult speaker mentioned word 'work time', she neither repeated it after her nor did it trigger anything about it in a binding form. This hinted towards her tendency to experience binding problem. The linguistic prompt 'sab say pehlay (at first)' triggered nothing while the hint 'kon saa kaam kertay ho? (what do you do?)' in the second asking triggered an optional slotfiller 'English' related to the very first core action – work time. However, with only one inappropriate slotfiller (silence) she mentioned optional slotfiller (English) in response to the question. When asked about what she did in English, she could only inform about 'ABCD', and without further delay, she pointed towards alphabetic book in the rack and said, 'wo chaheay (need that)'. She did not mention about any other optional slotfiller of work time – only upon asking if she liked '123', she replied in affirmative. Since she was unable to tell anything pertinent to work time, this also seemed to refer to her proprioceptive gestalt – she might not have processed the activity as an integrated entity, therefore, could not tell anything else.

The communicative situation regarding the schema of 1st action (in sequence) displayed signs of fragmented perception in Ma (mild-moderate autism) since he was observing immediate echolalia and silence on alternate turns; this seemed to be an opportunity to win time – delayed auditory perception**.** The 'win time' was a success and he responded with correct linguistic items afterwards – 'work time'. He showed fragmented proprioception overall regarding the first activity that he did at school. He seemed to process only 'school' and responded with its name – ARS. Further down the discourse, he displayed signs of gestalt processing; instead of focusing on auditory stimulus, i.e. adult's question, he started attending the board visually which had the pictures and names of his classfellows pasted on it. In response to first three askings he remained silent and non-responsive, then responded with inappropriate linguistic slotfillers – 'ARS', 'Ibrahim', 'Abdullah', 'look at the teacher', 'dhoop (sunlight)'. In the 14th turn of asking the same question again, he was provided with correct slotfiller; he at first responded with immediate echolalia and then uttered correct linguistic items – 'English', 'Maths', 'myself'. His tendency to attend to irrelevant stimuli in the environment and to background the relevant one suggested about his visual and auditory gestalt. Moreover, since he was responding with irrelevant responses, this referred to his distorted auditory processing. The only thing he could talk about work time was mentioning of optional slotfillers. Since he uttered linguistic units 'English' and 'Maths' on his own after some time of processing, this referred to his delayed auditory processing.

The discourse segment regarding schema of 1st action (in sequence) displayed signs of proprioceptive, visual and auditory awareness in An (mild-moderate autism). Without any prompt, he was able to tell 'homework keratee hain (make me do the homework)' and that also without any delay. This referred to the probable evidence that he had perceived the action visually, auditorily and proprioceptively. This discourse segment also hinted towards his possible fragmented proprioceptive processing. After informing the adult speaker about first activity in school, he got stuck with the lexical unit 'homework'. In response to the question of what he did after the work time, he replied with the following irrelevant linguistic units – 'sara homework kiya hai (have done the complete homework)'; 'teacher nay abhee homework kiya hai (teacher has also done the homework)'; 'main nay sara homework kiya hai (I have done the complete homework)'; 'us kay baad homework kiya (did the homework after that)'. This showed his tendency to overselect certain stimuli and neglect (temporarily though) other pertinent stimuli while doing some activity. To elicit relevant responses, the teacher aid made him recall about what he did the previous day after homework. This triggered correct linguistic responses – 'kal ABCD kiya (did ABCD yesterday)' & 'aur 123 kiya (and did 123)'. He displayed signs of associative/serial visual/proprioceptive memory. Since he took some time to recall and share with the adult speaker about the next action in sequence, this fragmentation in processing also disclosed the signs of likely delayed auditory processing during ongoing discourse and delayed proprioceptive processing. His proprioceptive awareness regarding the optional activities during core action in sequence was found to be intact.

The discourse segment regarding schema of 1st action (in sequence) that As (mild-moderate autism) performed in the school routine – OT – displayed signs of delayed auditory and proprioceptive perception. He took some time to tell correctly what he did with the help of his teacher. After asking seven times and with six inappropriate slotfillers, he uttered the correct slotfiller. He was continuously busy in sensory play (swinging body with head down, playing with the sleeves of the adult, at one point pointed to something on his left and uttered something unintelligible and then started continuously shaking his hands and swinging) and immediate echolalia ('ko', 'teacher Fida'). However, he was unable to tell what he did in the OT time except for 'sensory time'. This hinted towards his proprioceptive gestalt – the only thing that he focused on, in other words processed, and remembered about his body doing anything in OT time is enjoying sensory time. However, when asked about OT gross activities, he was blank as if he had never processed anything during OT time consciously. This hinted towards his probable proprioceptive agnosia, and the reason seemed to be his proprioceptive overload – his continuous engagements with his own weird body movements involved swinging, flapping hands and his overall restlessness. The communicative situation also displayed signs of fragmented hearing when he responded with irrelevant linguistic units ‘chat pay (on the roof)’ in response to the question regarding where he went to perform OT. The adult was expecting the relevant linguistic response as ‘neechay (downstairs)’ – this linguistic prompt had triggered about OT activities in two other children. On the contrary, As replied with an irrelevant and out-of-the-context response.

Adult: hoon? As, OT main kiya kiya kertay ho?
(hunh? What does As do in OT?)
Child: ( )
Adult: batao kahaan kahaan jatay ho?
(tell where do you go?)
Child: (°° °°)
Adult: haan sensory main? Aur kahaan jata hain As?
(yes in sensory. Where else does As go?)
Child: (chat pay)
(on the roof)

4.1.1.4.2 Absence of Schema

The communicative situation regarding schema of 1st action (in sequence) in Im (severe autism) displayed signs of distorted proprioception. When he was asked about what he did under the supervision of his head teacher, he responded with irrelevant linguistic units ‘speech keratee hain (speech therapy)’ instead of ‘work time’. Since the discourses were collected during speech time, he was stuck with what he was doing at that moment. This referred to his fragmented hearing and fragmented proprioception. When he was asked to tell what he was doing before coming to speech time, he responded with out-of-the-context linguistic items ‘bazaar say (from bazaar)’. His deviant and out-of-the-context response referred to his distorted proprioception. Moreover, further down the discourse, he showed signs of hypoproprioception since he was unable to tell what he did during work time. Regarding optional slotfiller, he could not tell anything except for repeating the hints of the adult speaker – immediate echolalia. At one place, he moved his arms suddenly and then giggled. The discourse also showed some signs of auditory overload and to avoid that, he withdrew himself from the conversation and responded with out-of-the-context linguistic response ‘juice peena hai (want to drink juice)’.

The communicative situation regarding what Hl (severe autism) did at school did not show any signs of his awareness regarding school activities. He was asked 17 times what he did at school with the help of Ma'am Am or what did he do at school, but he was indifferent to what was being asked. At first, he looked at the adult speaker and smiled slightly at the name of his teacher but remained silent. Then he looked here and there and then towards his left in the rack. Only once he mumbled something like 'teacher Anum' but quite fast as was his style of speaking. Then he started looking down throughout and was playing with his lips. Then he leaned forward and looked at the adult as if he was getting annoyed by all that discourse and then leaned backward while closing both his lips tightly, and with a smile on his face looked at the table silently. The only prevalent behaviour was his 'sensory play'. Throughout, he was engaged in his stereotypical behaviour of playing with himself and acting deaf. This highlighted his probable tendency to experience proprioceptive and auditory overload. The sensory overload did not let him focus on the auditoy stimuli, the voice of the adult speaker. His acting deaf could be regarded as his defensive style of observing auditory agnosia. This time, even the threat pertaining to 'balloon' did not make him elicit anything pertinent. When the adult speaker did not stop asking about school routine, he stood up and said, 'Speech time finish.' This gave a clear hint towards his auditory overload which was too unbearable for him to continue further with the discourse. As a result, he indirectly denied being part of the talk any more. The stereotypical behaviour of getting engaged with his own body also revealed signs of fragmented proprioception – as if he was trying to figure out and confirm the integration of his body parts as one body.

Il (mild-moderate autism) was unable to relate any of the activities, that he performed throughout his stay in the school. The adult speaker tried to affiliate his teacher aid with his school activities by asking 18 times and with different hints. Except for three inappropriate responses where he uttered echolalically 'teacher Anila', 'school' and 'ARC', he remained silent – uninterested and nonresponsive. He was looking away, then yawned, then made a slow sound playfully, and then became silent. Nothing triggered relevant linguistic response, which referred to his proprioceptive hyposensitivity. He behaved as if he had never processed what he did at school and what his teacher aid helped him in doing activities. He did not observe auditory agnosia during ongoing discourse. Unlike teacher's name and school's name, he was blank this time. The adult speaker then asked him about his class fellows and his class teacher, where they were at that moment, to see if anything could be triggered from his memory resources. The correct linguistic items could not be triggered as if he had never processed consciously the places where he had been performing activities like work, OT, snack, music, speech. His hypo-proprioception might have been the reason behind being blank. When the adult speaker tried to make a connection between where he would usually go after speech time to make him recall, he was silently but attentively looking at the adult speaker, then leaned on his right while sitting on the chair – he was non-responsive and uninterested.

The discourse segment regarding general awareness of the tasks Rn (mild-moderate autism) did at school revealed his hypo-proprioception. At first, he was asked four times what he did at school. He responded with something unintelligible in first two turns, with 'sitting school' in the third turn, and with non-responsive behaviour in the fourth turn. The question was then rephrased and linked with his teacher aid so that he could recall what activities his teacher helped him with in school. He again responded with irrelevant linguistic units 'sitting school'. Besides uttering 'sitting school', he did not utter anything relevant. After some time, he got distracted and lost the talk, about which he was silent though. This referred to his acute perception – visual gestalt – during ongoing discourse. This acute seeing seemed to hamper his visual processing because earlier he told correctly, though after delay, that he was at school. His unawareness regarding school activities highlighted his hypo-proprioception due to his acute perception. The way he identified body parts and correctly named the animal toys also informed about his visual gestalt. He had a tendency to experience attention tunneling. In the next turn, after listening to the same question attentively with proper eye contact, he stood up and leaned towards his left for the animal toys. His hands were still in the grip of the adult speaker, so he sat down and started looking at the adult speaker silently. Afterwards, he was asked further 15 times with the same question and even the hint – 'work time' – was provided too, but he behaved as if he was not listening to the adult speaker. There were two instances of deviant behaviour during these 15 askings, with three instances of verbal inappropriate fillers ('/a/ eyes', 'nose', 'superman') and few instances of non-verbal inappropriate fillers (uttered something unintelligible and then giggled to himself, fidgeting his body, and making sound with his head down). He told correctly the names of animal toys that were shown to him, since he was not being responsive, but even the few minutes activity of his interest could not work as an incentive and could not make him elicit about what he did at school throughout the day.

4.1.1.5 Schema of 2nd Action in Sequence

The schema of 2nd action in sequence was found present in four children while it was found missing in the rest of children.

4.1.1.5.1 Presence of Schema

The communicative situation regarding schema of 2nd action (in sequence) hinted towards distorted proprioception of Wn (severe autism). She was asked thrice what the next activity was after ‘work time’. In response to the first two askings, she replied with irrelevant linguistic items ‘gifts miltay hain (receive gifts)’ and ‘work time kertee hai (does the work time)’; the third time the question was rephrased as ‘Phir work time kay baad Wn kahaan jatee hai? (Where does Wn go after work time?’ since after every activity, children with autism would move to some other place for next activity. She could not relate it to the next action or place of action but replied with ‘Wn Peshawar jaatee hai (Wn goes to Peshawar)’, which was completely out of the discourse context. She confused going to another place of activity with going to Peshawar. An important point to note here is that she used to go to her native town along with her parents and brother every weekend. This could also be referred to as her fragmented hearing since she seemed to hear only a fragment of the whole sentence: ‘kahaan jatee ho? (where do you go?)’. After talking to her for few minutes about ‘Peshawar’, when she was asked again to tell about the next activity in the sequence, she responded with appropriate linguistic units ‘circle time’ – but after two irrelevant linguistic information ‘work time kay baad (after work time)’ and ‘school main° (work) time kertee hai (does work time in school)’. The latter response was a delayed echolalia with high pitch. To know what might have triggered this deviant response, the adult speaker engaged her in the talk pertaining to Peshawar – she was unable to tell anything pertinent to that deviant linguistic response. However, when she was brought back to the context of school routine and the possible action in sequence, she replied with two echolalic responses and in the turn after that, came up with correct response. This also seemed to hint towards her delayed auditory processing.

The communicative situation regarding schema of 2nd action (in sequence), which was play time in case of Aa (severe autism), displayed signs of delayed auditory processing. She remained silent at first and then uttered something unintelligible. Upon the request of adult speaker, she repaired her answer and spoke clearly and correctly with linguistic units ‘yo, hide and seeking’.

In the early part of communicative situation regarding schema of 2nd action in sequence, Ma (mild-moderate autism) showed signs of fragmented auditory processing where he interpreted the auditory stimuli out of the context. He was unable to recall about the 2nd action in sequence so responded with irrelevant linguistic item ‘house’ and with delayed and immediate echolalic utterances which were linguistic items like ‘Ma’am Hira’, ‘Ma’, ‘school’, ‘ARS’. This hinted towards the binding problem that he might have experienced. Upon receiving the prompt ‘OT main Ma kiya kertaa hai? (What Ma does in OT?)’, he answered appropriately with correct optional slotfillers – ‘sensory time’, ‘kicking’, ‘cycling’, ‘pressing’, ‘skipping (he mispronounced ‘stepping’)’, ‘ADLs’. He then told upon asking that he brushed his teeth ‘teeth brush’ and combed his hair ‘kanghee’ in ADLs, and after that he uttered linguistic unit ‘snack’ though it was not being asked. His inability to separate snack time from the time of OT referred to his fragmented proprioception. Although he did not repair his previous inappropriate linguistic responses, but upon receiving the hint regarding next action in sequence, he recalled all the relevant gross activities that he took part in during OT time. This also hinted towards his associative auditory and proprioceptive memory. The word ‘OT’ triggered his memory resources pertaining to what his body did in that time slot.

When the adult speaker tried to make An (mild-moderate autism) recall about next activity – schema of 2nd action (in sequence), he gave the hint of one of the fine motor activities that he was busy in before the speech time. After further askings, he replied with optional slotfillers – ‘ABC kiya (did ABC)’, ‘123 kiya (did 123)’, ‘sunaya phir 123 (then recited 123)’, ‘123 sunaya (recited 123)’. Besides these linguistic items, there were also few instances of immediate echolalia and two instances of inappropriate, out-of-context slotfillers – ‘Ma’am, bahir jana hai (Ma’am, want to go outside)’. At 24th turn, he responded with appropriate linguistic items ‘OT time’.

4.1.1.5.2 Absence of Schema

The use of a substitute linguistic choice by Az (severe autism) indicated that the schema of 2nd action (in sequence) was replaced by the schema of object – ‘kaila (banana)’.

Adult: Az kiya kerta hai work time [kay baad
(What Az does after work time)
Child: kaila]
(banana)

Even after seven times of asking and with various clues, he was unable to tell what the next sequence of action was – snack time. Although after third asking, he uttered 'kaila (banana)' that he had brought that day for snack (the teacher aid confirmed that later), but that could not be regarded as correct response since every time he was taken to the next place of action, he was told to finish the previous task and to announce about the next activity. This, however, clearly indicated the delayed proprioceptive processing and proprioceptive gestalt. This could not be referred to as delayed auditory processing because upon asking where he went after work time, he responded thrice with linguistic item 'zoo' and once with linguistic unit 'park'. It might have been an indicator of his fascination with those two places where he liked to go, but it could not be considered as an instance of delayed audition. However, it can be referred to as fascination of auditory stimuli (since he was obsessed with the sounds of animals) and fascination with visual stimuli (since the very sight of animals always stimulated him to make their respective 'animal sounds'). This could also be regarded as his proprioceptive fascination (since he liked being in the park and in the zoo).

The communicative situation regarding schema of 2nd action (in sequence) exhibited signs of auditory gestalt in Mm (mild-moderate autism). She was stuck in what she did in work time, so did not process auditory information regarding what she did after work time. Upon second asking, she became silent and upon third asking, she responded with inappropriate linguistic choices – 'work time finish ho jata (work time finishes)'. When the prompt of snack was given to her, she did not use it appropriately as the slotfiller. She rather continued with the linguistic choice – 'snack time finish ho jata (snack time finishes)', 'stop ho jata time (time stops)'.

The communicative situation regarding schema of 2nd action (in sequence) disclosed signs of possible fragmented hearing in Zb (mild-moderate autism). She could not reply in the context of what was being asked earlier related to school and its activities. She was asked five times what she did after work time, with different prompts like where did she go with her teacher aid after work time, and the like; every time she responded with irrelevant linguistic items 'zoo', 'race course 'park', 'park', and with other inappropriate slotfillers which included '(unintelligible speech)' and (silence)'. Even when she was told about the next action in the sequence – snack time – she remained silent and uttered nothing. Although going to 'zoo' and 'race course park' is a kind of school activity where on every Thursday in winters, all children were taken to a nearby race course park. According to her schedule, after she would finish work time, she was taken to the park along with other children. These non-generalized/over-generalized linguistic responses suggested her tendency to experience proprioceptive gestalt. She was unable to filter and separate the experience of going to park every Thursday and to zoo twice a year. When the adult speaker informed her that she went with her teacher (downstairs in the kitchen) for snack, she remained silent – as if she had never processed the 'snack time' of her school routine.

The communicative situation regarding schema of 2nd action (in sequence) disclosed tendency of proprioceptive hyposensitivity in As (mild-moderate autism). He was unable to tell what he did usually after OT time even after asking nine times. His three echolalic utterances – 'OT main (to OT)' – regarding previous activity referred to his proprioceptive gestalt since he did not seem to filter out the relevant (next activity) from the irrelevant (previous activity) stimuli. Moreover, he was swinging though his hands were in the firm grip of the adult speaker. When the adult speaker rephrased the question and asked about his current positioning of body to refer to ongoing activity, he was again blank. This time inappropriate fillers included two alternate instances of silence, flapping of the right hand, then pointing towards the rack and saying something unintelligible, and then making some sound. This suggested about his proprioceptive agnosia – he did not seem to process what his body did after one activity was over. Only the hint triggered complete response – speech time.

Adult: hoon? Ss .. ((gave him a hint))
Child: ( )
Adult: spee …
Child: spee ((immediate echolalia))
Adult: speech ..
Child: speech speech time

Although the word snack time was mentioned, Im (severe autism) was unable to pick that up to talk about schema of 2nd action (in sequence) – snack time. The inappropriate slotfiller included his continuous echolalic utterance 'work kerta hai (does the work)'. There were two instances of giving sudden jerk to his arms during the echolalic uttererance. The irrelevant linguistic choices along with non-verbal behaviour showed signs of hypo-proprioception; he was neither aware of what he did after work time, nor aware of what he did during snack time.

Il (mild-moderate autism) and Rn (mild-moderate autism) could not recall anything about 2nd action in sequence due to their hypo-proprioception.

4.1.1.6 Schema of 3rd Action in Sequence

The schema of 3rd action in sequence was found present in only one child, while it was found missing in the discourses of other children.

4.1.1.6.1 Presence of Schema

In Az (severe autism), the discourse marker 'after …' failed to trigger the next place of activity of the daily school routine. Even the trigger 'Ma'am Maryam' did not work; he told correctly about 3rd action in sequence when question was repeated fifth time, and after four inappropriate slotfillers ('(silent)', (hoon', 'zoo', '(unintelligible speech)'). The fifth time, the indication of 'neechay (downstairs)' generated the correct response.

Adult: neecahy jatay ho! Neechay kahaan jatay ho?
(you go downstairs! Where do you go downstairs?)
Child: OT

This word triggered his memory resources related to his body positioning in the space (downstairs) which indicated towards associative (serial) proprioceptive memory. The memory of tasks that were done in OT was somewhat intact, with few traces of associating 'ma'am Maryam kiya keratee hain? (what did ma'am Mayram teach you?)' with the reply 'work' instead of giving response pertinent to OT gross/fine motor activities that he performed daily in his school routine. In optional action and object, he could only mention about 'jumping' and 'trampoline'. Upon asking if he walked on the treadmill, he replied in affirmative.

4.1.1.6.2 Absence of Schema

About schema of 3rd action (in sequence), Wn (severe autism) could tell only after hint. In the fourth attempt when she was given the clue by asking 'OT main kiya kertay ho aap? (what do you do in OT?)', she picked it up and replied with correct linguistic items – 'OT Time' with a smile on her face. However, she could not tell generally about what she did there.

After the question was repeated fourth time with prompt ‘exer /eksə/’, she picked up the clue and uttered ‘exercise’. When asked what she did specifically in exercise, she could not tell anything about stepping, jumping on trampoline or walking on treadmill. She could not even pick up on the hint ‘tred’ and uttered with uncertainty ‘tread football’. Even the correction ‘treadmill’ could not trigger the optional slotfiller and the associated activity. Same happened with the prompts ‘ste’ for stepping and ‘jum’ for jumping. She did not respond with enthusiasm as she did while the prompts of ‘OT’ and ‘exercise’ were given. Moreover, when she was asked what else she did in OT, she responded with ‘snack time’. Upon reminding that she also enjoyed sensory time in OT, at first she remained silent but upon reminding again, she repeated after the adult speaker in high pitch: ‘sensory time’. Her irrelevant and out-of-the-context linguistic choices informed about her unawareness regarding ‘OT time’ and indicated her tendency to experience hypo-proprioception. When she was given the hint ‘exer /eksə/’ at first, she appeared deaf – auditory agnosia – but after asking one more time with prompt, she immediately became attentive and picked up the clue. However, later in the communicative situation, she could not tell about OT activities – she only repeated relevant words after the adult speaker and that showed no signs of her auditory delay at all. At one place during the communicative situation, she showed signs of proprioceptive gestalt.

Adult: OT main kiya kertay ho?
(what do you do in OT?)
Child: OT main . ((pause of 2 secs)) circle time
(in OT . ((pause of 2 secs)) circle time)

Her teacher aid informed the adult speaker that she enjoyed circle time the most as compared to other school activities. At another place, when the talk regarding gross motor activities during OT time was going on, she gave another out-of-the-context response – ‘Wn . snack time’ with a raised voice at the end. This seemed to hint towards her fragmented proprioception – she responded to ‘Aur kiya kertee hai Wn? (what else Wn does?)’ in the context of overall school routine, instead of talking about any action of school routine. This referred to binding problem that she showed through her deviant linguistic choice.

Adult: jumping kertee hai? Treadmill pay chaltee hai? Aur kiya kertee hai Wn?
(you jump? Walk on treadmill? What else do you do?)
Child: Wn . snack time ((raised the voice at the end))

The communicative situation regarding schema of 3rd action (in sequence) indicated signs of hypo-proprioception in Im (severe autism); he was neither aware of what he did after snack time, nor could tell what he did on computer. Upon asking, he replied with inappropriate slotfiller (school), so he was provided with the correct answer – IT/Computer class. He did typing practice on computer, that included identifying letters on keyboard and then typing his own name, etc. However, he could not recall anything related to computer. Upon reminding him that he did work at computer, he observed immediate echolalia ‘kaam kerta hoon (do the work)’ but then replied with the irrelevant linguistic items – ‘khailta hoon (I play)’. He might have played different games at home, however in IT class, he never played any game since the focus of activity was academic in nature. This appeared to be his tendency to experience distorted proprioceptive and fragmented auditory processing. During the communicative situation, he displayed two instances of sensory play that included banging the table and singing unintelligibly.

During communicative situations regarding 3rd activity in sequence, Mm ((mild-moderate autism) remained silent. Even when the correct answers were provided for the pertinent action – IT class, she uttered ‘IT’ non-responsively – she was either feeling or acting deaf. This was likely due to his auditory agnosia.

The linguistic and non-linguistic choices of Zb (mild-moderate autism) indicated her tendency to experience auditory overload. At first, she did not respond to the adult speaker regarding what she did/where did she go after snack time. She attended music time after snack time, but even when the adult speaker asked if she went to OT area, she remained silent and non-responsive and was acting/feeling deaf – auditory agnosia. She was asked eight times about the next action in the sequence, but she responded eight times with inappropriate slotfillers (‘sigh’, ‘silence’, ‘sensory play – palying with her nails’, ‘silence’, ‘silence’, ‘silence’, ‘sensory play – palying with her nails’, ‘silence’). Even after providing with the answer – music time – she continued with the same ‘silence’. However, upon asking if music teacher came to the school, she broke the ice and replied in affirmative. After this episode of temporary auditory agnosia, she became attentive and started responding to the adult speaker. Nonetheless, she showed fragmented proprioception regarding music time. The only thing she could mention about music time and related it with music teacher was ‘musical chair’. Besides singing songs for children to imitate, the music teacher also made all children form a train and then move in a circle while he would sing some pertinent song. He also asked them to imitate the actions on certain poems. However, she was reported to avoid all these activities except ‘musical chair’ due to probable auditory overload. Moreover, even if she would sit there, she would hardly pay attention to the music teacher and would hardly participate in other activities. Her fragmented proprioception was believed to be due to auditory overload. When she was asked about optional actions during the music time that she enjoyed, she only talked about ‘musical chair’, although the music teacher made all children sing the song after him, imitated the steps of certain poems and then went for musical chair activity (the order was subject to change). When she was asked to sing her favourite songs ‘did dil Pakistan’ & ‘is parcham kay neecay (under this national flag)’, she at first tried to sing the songs in her muffled, plosive voice. Later, she refused twice in her guttural voice by saying ‘nahee sunana (will not sing)’. Her delay in responding to the adult speaker did not show any signs of auditory delay. It only referred to her lack of interest in singing the song/poem.

In Ma (mild-moderate autism), the schema of third activity in sequence hinted towards his fragmented proprioception. Instead of responding with relevant linguistic items ‘snack time’, he responded with following optional slotfillers – ‘lays’, ‘pastries’, ‘cupcakes’. All these linguistic choices were punctuated with the instances of ‘silence’.

In An (mild-moderate autism) discourse pertaining to schema of 3rd action (in sequence) displayed hints of fragmented proprioceptive processing. Instead of stating about core slotfiller ‘snack time’, he mentioned the eatable that he took as food during snack time – ‘OT kay baad aaker khana khaya, chawal khai (ate food after OT, ate rice)’. He only happened to process food that he ate and not the activity as a whole.

As (mild-moderate autism) was unable to recall the next action in sequence – snack time. His response regarding schema of 3rd action (in sequence) referred to his proprioceptive agnosia – he must not have processed consciously the next action in sequence. Throughout the discourse segment, he was busy in his sensory play – shaking hands, swinging his body with head down, springing his body, playing with something on the table. Other inappropriate slotfiller included one instance of immediate echolalia ‘neechay (downstairs)’, two instances of silence with his body at rest this time. The only words he uttered were wrong slotfiller 'speech time' and after that he again became non-responsive and uniterested in the adult speech and only uttered 'ta ta ta dee'. This hinted towards his tendency to experience proprioceptive overload.

Il (mild-moderate autism) and Rn (mild-moderate autism) could not recall anything about 3rd action in sequence due to their hypo-proprioception.

4.1.1.7 Schema of 4th Action in Sequence

The schema of 4th action in sequence was found present in only two children while it was found missing in the discourses of other children.

4.1.1.7.1 Presence of Schema

Although Wn (severe autism) mentioned about snack time – schema of 4th action (in sequence) – while she was being asked about 3rd action in sequence of school routine, she did not know about her snack in particular. Continuing with her response 'snack time', she was asked to tell what she had brought that day for snack time; she repeated echolalically 'snack main (for snack)' in low voice and then remained silent for next three turns. After that, she again repeated echolalically after the adult 'snack main (for snack)' in the same low tone and then suddenly uttered something unintelligible with high pitch, something like /banna/. Only with clue 'nug' she was able to tell about snack of the day ('nuggets'). This picking up of the word through prompt had nothing to do with associative memory. It only highlighted about her unawareness of her own snack.

The initial responses about schema of 4th action (in sequence) indicated fragmented hearing since Zb (mild-moderate autism) related going somewhere with going to trip and on swings. Upon asking which activity she went for after music time, she first responded with irrelevant linguistic items 'trip pay (for a trip)','swings pay (for swings)'. However, when the adult speaker gave the prompt 'neechay (downstairs)', she at once recalled that she would always go downstairs to do OT activities – the last core action of the routine. This referred to her visual perceptual memory as the word 'neechay' triggered a correct response. As for the optional slotfiller germane to the core action, she replied without any delay and told about her gross activities – ADLs, mopping, dusting. At two places, she took time to respond which clearly indicated her tendency for delayed hearing. Otherwise, her silence was an indication of her withdrawal towards auditory stimuli – auditory agnosia due to probable auditory overload.

4.1.1.7.2 Absence of Schema

Az (severe autism) was unable to tell correctly what he did after OT time in the school. He was blank about fourth and last action in sequence of the school routine. The question was asked thrice but every time he would come up with inappropriate slotfillers (‘zoo’, ‘(silent)’, ‘park’) instead of the correct linguistic choice – music time. However, upon bringing to his attention that he enjoyed ‘Music Time’ after OT time, he repeated the correct answer after the adult ‘music time’ and while nodding in affirmative and replying paralinguistically with ‘hoon (hunh)’ gave the impression that he had recalled about the music teacher and the activity associated with him. Nevertheless, he could not relate what music teacher did when he was conducting ‘Music Time’. He confused music teacher’s activity with teacher Maryam’s activity and replied with linguistic unit ‘work’ instead of ‘poem singing’. This hinted to the distorted proprioceptive processing of Az since he did not seem to be aware of what his body did during ‘Music Time’. This also gave a hint to his fragmented hearing since he only focused on the word ‘teacher’ and associated the word ‘work’ when he was further being asked about what the music teacher made him do during the music time.

The discourse segment regarding schema of 4th action (in sequence) indicated proprioceptive awareness in Im (severe autism) but in an indirect manner. When he was asked what he did at school after his IT/Computer class, he could not come up with relevant linguistic item – music class. However, upon giving the hint of ‘music teacher aatay hain (music teacher comes)’, he observed immediate echolalia in next three turns; in response to relevant question of what music teacher did, Im started singing poems. This triggering of poems that the music teacher would sing during music time referred to his associative auditory memory. However, he could not recall the poems and their lyrics in an appropriate manner. At first he started singing with ‘hamara yeh subha:y Pakistan (goodmorning Pakistan)’ which was the song of a morning show and had nothing to do with music activities of the school. After incomplete song, he then uttered ‘tootee baar baar kiyoon khol raha hai tootee band ker (why are you turning on the tap; turn it off)’. This irrelevant linguistic choice was in fact an instance of delayed echolalia. Someone might have told him at home to turn off the tap, so he uttered in the same tone. The adult speaker then brought him back to music time activities and he resumed his singing from the middle of another poem, in random order – 'ik din us ko choontee nay kaya (one day an ant tasted it)/billee ko bhee maar bhagaya: (it beat the cat and made it run away)/ahaa tamatar bara mazaidaar (aha! The tomato is very yummy)'. However, when he was asked about next thing that he did after music time, he responded with irrelevant linguistic choice 'music time'. This indicated towards his distorted proprioception – when he was asked to tell about next activity, he mentioned the name of previous activity.

During communicative situation regarding 4th activity in sequence, Mm ((mild-moderate autism) remained silent. Even when the correct answers were provided for the pertinent action – music time, she remained quiet; she was either feeling or acting deaf. This gave a clue to her auditory agnosia.

The communicative situation regarding schema of 4th action (in sequence) showed signs of fragmented proprioception since Ma (mild-moderate autism) could not combine all the activities as meaningful one chunk. However, he showed signs of proprioceptive awareness regarding activities that he performed during music time. Instead of telling about the next sequence, he said, 'speech time finish'. He was then brought on the lines of telling about next activity: 'Music time main kiya kertya ho aap? (what do you do during music time)'. He replied instantly with linguistic item 'poem' and then started mumbling or singing something to himself in a low tone. Upon asking to sing clearly, he sang one poem at a very low volume while second one on the top of his voice – 'dil dil Pakistan / Jan Jan Pakistan (…) pesi pesi Pakistan (Pakistan is heart, Pakistan is life … pepsi pepsi Pakistan)'.

The communicative situation regarding schema of 4th action (in sequence) showed signs of proprioceptive gestalt. An (mild-moderate autism) was unable to background the previous activity and hence was coming up with irrelevant responses. He was unable to think about what his body did once one activity was finished. When he was asked about next action in sequence – 'ADLs', he got stuck again with the previous sequence. The seven inappropriate slotfillers included alternate repetition of linguistic choices 'us kay baad main nay khana khaya/phir main nay khana khaya (then I had food)' and 'us kay baad play time ho giya (then it was play time)'. In the eighth turn, he mentioned about off time by uttering irrelevant linguistic items – 'time khatam ho giya thaa (school time was over)' – but could not mention anything about the next action in sequence. Upon reminding him that he went to washroom, he recalled that he did his ADLs – though he did not utter core slotfiller. Further during the turn, he responded with appropriate optional slotfillers – ‘daant brush kiay thay (brushed my teeth)’ (repeated four times) and ‘moo dhoya thaa (washed the face)’ (repeated twice). These relevant linguistic items showed signs of proprioceptive awareness regarding his body movements and actions in space – washing face, brushing teeth, etc. in washroom. But the proprioceptive awareness had signs of gestalt. Besides experiencing gestalt, attention tunneling, he was aslo experiencing delay in processing the next action that he had usually performed during ADLs – delayed proprioceptive processing. He was only able to recall correct response when he was asked indirectly about the action – associative proprioceptive memory.

As (mild-moderate autism) was unable to recall about next action in sequence. The adult speaker tried to make him recall after mentioning all the actions in sequence. During the communicative situation regarding schema of 4th action (in sequence), he displayed signs of auditory overload – he was being aggressive since the adult speaker was trying to elicit the correct response. The adult speaker repeated the previous actions in sequence to make it easy for him to recall, but he was only repeating meaninglessly the linguistic units after the adult speaker. There were two instances of inappropriate non-verbal fillers – ‘stretching of his arms’ and ‘flapping of hands and moving of body unusually’. He also made sound as if he got aggressive and then started looking here and there and was a bit angry. When the adult speaker did not quit even after ten times of asking, he nodded his head as if trying to satisfy the adult with answer. Upon receiving the hint /wa/ for work time, he repeated ‘wa’ aimlessly while yawning, but upon receiving the hint /work/ completed ‘work time’.

Il (mild-moderate autism) and Rn (mild-moderate autism) could not recall anything about 4th action in sequence due to their hypo-proprioception.

4.1.1.8 Schema of 5th Action in Sequence

The time table of only two students had fifth slot for school activity. Both of them showed absence of this schema of sequence.

4.1.1.8.1 Absence of Schema

Regarding schema of 5th action (in sequence) – music time, Wn (severe autism) remained silent throughout the communicative situation. The questions regarding music time and music teacher were asked seven times but she remained silent this time with her head down – she kept looking down in her lap. The question was rephrased for the eighth and ninth time and she was asked about her favourite poem – she remained silent and was looking down. In the tenth attempt to elicit something germane to ‘music time’, at first she was silent, looking down and then immediately started off with the song: “I love you/you love me/we are happy family/ …” – the rest of the song was unclear due to unclear pronunciation; however, she sung completely. On the demand of adult speaker, she sung completely two other favourite songs of hers – “bulbul kaa bacha …” (with few pronunciation errors) & “lathay kee chaadar …” (with unclear pronunciation). This intimated about her auditory and visual agnosia – she was neither responding to the auditory information nor attending the adult speaker as she was doing earlier. This might be the reason of auditory overload which she had to manage using her unique defensive strategy. Her avoiding of eye contact also hinted towards her visual peripheral processing. However, at the mentioning of the word ‘song’, she took two turns to switch on her sensory system and attended the adult speaker visually while singing her favourite songs. Although she punctuated the whole communicative situation with her silence and evasion of eye contact, her immediate responses at hearing about poems/songs also showed her fascination for them. She did not say anything about any other activity that she did during speech time; she did not even repeat relevant linguistic items ‘music time’ or ‘music teacher’, etc. Non-echolalic withdrawal indicated signs of sensory overload as mentioned above.

During the communicative situation related to 5th action (in sequence) – his last activity in sequence – An (mild-moderate autism) showed signs of proprioceptive gestalt. He was unable to separate irrelevant information from relevant information. Moreover, this gestalt style caused distorted proprioceptive processing since he was referring to the activities that he had talked about earlier – work time and snack time. The ten inappropriate slotfillers that he uttered included the following linguistic and non-linguistic choices: ‘us kay ba:d phir khana khaya thaa (then ate food)’, ‘(silence)’, ‘(unintelligible speech)’, ‘us kay baad kaam kiya thaa (then did the work)’, ‘ABC’, ‘doctor sahiba kehtay hain (doctor says)’, ‘doctor kay paas hain (with the doctor)’, ‘(silence)’. Further down the discourse segment, he displayed clear signs of distorted proprioception. In the 11^{th} turn when he was provided with appropriate slotfiller ‘speech time’, he did not respond appropriately rather responded with few other inappropriate slotfillers – ‘Ma’am’, ‘(silence)’, ‘treadmill’, ‘jummay kaa time hota hai (then comes Friday prayers time)’, ‘play time hota hai! (then comes play time)’. Specifically speaking, the irrelevant linguistic choice ‘jummay kaa time hota hai (then comes Friday prayers time)’ had no link with what was being asked. That out-of-the-context response referred to his proprioceptive confusion.

Unlike other 12 children with autism, the discourse of Ah (severe autism) regarding conception and processing of School Routine could not be segregated under the subheadings of ‘Presence of Schema’ and ‘Absence of Schema’. The teacher aid and the head teacher informed the school routine of Ah (severe autism) as following: OT time, work time, snack time, circle time, socialization. The discourse about school routine lasted for only 42 seconds. Only one discourse segment took place due to his behaviour issues. He displayed tendency to withdraw himself from visual and auditory stumuli due to his probable sensory overload. His withdrawal included hitting the other person, whose sight or sound was disturbing for him. Therefore, in the start, he remained silent for his six turns and was acting deaf – auditory agnosia. When the discourse became too hurtful for him to listen to further, he threw tantrums and hit the adult speaker and injured her with his finger nails. To calm him down, and to minimize his hitting behaviour and tantrums, the discourse was stopped, and he was handed over a book due to his fondness for reading books. This visual fascination seemed to hamper his proprioceptive awareness regarding his daily routine at school. Moreover, since he was in the habit of not tolerating anything else except reading from books or pictures, he might not have processed his own self being engaged in doing school activities. Therefore, he remained silent throughout both discourses and then withdrew himself from the auditory stimuli.

4.1.2 Embodied Conception and Processing of Birthday Party

At Autism Resource Center, on average, the birthday of one to two children is celebrated per month. On the day of birthday of any child with autism, children are told since morning and are made to wish the birthday boy or girl. The school routine is curtailed for the day and birthday is celebrated from 12 noon till off time. The hall is decorated with balloons and colourful ribbons. The parents of the birthday child then come along with cake and other eatables and party time begins. All teacher aids announce something like "it's party time … it's ABC's Birthday". All children along with their teacher aids then gather in the hall and children are given birthday caps to wear. Their attention is then directed towards the cake and all other decorations pertinent to the event. The cake is then decorated with candles which are blown by the birthday child before cutting the cake. As the child cuts the cake, everyone in the hall sings Birthday song and teacher aids make all other children sing the song and wish the birthday child. The child then receives a combine gift by the CEO of the center and then pictures are taken to capture the memories of the special day of the child. They are then served with cake and other eatables.

Table 9: *Segmentation of 'Birthday Party'*

Event Schema: Sequence	Event Schema: Action / Object / Place Core slotfillers	Event Schema: Action / Object / Place Optional slotfillers
Schema of sequence: 1st action	Action – bringing the cake Object – cake	Cream cake / chocolate cake
Schema of sequence: 2nd action	Action – decorating place with balloons Object – balloons	-------
Schema of sequence: 3rd action	Action – putting candles on the cake Object – candles	-------
Schema of sequence: 4th action	Action – blowing the candles Object – candles	-------
Schema of sequence: 5th action	Action – cutting the cake Object – cake; knife	-------
Schema of sequence: 6th action	Action – eating the cake	Action – eating samosas, etc.
Schema of sequence: 7th action	Action – receiving gifts Object – gift	-------

The actions and slots listed in Table 9 above were looked for against schemas relevant to event in the discourses of verbal children with autism when they were asked about the ocassionally attended (once in a month) event of 'Birthday Party'. The sequence along with respective slotfillers are tabulated in accordance with the sequence of actions observed by the adults and made to observe by children at the party. This usual routine was observed throughout the stay for both data collection and general observation. Besides birthday celebrations at ARC, children with autism get the chance of experiencing the same event at home when siblings' birthdays are celebrated or at some relative's when anyone's birthday is celebrated. The verbalization of this event revealed how the perception of the event was stored and how they might have processed it. The Cognitive Discourse Analysis of their linguistic output also shed light on their general way of inputting the information – auditorily, visually and proprioceptually.

Contrary to the conception and processing of the event of "School Routine" – that was being experienced five days a week by all kids and hence, most of the schemas were found present, (See Tables 14 and 15) – the schemas related to the event of "Birthday Party" were found absent in almost all 13 verbal children with autism, with the exception of only few (See Tables 16 and 17). The presence of a specific action and/or object related to different sequences displayed signs of either delayed perception and/or associative/serial memory. The sequence of this event was altogether missing. Therefore, the discourses could not be segregated under the subheadings of 'Presence of Schema' and 'Absence of Schema' as was done in the previous section. Following is a detailed analysis of their discourses pertaining to the exploration of sensory perceptual processing through the presence and absence of petinent schemas.

The discourse of Az (severe autism) lasted for 3 minutes and 59 seconds. Through only one communicative situation could take place, his nill linguistic response and prevalent non-linguistic behaviour were assumed to be apparent signs of auditory agnosia, hyper-audition and auditory overload. Before starting off with the discourse related to birthday party, during general conversation, he was making noise through the chair he was sitting in. The adult speaker tried to get his attention by asking if he wanted to watch a video. He stopped swinging the chair and became attentive towards her. The direct questioning related to 'birthday party' could not be done due to his deviant behaviour. Through video incentive, when asked if he remembered anything about his birthday, he remained silent. However, he was tapping fingers silently on the table; it was difficult to say if he was trying to recall or if it was a shift from one sensory play to another. His silence in response to the repetitive questioning pertaining to birthday hinted towards auditory agnosia. In contrast to the previous discourse germane to ‘school routine’, he was not responding linguistically; he was feeling/acting deaf. This account could not be regarded as sign of delayed auditory perception. After five instances of ‘silence’, he started making noises repetitively, as if to block out the sounds of the adult speaker. This hinted toward his hyper audition where he wanted to minimize the hurtful sounds of the adult speaker. Besides this, his withdrawal in response to the auditory stimuli – repetitive questioning about the same thing, also implied that he was vulnerable to auditory overload which made him shut down his auditory processing. In continuation of the same communicative situation, when the question was paraphrased again to make him elicit something about birthday, he did not utter a single word related to birthday. To get his attention, when he was asked again if he wanted to watch the video, after two instances of inappropriate paralinguistic responses, he replied in affirmative. This gave a clue about his offline (already stored) processing. This was not typical to him; he would usually respond to a question or statement and most of the time, at times with delay, do utter something: the response could be correct or incorrect, but at least he would saya something. That was observed throughout the discourse of ‘school routine’. The reason of his acting deaf and experiencing auditory overload might have been that since the schemas related to the event of ‘birthday party’ were not present in his memory, he was unable to utter anything about it. With the change of subject, from birthday to video, he started responding to the adult speaker accordingly. He also asked in his usual style ‘yeh kiya hai (what is this)’ when the adult was opening the video for him to watch. He became attentive towards video and stopped acting weird. According to the general observation of few birthday parties attended at ARC, Az was always seen lost in his own world, giggling to himself and not attending to the event visually, auditorily or proprioceptively. That might have been the reason of absence of this event and its schemas altogether in Az.

The discourse of Wn (severe autism) lasted for 4 minutes and 40 seconds. In three long communicative situations, her linguistic choices and non-linguistic behaviour suggested the tendency of experiencing sensory agnosia, delayed and hypo proprioception, associative auditory memory, auditory overload and fascination towards auditory stimuli. Throughout the first communicative situation, she was not just evading eye contact, she was also being inattentive and non-responsive. She was attending the adult speaker neither visually not auditorily – at first, she was silent and then lowered her head and was looking down; at one point she rested her head on the table. This gave an inkling of her sensory agnosia, although it was difficult to specify if it was auditory or visual in nature. However, when the question was rephrased and was linked with the birthday party she had recently attended at the center, and when the hint ‘cake’ was given, the somehow correct response was triggered. She repeated the one-word hint after her and then picked up the clue and completed the sentence herself – 'cake. khaya thaa (ate the cake)’. This could also be considered as a hint towards her delayed proprioceptipe processing and associative auditory memory. In the next discourse segment, her non-verbal behaviour displayed signs of sensory agnosia, visual and/or auditory, and hypo-proprioception. She was unable to tell what else was there in the birthday, if she did something else besides eating cake and who attended the birthday. She was given the hint of cutting of cake, but she was acting deaf. She was least interested in listening to her and looking at her. At one place she giggled to herself too. This inattentiveness and inappropriate giggling hinted towards her sensory overload. She was unable to filter the auditory information and to cope with it, she observed this unusual behaviour that was her stereotypy. There were five instances of her being ‘silent sitting, with head down’. That, too, seemed to give an inkling about her auditory overload. Nevertheless, when the talk was shifted to puzzles and the adult speaker asked her if she wanted to play with them, she was quite attentive and showed her desire to play with them. She lifted her head up immediately on her own and finally uttered one linguistic unit ‘puzzles’ in high-pitched voice. However, other linguistic units relevant to cake and eatables were never uttered. Throughout she was silent and non-responsive, and after the linguistic utterance ‘cake khaya tha’, spoke for the second time and that also about puzzles. The incentive of playing with puzzles worked and she became attentive after some time. However, she was only repeating the clues given by the adult speaker. That clearly indicated that due to her hypo-proprioception, she might have never attended the event and its action and pertinent objects. Therefore, nothing could trigger about the event. She again displayed off and on a non-responsive and an uninterested behaviour towards the adult speaker and her questions. In the succeeding discourse segment, she was asked about birthday song since she was reported to have fondness for singing songs and poems – fascination towards auditory stimuli. Only with hint, she was able to sing the song. At first, she started singing after the adult speaker –

she completed the birthday song through linguistic items ‘day to you’, and afterwards, she started singing and the adult speaker was singing after her.

The discourse of Aa (severe autism) lasted for 10 minutes and 46 seconds. In all six communicative situations, her linguistic choices and non-linguistic behaviour displayed certain signs of delayed audition, monoprocessing, visual and proprioceptive fascination, proprioceptive and visual gestalt, fragmented perception and gestalt hearing. In communicative situation 1, when she was asked open-ended question about birthday ‘birthday main kiya hota hai?’ she responded with irrelevant linguistic items ‘ya’, ‘wow’ and ‘that’s a bowl’ – before the actual discourse she was taking names of the objects. For the next 2 minutes and 38 seconds, the adult speaker kept talking about the toys and other objects to satisfy her need of talking about them. She then moved to the topic of birthday once again. This time Aa attended the adult speaker auditorily and responded appropriately with correct linguistic unit – ‘the cake’. This initial communicative situation brought to light her tendency to slow attention switching – delayed auditory perception. This also referred to her tendency to process stimuli through one modality only – monoprocessing. Since she was visually attending the crystal bowl that was on the table, she took time to switch attention to the auditory stimuli which was the voice of the adult speaker. In communicative situation 2, she was asked nine times ‘Birthday main kiya hota hai? (what we do in birthday?)’. Her inappropriate slotfillers included following linguistic utterances: ‘something (a complete sentence) unintelligible in the style of ‘smurfs’ – cartoon characters’, ‘oo: birthday (which she said joyfully but slowly)’, ‘the (took a pause of 2 secs) animals (uttered slowly)’, ‘silence’, ‘a toy’, ‘silence’, ‘toy present’. The linguistic response ‘toy presents’ related to the seventh action in the sequence. The communicative situation regarding elicitation of other items related to birthday event revealed her visual and proprioceptive fascination towards toy (stuffed-animal) presents. She loved playing with toys and received toy gifts on her birthday. So, she referred to the action of receiving gifts to her receiving toy presents. That referred to her proprioceptive gestalt and visual gestalt – she was not asked what she received on her birthday. She was asked what else was associated with birthday. Her fascination with stuffed animal toys resulted in her gestalt perception. However, upon the request of the adult speaker, she put all the toys to rest.

Adult: Let’s not disturb them. Let them sleep. Shhh

Child: ((letting them sleep))

This helped in getting her attention back. In communicative situation 3, when she was inquired further about core slotfillers, she responded with linguistic item ‘cake’ once again and talked appropriately about her favourite flavor of the cake. In communicative situation 4, she was asked ‘Who brings the cake? – 1st action in the sequence of the event. In the second turn, she responded with relevant linguistic item ‘daddy’ without any delay. However, she got distracted by the glasses that the adult speaker was wearing. This showed her tendency to experience visual gestalt where the irrelevant stimuli got her attention and she got distracted. In communicative situation 5 regarding optional slotfillers of birthday party, she responded with lexical item ‘food’ and then she enlisted a range of food items: ‘chocolate cake’, ‘noodles’, ‘chocolates’, ‘chocolate biscuits’, ‘chocolate ice cream’, ‘chocolate cocomo’, ‘chocolate juice’, and ‘lots of chocolate flavors’. The linguistic units included all the food items that were chocolate in flavor, except for noodles. It sounded as if she was now acutely thinking about food items only. This overly narrow attentional focus referred to her fragmented perception. Since she had placed all toys on the table upon the request of adult speaker earlier, in the middle of communicative situation, she got distracted once again by her toys and uttered linguistic items ‘animal friends will make wake up (she repaired ‘make’ as ‘wake’)’. In communicative situation 6, when she was asked indirectly about candles ‘cake kay ooper kuch lagatee hai? (what do we put on the cake?)’, she was unable to state anything relevant. Rather after four seconds, she uttered in unusual, weird shrill voice which was difficult to understand: ‘aisaa kertee hai main cake khaoon gee (I will eat chocolate cake)’. The next communicative situation revealed her visual and proprioceptive awareness regarding cake and its flavors. In the succeeding communicative situation regarding further elicitations about pertinent objects/actions, she again displayed signs of deviant attentional pattern – visual gestalt. After telling the adult speaker about cake and food, she started attending the toys that were put aside on the table. The adult speaker, after observing her deviant attention, started talking about toys once again. This time, she was trying to convince the child that since animal toys and characters were sleeping, the child must not disturb them. After some time, her attention was brought back to topic of the talk – birthday party. This revealed her habit of processing auditory stimuli with delay – delayed hearing. The discourse segment regarding candles could not make her elicit about blowing them. She responded with irrelevant response and did not process what was being asked. This referred to her gestalt auditory perception.

The discourse of Im (severe autism) lasted for 5 minutes and 34 seconds. In all eight communicative situations, his linguistic choices and non-linguistic behaviour appeared to show signs of auditory overload, gestalt hearing, delayed hearing, associative visual and auditory memory, and hypo-proprioception. Before starting off with the discourse, the adult speaker was talking about sequence of the days of the week. When she changed the topic to birthday, he displayed signs of delayed auditory processing. In response to general open-ended question about birthday 'birthday kiya hotee hai (What happens in birthday??)', he meaninglessly replied with linguistic unit 'Monday' as continuation of the previous communicative situation where the adult speaker asked him about days of the week in her speech session. After providing with the hint 'party' when he was asked again if his birthday was celebrated, he responded with immediate echolalic utterances 'huee thee (it was celebrated)' and 'kee the (it was celebrated)'. In communicative situation 2, he was asked eight times what we did in birthday or what happened in birthday, he was blank in terms of appropriate slotfillers. However, after eight instances of immediate echolalia combined with unintelligible speech, he responded with irrelevant linguistic choices 'khailtay hain (we play)' and 'perhtay hain (we study)'. On ninth attempt with hint 'cake', he picked up the clue and said, 'cake kaattay hain (we cut the cake)'. In next communicative situation, but he could not respond with appropriate slotfiller when he was asked about balloons. Nothing pertinent could be triggered regarding birthday party until birthday song was sung as a hint. This referred to his serial auditory memory which helped him recall about the pertinent action of cutting the cake, though after two irrelevant responses. This also seemed to hint towards his delayed auditory processing. Moreover, the frequent instances of immediate echolalia hinted towards his auditory overload to avoid which, he was busy in his own echolalia. Even upon hearing the word 'balloon', he could not utter anything pertinent. The echolalia also hinted towards his auditory gestalt perception since it served nothing in common with the intended meaning of the adult speaker. The next discourse segment regarding further elicitations pertaining to birthday party event showed signs of auditory overload. He was busy in his stereotypical linguistic utterance 'wo (that)' that was echolalic in nature. The adult speaker tried to make him recall what he did on his birthday. He was unable to utter anything relevant to the event. When he was asked what else we did in birthday especially with reference to cake, he responded with irrelevant linguistic units 11 times ‘wo kiya thaa (I did that)’ & ‘wo lagaya thaa (I put that)’; at the 12th attempt he responded with relevant lexical item ‘candle’ – he talked about 3rd sequence of action ‘putting candles on the cake’. However, the word ‘candle’ in response to indirect hint of putting candles on the cake referred to his associative visual memory and delayed auditory processing where he observed echolalia just to win time. In next communicative situation when he was directed to the next sequence of the event, blowing candles, he could not come up with appropriate slotfiller – core action of blowing candles. Regarding ‘blowing the candles’, he was unable to catch any hint. He at first displayed signs of auditory overload since he responded in the earlier part of the discourse segment with his stereotypical repetitive questioning ‘baba aain gay (will father come to pick me?)’ and ‘theek hai (okay)’. When asked precisely how to stop the candle from burning further, he gave an unusual, unintelligible auditory response: ‘thal ker kay’. This showed probable signs of hypo-proprioception. His inability to recall even after receiving prompts hinted that the action was not processed by him – neither visually nor proprioceptively. In response to the hint by adult speaker ‘blow nahee kertay? (do not we blow the candle)’, he repeated echolalically: ‘blow nahee kerta (I do not blow it)’. In communicative situation 7, when he was asked to tell what else part of birthday event was and if something else was associated with birthday party that he might have processed attentively, he immediately responded with linguistic items ‘balloon hotay hain (there are balloons)’. Although he talked about core object of 2nd action in sequence, he told himself without any prompt. His correct response could be referred to as delayed echolalia, a fluke that worked well this time. However, instead of talking about balloons in terms of birthday decorations (which were always used in birthday parties at home and at school), he again responded with irrelevant linguistic choice: ‘khailtay hain (we play)’.

In the communicative situation 8, to know if he could tell about ‘cake’ himself without any prompt, he was asked to recall and tell about something sweet that was eaten on birthday. After repeating questions 14 times with prompts and after 13 inappropriate slotfillers (‘wo khataa hoon (I eat that)’, ‘kerwaa hotaa hai (it is bitter)’, ‘meetha hota hai (it is sweet)’, with the prompt /k/ sound, he uttered appropriate lexical item – ‘cake’. He only uttered about cake in the very first discourse segment where hearing of birthday song triggered his response ‘cake kaattay hain’. After that, he did not talk about it at all. When the adult speaker asked him indirectly about eating cake on birthday, he displayed signs of hypo-proprioception – as if he had not processed his own action of eting the cake. He made use of his stereotypical linguistic expression ‘wo’ to fill the gap of cake. However, after /k/ prompt he uttered word ‘cake’. He could have uttered ‘candles’ but he did not. In last communicative situation, when was asked about guests/friends, he could not tell appropriately about guests/friends even after five askings. He was initially responding with his stereotypical linguistic choices ‘wo (that)’ and ‘us ko (those)’, but when he was asked to name his friends who attended his birthday, he told the names of his classfellows correctly (ashar, umer, ameen, azka). However, when asked what he received on birthday, he could not tell appropriately about gifts.

The discourse of Hl (severe autism) lasted for 2 minutes and 10 seconds. In all five communicative situations, his linguistic choices and non-linguistic behaviour indicated signs of associative (visual/auditory) memory, proprioceptive and auditory overload, auditory agnosia, delayed and gestalt hearing, and visual gestalt. The communicative situation regarding general open-ended question about birthday party displayed signs of proprioceptive overload. There were two instances of sensory play of hand flapping and making low pitched sounds in response to the question. The ongoing discourse also disclosed his tendency to either feel or act as deaf – auditory agnosia. Even when in the fifth and sixth attempt, he was told the appropriate slotfiller ‘cake’ twice, he remained oblivious of what information was being asked from him. There were three instances of non-responsive body language, looking here and there as if deaf. Neither did he respond to the question being asked nor did he catch the hint, since he was not attending the adult speaker and her voice – he was not there.

Adult: CAKE?
Child: ((looking here and there; as if deaf))
Adult: cake?
Child: ((did not respond))

Contrary to the previous communicative situation, he attended the adult speaker’s voice and after some delay, picked up the hint /ca/ in association with the promt ‘cake kay ooper kiya lagatay hain? (what do we put on the cake?)’. He completed /ca/ with appropriate slotfiller – candle. This referred to his delayed auditory perception and associative (visual/auditory) memory. The auditory agnosia that he was experiencing in the previous discourse segment got transformed into immediate echolalia at first and then into delay in processing. The next communicative situation regarding another item pertinent to birthday party revealed signs of auditory gestalt. He was in the habit of completing the turn with the help of prompt. The prompt could be one syllable or one word. The same happened when he was asked about another core slotfiller 'balloon'. He was asked to tell something else that was part of birthday event and was provided with a prompt too: /ba/. He picked it up and responded with correct lexica item 'balloon'. After an interval of attending the adult and her questions, he started looking here and there again. The adult speaker asked him to sit properly and then, she took his arms and placed them on the table. He observed the same still posture till the end of next communicative situation. To get to know if previous hints triggered anything relevant, the adult speaker asked him to tell what else was there on birthday. He was silent throughout the discourse segment. He remained silent, sitting still and even when the adult speaker uttered in a tone as if confirming from him about 'birthday gifts?' he remained silent. He observed same silent, still posture and did not respond to the five further askings of the adult speaker. His silence hinted towards his nill processing of the knowledge structures of the event. His teacher aid reported that since he was afraid of balloons, he never liked attending birthday parties. This might have been the reason of his not having enough knowledge structures pertaining to the event. Later, when the adult speaker started counting the names of objects associated with birthday party, he was non-responsive throughout. The teacher aid informed the adult speaker that he learned, remembered and recalled things through counting and naming them on fingers. The adult speaker took his left hand, placed on the table and started counting objects on his fingers. The adult speaker counted 'cake', 'candles','balloons', 'gifts', 'birthday cap' on his fingers; he was least interested in the counting or the adult speaker, turned slightly to his right, took his hand away and folded arms on his belly. However, this did not work, and he could not retrieve knowledge structures (concepts) about birthday party. During ongoing discourse, he displayed apparent signs of auditory agnosia – acting or feeling deaf and was non-responsive. Then, the adult speaker started counting the core slotfillers of the birthday event on her own fingers. Hl first gave an unusual forward push to his body (once only), then leaned forward while repeating meaninglessly with linguistic utterance 'cake'. While the adult speaker was still counting the pertinent slotfillers on her fingers, he leaned forward, looked at her fingers, and instead of repeating anything pertinent, uttered ‘mary had a little lamb’ twice while pointing at the side rack. When his request went unnoticed by the adult speaker, he reclined back and covered half of the face with one hand, then leaned on his left and pointed again with stretched arms this time ‘mary had a little lamb’. That was how last communicative situation ended, without further elicitations pertinent to the event of birthday party. The only thing that made him utter something after auditory agnosia, and that also out of the context, was the sight of story book. The utterance of linguistic choice ‘mary had a little lamb’ referred to his acute perception, where it was difficult for him to filter relevant from irrelevant – visual gestalt. This could also be referred as his tendency to withdraw from something overwhelming. In this discourse segment, the auditory stimulus was the adult speaker’s voice which he was trying to avoid due to auditory overload. The result was his silence at the first place, and then his deviant attention pattern – visual stimuli (story book) instead of auditory stimuli (adult speaker’s voice).

The discourse of Ah (severe autism) lasted for 1 minute and 17 seconds. Through only one communicative situation that took place, his nill linguistic participation and prevalent non-linguistic behaviour showed signs of visual fascination and sensory overload. When he was asked ‘what do we do in birthday?’, he echolalically whispered the lexical item ‘birthday’ and when after the same question was asked five times, he remained silent throughout. Upon the suggestion of his teacher aid, he was shown the picture of birthday party and through ‘what is this’ questions, the information regarding ‘objects’ was asked. However, he was unable to retrieve those objects as core slotfillers of birthday party and was unable to reply to “what do we do in birthday” and “what she/he (people in the birthday party pic) is doing” questions. In other words, actions could not have been registered as the objects had been. Like school routine, Ah’s visual fascination with reading books and/or captions on pictures seemed to detain him from processing the information available in the environment around him. He did not attend birthdays celebrated in the center. However, this not-attending-the-stimuli behaviour referred to his tendency to experience sensory overload. He seemed to then resort to pictures, books and words.

The discourse of Mm (mild-moderate autism) lasted for 4 minutes and 37 seconds. In all eight communicative situations, her linguistic choices and non-linguistic behaviour indicated signs of serial auditory memory. The discourse about birthday party event did not disclose any signs of fragmented or delayed hearing. When the adult speaker announced that they would talk about birthday that day, she immediately responded with linguistic units ‘cake kaattay hain (we cut the cake)’. Cutting the cake is 5th action in the sequence but the action could be considered as the appropriate slotfiller since cutting the cake was the main action of birthday party. The schema of the event was affiliated with cake. She was then made to recall her own birthday. She responded with random but appropriate linguistic slotfiller ‘candle’ as a response to the question – though in sequence of action, the core slotfiller (candle) is part of 3rd and 4th sequence where we put candles on the cake and then blow them before cutting the cake. She only displayed hints of serial auditory memory when upon asking if she celebrated her birthday, she replied in affirmative and quickly told about another core object of the event – candle. Her quick and correct linguistic responses informed that the event was processed quite satisfactorily, though general sequence was missing. In response to the second probing question, she responded with linguistic unit ‘balloons’. Balloons were core objects of the 2nd sequence of action where the room was decorated with balloons. She did not mention about core action, but about core object though out of sequence. She then created her own sequence in response to the question ‘what do we do after that?’. Main actions ‘cake kata (cut the cake)’, ‘candles ko phook mara (blew the candles)’, & ‘cake khaya (ate cake)’ were told in the same order. She talked about the cutting of the cake which is 5th action in the sequence of the event. In the beginning when she was asked about who brought the cake, she continued with the mentioning of the cake. Here she talked about the 6th sequence of action when after cutting the cake we eat it. Later, upon asking the question again, she replied with correct answer – that it was brought by her mom. She repeated the core action of 5th sequence through linguistic response ‘cake ko katta (cut the cake)’ and then talked about core action of 4th sequence i.e. blowing candles twice – ‘candles ko phook mara (blew the candles)’. In communication situation 7, she mentioned ‘blowing up the balloon’ as another action related to the event, though it is not part of any sequence of birthday party – she might have done that or seen someone else did that, that’s why mentioned in response to ‘what do we do after that?’ question. In last communicative situation, the question pertinent to the last sequence of event was processed quickly and was replied with correct answer. In response to the probing question if she received anything from her parents on her birthday, she replied with lexical item ‘gift’.

The discourse of Zb (mild-moderate autism) lasted for 1 minute and 3 seconds. Through only one communicative situation that could take place, her linguistic choices and non-linguistic behaviour displayed signs of associative proprioceptive memory, visual fragmentation, gestalt and hyposensitivity. The discourse regarding birthday party was linked with the birthday of a child with autism that was celebrated the previous day at the center. Since the teacher of that child was holding the knife with the child as precautionary measure, the girl with autism only processed that teacher cutting the cake – and not the child whose birthday it was. This referred to her fragmented visual perception. Although she was informed that it was Aammar’s birthday and not of Ma’am Hira’s, she again responded with what she had processed at the party. Since the relevant person for the party was the child, her inability to filter the relevant stimuli from irrelevant also indicated clearly about her visual gestalt. Since she could not tell anything about candles and balloons, she did not not seem to process them at all as if they did not happen to get her attention; this appeared to be an obvious indication of her visual hypo-sensitivity. During the discourse segment, she was also busy in her non-verbals – looking here and there; shrugging her body, leaning forward and putting her head down on the table; and adjusting her sitting posture while sitting upright. However, the hint of what did she eat made her recall, though with a slight delay, about cake and its flavor – associative proprioceptive memory.

The discourse of Ma (mild-moderate autism) lasted for 2 minutes and 6 seconds. Through four communicative situations, his linguistic choices and non-linguistic behaviour displayed signs of hypo-proprioception, visual gestalt and hyposensitivity, and associative proprioceptive memory. He was unable to respond in general context related to the event. However, linking of the question with a birthday party celebrated at center triggered about cutting of the cake; his linguistic choice ‘cake katta thaa (cut the cake)’ in response to this suggested about his possible associative auditory memory. The adult speaker tried to make him utter something further pertaining to birthday party. When he did not utter anything, she tried to give hint of the room but that was all the same for him. His silence indicated that either auditory stimuli (adult’s voice) was not being processed at the time or there were no traces in his memory resources since he had not processed the other items consciously. The association did not work this time. He could not tell anything about core slotfillers of birthday event even after 15 turns of making him elicit about them; at first, he was asked about the flavour of cake, in response of which he whispered with linguistic items 'happy birthday kaa (of happy birthday)' to the adult speaker. the irrelevant linguistic choices regarding the flavor of chocolate and other relevant objects hinted towards possibility of hypoproprioception – as if what he did during birthday, especially in his own birthday, was never processed by him. The only thing he happened to attend to were eatables – after four silent turns, instead of telling about core slotfillers of birthday event, he told about other eatables 'chocolate', 'strawberry', and switched to his 'silent' mode in the last six turns. He, nevertheless, displayed signs of fascination towards other eatables that might have been served along with cake – visual gestalt. Other relevant linguistic information could not be triggered from his memory resources since no traces could be found in the context of birthday party. The adult speaker again tried to make him elicit about balloons and birthday caps. Even the hint /b/ did not trigger anything from his memory resuorces. In communicative situation 4, he was asked three times what the room was decorated with and four times if birthday caps were worn during the event – he remained silent throughout. This could not be referred as his auditory agnosia since he was attending the adult speaker visually and auditorily. However, he did utter something unintelligible; this hinted towards his hypovision – as if he never attended other pertinent actions and objects visually.

The discourse of An (mild-moderate autisms) lasted for 7 minutes and 36 seconds. Through four communicative situations, his linguistic choices and non-linguistic behaviour displayed signs of delayed and hyper audition, associative memory, hypo-proprioception and vision, auditory overload, visual fragmentation, distorted vision and proprioception. The communicative situation regarding his general awareness about birthday party disclosed his tendency to experience hypo-proprioception – he was unable to recall or attach anything pertinent to the event. He also explicitly told the adult that he did not know what was done at birthday – 'ma'am birthday pay mujhay nahee pata kiya hota hai (ma'am, I do not know what is done on birthday)'; his discourse later testified that. In the next turn he responded with 'Ibrahim ( ) Ibrahim ( )', then started playing with the pencil which was taken away after a struggle and the responded again with linguistic units 'Ibrahim hota ha Ibrahim hota hai (there is Ibrahim, there is Ibrahim)'. When the adult speaker indirectly refered to his sister's birthday that was celebrated the previous day, he attended the auditory stimulus but did not respond with core slotfillers as he was expected to utter. He responded with 'iman kee birthday (Iman's birthday)', 'abhee abhee bahir jana hai (I want to go out now', and after three instances of silence, again responded as 'birthday pay (.) Ibrahim hota hai (there is Ibrahim on birthday)'. In the third attempt of making him elicit about 'cake', he was asked what his parents brought for birthday the previous day. Only then he came up with appropriate slotfiller – 'wo cake . cake lai thay (they brought the cake)'. He could not tell anything about the flavour of the cake but responded with irrelevant linguistic items 'iman kaa cake (Iman's cake)' and 'iman kee birthday thee (it was Iman's birthday)'. However, when he was given certain options to pick from, he chose the correct option. He showed awareness regarding its taste only when few options were given – he picked the right option 'chocolate cake aaya thaa (it was chocolate cake)' and upon asking, also expressed that he liked the cake. This delay in giving the correct linguistic responses revealed his tendency to process information with delay – delayed auditory processing. His tendency to make sounds and to get engaged with something irrelevant in the environment along with uninterested body posture hinted towards his hearing to be hyper – auditory hypersesitivity. To avoid auditory overload, he was withdrawing himself from the questions of the adult speaker and was looking away throughout the communicative situation. In communicative situation 2, when he was asked what else was there in the birthday besides chocolate cake, he responded with linguistic items 'chocolate cake thaa (there was chocolate cake)', 'mairay friend aai thay (my friends came)' and uttered something unintelligible 'jagga'. The question was rephrased, and he was asked seven times very specifically about candles – 'cake kay ooper kiya lagaya thaa (what was put on the cake)' – but he did not pick up the clue and responded with irrelevant information 'kuch lagaya tha (something was put), 'iman nay, iman nay', 'wo (that)' and then started staring at the person standing in the door. His irrelevant linguistic choices showed signs of visual hyposensitivity towards that part of the event – as if he had never processed it. That hyposensitivity and gestalt showed signs of distorted visual and proprioceptive processing. Sometimes he would refer to his friends and sometimes he would refer to eating of the cake and other food items that were served. He could not utter anything pertinent like 'balloons', etc. He was then asked once again a flexible question of what else was there in birthday. He again responded with inappropriate slotfillers – 'nahee nahee nahee (no, no, no)', and took the name of his youndest sister 'alvina'. The linguistic choices he made during the discourse segment regarding other things associated with the event brought to light his visual fragmentation. The adult speaker wanted to elicit from the child about other objects related to event, but the child again talked about his friends. He could not tell anything regarding candles and how they were blown. He was referring to other people instead of birthday objects and actions. Even the hint regarding decorating of room did not trigger his memory resources – since it did not seem to be processed like few other things. However, he responded with gifts which was irrelevant if we strictly analyse in terms of response. This hinted towards his associative auditory/visual memory – mentioning of room and its decoration triggered about gifts. The discourse also showed his visual awareness regarding the toy gift that his baby sister received – 'toy diya (gave toy) – and the dress his other sister got on her birthday the previous day – 'us ko frock . kapray milay hain (she received frock /dress as gift)'.

The discourse of As (mild-moderate autism) lasted for 2 minutes and 12 seconds. Through five communicative situations, his linguistic choices and non-linguistic behaviour displayed signs of auditory gestalt, visual and auditory overload. In response to the open-ended question about birthday, he was unable to recall its core or optional actions or objects. He was blank, though at rest and was quite attentive to the adult speaker. However, he displayed most of the instances of immediate echolalia. He attended a birthday party of his class fellow few days back too but was unable to recall what happened in the party. Instead of processing the question to respond accordingly, he was only repeating what the adult speaker was asking him. His immediate echolalia hinted towards his tendency to acutely process auditory information to the extent that he ended up repeating it – auditory gestalt. At sixth turn, instead of repeating the question with prompt, the adult speaker made gesture of cutting the cake with her index finger as imaginary knife and loudly uttered 'cake'. He looked at the gesture by the adult and repeated meaninglessly 'cake'. However, this core hint could not trigger anything pertinent in the succeeding communicative situations. In the next discourse segment when he was asked about cake cutting just to trigger his response, he again responded with inappropriate slotfiller: immediate echolalia – auditory gestalt. However, he tried to imitate the cake cutting gesture of the adult speaker – he closed the tips of his fingers together and gave it slight jerks as if to explain the cutting process. Later, he gave jerks to his index finger that was pointed towards the adult; this can be referred to as his sensory play. When he was asked about 'candles' and 'blowing of the candles', he showed signs of frustration, repeated in high pitch what the adult speaker uttered and started his ritualistic behaviour of teeth grinding. The teacher aid highlighted that he was fond of blowing candles. So, through different prompts and hints, he was asked about those two schemas of 4th sequence. Even after inquiring 10 times about candles and the act of blowing them, he only responded with echolalic responses – as if he was never aware of them at all. He also made some noise 'aa::' to block out the sound of the adult speaker – auditory overload.

Adult: ((took hold of his hands)) candle kaisay blow kertay hain?
(how do we blow the candle?)
Child: ((looking away, then replied by giving eye contact)) °°blow kertay°°
(we blow)
Adult: phooo= (she made the sound of blowing candles)
Child: ((imitated her by making the same sound echolalically)) =phoo=
Adult: =phoo maar kay?=
(by doing 'phoo')
Child: ((took hands away from the adult's grip)) aa:::::: ((put hands in the lap and head was down))

The discourse segment about the taste of the cake hinted towards his tendency of not attending visual stimuli. This bias to withdraw from visual stimuli and not process them hinted towards his probable visual overlaod. In communicative situation 4, he was asked 'birthday main aur kiya hota hai' and then hint was given too – balloon. He was unable to tell anything about other slotfillers, like balloon, etc. He could not even grasp the hint given by adult speaker. This informed about his tendency to not attend stimuli visually, and this might be due to visual overload; therefore, he could not utter anything pertinent. In all seven turns, he again responded with immediate echolalia and was busy in his sensory play of teeth grinding; he could not tell the colours of balloons that were present in the birthday and that were always available whenever any birthday was celebrated in the centre. He could not tell the adult speaker who cut the cake. The only information that could be retrieved was some part of the birthday song that he sung to complete the song. This referred to his auditory gestalt – the only thing that he could focus in the birthday party was 'a-two-word excerpt' from the song. In the end of this communicative situation, he clapped to himself so the adult speaker at once asked him about clapping and birthday song in communicative situation 5. He showed the signs of remembering the act of clapping and was clapping hard while singing birthday song. Besides zero knowledge pertaining to sequence of actions, he did not know about the core objects of birthday party. His discourse displayed that the schema was altogether missing, except for the second line of birthday song that he was able to recall: " … many more" and the act of clapping. Nothing could be triggered about the schema of 'Birthday Party'.

The discourse of Il (mild-moderate autism) lasted for 3 minutes and 57 seconds. Through four communicative situations, his linguistic choices and non-linguistic behaviour displayed signs of hypoproprioception, hypovision and sensory agnosia. The schema of birthday event was found missing altogether. Throughout the discourse, he did not utter anything pertinent to either sequence, or objects or actions. At first, he was given the hint by singing birthday song. He responded with something unintelligible which was not pertinent to core slotfillers of the event. The teacher aid informed the adult speaker that he attended birthday of his class fellow few days back, so the adult speaker gave its reference. The teacher aid also informed that since the cake was a green car, Il remembered that it was car cake. Accordingly, the adult speaker asked him about the cake: 'ahmad kee birthday pay kon saa cake thaa'. However, both the hints could not trigger anything in all 13 turns. The discourse revealed his tendency to neither process the event visually, nor auditorily nor proprioceptively. He was blank and seemed to have observed sensory agnosia during the event. He was uninterested and non-responsive towards the adult speaker's questions and hints but was only interested in the toy car he was playing with. Therefore, at one place he responded with irrelevant linguistic items 'car is' and 'green car' instead of appropriate slotfillers. After the toy car was taken away, he responded with something unintelligible. The discourse regarding celebration of birthday dislosed his tendency towards hypo-proprioception. He was quite attentive but could not recall anything pertinent to the birthday party. The adult speaker then shifted to general open-ended question 'Birthday pay kiya hota hai? (what do we do on birthday?)'. After asking about the event seven times, the adult speaker gave him the hint 'cake' in eighth turn, to which he was non-responsive. The adult speaker then tried to elicit from him the information germane to birthday party in terms of cake. He displayed no awarenss regarding cake or any other thing or that matter. This non-verbal behaviour response of not attending stimuli visually hinted towards his tendency of visual hyposensitivity. However, in the next turn, he repeated on his own the core slotfiller of the first sequence – ‘cake’. Among the few linguistic units that he uttered clearly, one was ‘birthday’; he uttered that one linguistic item uttered in an unusual tone, while leaning on his right and giving eye contact to the adult. He could not even complete the birthday song which referred to his tendency of not attending and missing out some auditory stimuli – hypohearing. In communicative situation 3, his inappropriate slotfillers were the instances of immediate echolalia. He was asked 11 times ‘birthday pay kiya hota hai? (what do we do in birthday?)’ but he responded meaninglessly and echolalically ‘birthday’ and later with ‘cake’ after receiving the hint only; he punctuated his echolalic responses with non-responsive and uninterested body language. In last communicative situation, the adult speaker tried to trigger and make him elicit any of the core slotfillers; in all 19 turns, he responded with one echolalic linguistic unti ‘cake’ and with two instances of squealing sound. Otherwise, he remained either non-responsive and uninterested in the talk or silent while giving proper eye contact to the adult speaker. At one place, he uttered ‘baby is crying’ since another child outside was throwing tantrums. This linguistic choice and other responses regarding other relevant items suggested his visual experience to be hyposensitive. He was unable to tell anything about birthday event which referred to his memory resources being blank in terms of this type of information. The adult speaker, then asked him to recall and tell about his own birthday. He was again blank, though he was attending the adult speaker both visually and auditorily. That evidence clearly indicated his vision to be hyposensitive, since he did not seem to attend to and processed the information related to the event.

The discourse of Rn (mild-moderate autism) lasted for 6 minutes and 40 seconds. Through six communicative situations, his linguistic choices and non-linguistic behaviour displayed signs of hypoproprioception and delayed audition. The child was busy in his jargons which contained a complete sentence. He responded to the open-ended question of the adult with his jargon. As an incentive, the adult speaker told him that she would show him a video only if he answered to her questions. The adult speaker opened the video for him to which he was quite attentive. She then paused it. Afterwards, he was asked seven more times ‘birthday pay kiya kertay hain?'/'birthday pay kiya hota hai? (what do we do on birthday?)'. After six inappropriate slotfillers that included irrelevant linguistic choices 'video', an echolalic response 'birthday pay kiya hota hai (what do we do on birthday?)', 'happy birthday', and one instance of silence, he responded with linguistic unit 'balloons' in the eighth turn. The next discourse segment revealed his awareness regarding another pertinent object – cake. This however referred to his delayed auditory processing. The adult speaker further tried to ask him about birthday event and its related actions and objects. Related to other actions and object, he displayed signs of hypo-proprioception. He was unable to tell what was done with cake and who brought the cake when his birthday was celebrated. However, in communicative situation 3, when he was asked about who brought the cake and what was usually done with the cake, he could not respond correctly. He could not tell anything about 1st, 5th or 6th action in the sequence of the event with respect to core slotfiller 'cake'. In all 14 turns, his inappropriate slotfillers included irrelevant linguistic choices 'balloon', 'happy birthday', 'mama, baba' (echolalic response), 'mama cake' (echolalic response), and some instances of silence and non-responsive and uninterested behaviour. He was being echolalic at few places only. Otherwise, he was blank as if he had never processed anything else except for cake and balloons. However, when the adult speaker gave him a prompt and asked what we put on the cake, after a long delay, he responded accurately in the ninth turn with relevant linguistic unit 'candles' – delayed audition. During the communicative situation, he was either looking here and there, or turning to his left as if to avoid the adult speaker or observing non-responsive and uninterested posture. Two other inappropriate slotfillers included irrelevant linguistic choices 'laptop', cake cake', 'canteen' and 'happy birthday'. In communicative situation 5, he was asked 10 times what was done with candles: 'candles ko kiya kertay hain?'. With 10 inappropriate slotfillers that contained non-responsive, uninterested body language and irrelevant linguistic choices, 'video', 'oo a laa', 'noooooo', 'naee naee naee (no, no, no)', 'daikhnee hai (echolalic 'want to watch')', he was unable to tell about 4th action in sequence germane to 'candles'. In communicative situation 6, he was asked 12 times to tell further about birthday event: 'aur kiya kertay hain birthday main?'. The adult speaker punctuated the turns with repeating some of the core slotfillers which the child uttered – cake, balloons, and candles. He could not tell further about anything relevant to birthday party, like cutting of the cake and eating it, blowing candles and receiving gifts, etc. The adult speaker tried her best to make him recall by revising what he had told her earlier. Since he had not processed other relevant schemas, he was unable to retrieve anything else from his memory resources. Even the incentive to watch the video did not help him utter anything relevant to the event and he remained non-responsive and uninterested throughout that communicative situation. The schema of birthday event had traces of gestalt. He could only recall and tell randomly about two schemas of objects – candles and cake. His discourse regarding schemas of birthday event displayed absence of schema of sequence and relative actions. Table 10 gives an overview of embodied experiences of all 13 verbal children that they displayed throughout their discourses.

4.3 Theme 2: Heterogeneous Embodiment as Result of Varied Experientialism

Tenbrink (2015) prescribes that since "language may in many ways be insufficient for gaining access to cognitive processes and representations to the extent desirable for a research purpose …, it is highly beneficial to collect other types of evidence that can complement the insights gained form language" (p. 121). Evans and Green (2006) also signified the importance of triangulation of data through "converging evidence" by outlining "that when patterns in language suggest corresponding patterns in conceptual structure, cognitive sematicists look for related evidence of these patterns in other areas of investigation" (p. 170). In line with methodological approach suggested by both theoretical and methodological frameworks, and executed through CODA (Hölscher, Tenbrink, & Wiener, 2011; Tenbrink & Wiener, 2009), linguistic analysis was triangulated with the converging evidence of behaviour data.

The behaviour data (illustrated child-wise in Appendix D) involved findings regarding the varied embodiment of verbal children with autism, in the light of their peculiar yet heterogeneous visual, auditory and proprioceptive experiences. The percentages against all 20 categories in all three modalities refer to the behaviours that were categorised accordingly in the SPCR (Bogdashina, 2003). For example, out of 54 visual behaviours, 5 indicate visual gestalt, 5 refer to hypervision and 6 to hypovision, 3 indicate presence of visual sensitivity, 1 refers to fascination towards visual stimuli, 1 refers to inconsistent visual fluctuation, 5 tell about fragmented perception, 5 inform about distorted perception, 2 indicate sensory agnosia, 2 inform about delayed perception, 1 refers to vulnerability to sensory overload, 1 tell about monoprocessing, 1 is about peripheral perception, 2 indicate tendency towards systems shutdowns, and so on. Moreover, if few children were reported to have one out of five visual gestalt behaviours, their visual gestalt was calculated as 20%.

The combined behaviour findings regarding the diverse, eccentric experiences of all 13 children in three modalities are tabulated in Tables 11, 12, and 13 for the sake of comparison and contrast. However, the in-depth qualitative analysis hinted towards different visual behaviours that led to that 20% or 40% visual gestalt and other experiences in different children. All 13 children displayed different sensory experiences and behaviours in all three modalities which support the notion of varied embodiment and experientialism that Cognitive Linguistics claims of. Moreover, like the findings of second question (through linguistic data), the findings of third question (through behaviour data) also brought to light the difference in their sensory experiences throughout the discourses. The research findings of language data validated the peculiar embodiment of verbal children with autism in the context of certain concepts regarding two events – School Routine and Birthday Party.

What we express through words provide/project a reflection of the mental processes that cannot be observed outside laboratory. The 'language-reflects-patterns-of-thought' standpoint of cognitive linguistics serves well in handling with the said problem. The current study assumed the role of thought as crucial since 'what we think' brings to light 'how we might have perceived' any phenomenon. The 'how' of perception and conceptualization stresses the need to explore 'why' we perceive and conceptualize objects, actions and events in a particular way and how our conceptualization and processing are determined by our experiences – bodily experiences. Specifically speaking, the patterns of processing identified in the language data were compared with the evidence of unique sensory perceptual experiences collected through behaviour data. The Sections 4.3.1 and 4.3.2 shed some light on the heterogeneous visual, auditory and proprioceptive embodiments, that seemed to determine the construal of their respective realities.

Table 10: *School Routine & Birthday Party – Sensory Perceptual Experiences/Processing*

	Children with Severe Autism						Children with Mild to Moderate Autism						
	Az	Wn	Aa	Im	Hl	Ah	Mm	Zb	Ma	An	As	Il	Rn
Gestalt Perception	P*	A*	P*° V*°°° A*°	A*° P*	A**° V°		V* A*	P** V°	A*** V*°	P**	P*** A°°°		V**
Intensity with which senses work	Hyper: A°	Hypo: P**°°°		Hypo: P***°°	Hyper: A*			Hypo: V°	Hypo: P° V°	Hypo: P° A° V°	Hypo: P*	Hypo: P***° V°° A°	Hypo: P**°
Fascination with certain stimuli	A* V*		V° P°			V*°	V*						
Fragmented perception	P* A*	A*	P*	A** P*	P*		V*	P** A** V°	P**** A*	P** V°	A***		
Distorted Perception	P*	P*	V*	P*****			P* V* A*		A*	P**° V°	P* V*		V*
Sensory agnosia	A°	V*°° A*°°			A*°°	A*	A*	A**			P***	V° A°	
Delayed perception	A* P*	A*** P°	A***°° P*	A°°°	A°		A*	A*	A**	P** A*°	A** P*	A*	A*°°°
Sensory Overload	A°	A*°	A*	A*°°°	A***° P*°	*°	A**	A**		A°	P***** A*° V°°		
Mono-processing			°							*			
Peripheral perception		V*			A*								
Perceptual memory								V*					
Associative (serial) memory	A** V* P**	A°		A*° V°			A°	P°	A*° P*	V*° P** A°			

Legend: Birthday Party ------ ° School Routine ------- * Visual ---- V Auditory ---- A Proprioception ----

Table 11: *Overview of Visual Embodiment of all 13 children*

	Children with Severe Autism						Children with Mild to Moderate Autism						
Sensory Experiences	Az	Wn	Aa	Im	Hl	Ah	Mm	Zb	Ma	An	As	Il	Rn
Gestalt Perception	20%	20%	40%	40%	60%	-------	40%	80%	20%	20%	-------	40%	20%
Intensity with which senses work	Hypr 40% Hypo -----	Hypr 20% Hypo -------	Hypr 40% Hypo 16.67%	Hypr 20% Hypo 16.67%	Hypr 20% Hypo 33.33%	Hypr 20% Hypo 83.33%	Hypr 40% Hypo 33.33%	Hypr 20% Hypo 66.67%	Hypr 20% Hypo 66.67%	Hypr 20% Hypo 33.33%	Hypr 20% Hypo 33.33%	Hypr 40% Hypo 16.67%	Hypr ----- Hypo 33.33%
Sensitivity to (disturbance by) some stimuli	33.33%	-------	33.33%	-------	33.33%	33.33%	-------	-------	-------	33.33%	-------	-------	33.33%
Fascination with certain stimuli	100%	-------	100%	-------	100%	100%	100%	100%	-------	100%	100%	-------	-------
Inconsistency of perception	-------	100%	100%	100%	-------	100%	100%	100%	100%	100%	-------	-------	-------
Fragmented perception (partial perception)	20%	40%	40%	20%	20%	20%	40%	80%	-------	-------	20%	20%	-------
Distorted Perception	60%	20%	40%	40%	80%	40%	40%	60%	40%	40%	80%	-------	60%
Sensory agnosia (difficulty interpreting a sense)	50%	50%	50%	50%	100%	100%	100%	100%	50%	50%	50%	50%	-------
Delayed perception	-------	50%	-------	50%	100%	50%	-------	-------	50%	-------	50%	-------	-------
Vulnerability to sensory overload	100%	100%	-------	-------	100%	100%	-------	100%	100%	-------	100%	-------	-------
Mono-processing (number of channels working at a time)	-------	100%	-------	-------	100%	100%	-------	-------	-------	-------	100%	-------	-------
Peripheral perception (avoidance of direct perception)	100%	100%	100%	-------	100%	100%	100%	-------	-------	-------	100%	-------	100%
Systems shutdowns	50%	50%	50%	50%	50%	50%	50%	100%	100%	50%	100%	100%	-------
Compensating for unreliable sense by other senses	100%	100%	100%	100%	100%	-------	100%	100%	100%	100%	100%	100%	100%
'Losing oneself' in stimuli. Resonance	-------	100%	100%	-------	-------	-------	-------	100%	-------	-------	-------	-------	-------
Daydreaming	-------	-------	100%	-------	-------	-------	-------	100%	-------	100%	-------	-------	-------
Synaesthesia	50%	50%	50%	-------	50%	50%	-------	50%	50%	50%		-------	-------
Perceptual memory	100%	100%	100%	-------	100%	100%	-------	100%	100%	100%	-------	100%	100%
Associative (serial) memory	-------	-------	-------	-------	-------	-------	-------	100%	-------	-------	-------	100%	-------
Perceptual thinking	28.57%	42.86%	42.86%	57.14%	14.29%	57.14%	42.86%	14.29%	42.86%	42.85%	-------	57.14%	28.57%

Table 12: *Overview of Auditory Embodiment of all 13 children*

	Children with Severe Autism						Children with Mild to Moderate Autism						
Sensory Experiences	Az	Wn	Aa	Im	Hl	Ah	Mm	Zb	Ma	An	As	Il	Rn
Gestalt Perception	------	100%	100%	100%	50%	100%	40%	100%	50%	20%	-------	-------	50%
Intensity with which senses work	Hyper 14.28 % Hypo: 42.86 %	Hyper 42.86 % Hypo: 28.57 %	Hyper 28.57 % Hypo: 14.29 %	Hyper 85.71 % Hypo: 14.29 %	Hyper 85.71 % Hypo: 14.29 %	Hyper 57.14 % Hypo: 28.57 %	Hyper 42.86 % Hypo: 28.57 %	Hyper 28.57 % Hypo: 57.14 %	Hyper 42.86 % Hypo: 57.14 %	Hyper 71.43 % Hypo: 14.29 %	Hyper 71.43 % Hypo: 48.86 %	Hyper 28.57 % Hypo: 42.86 %	Hyper 28.57 % Hypo: 71.43 %
Sensitivity to (disturbance by) some stimuli	-------	50%	50%	50%	50%	50%	50%	50%	100%	100%	50%	-------	50%
Fascination with certain stimuli	100%	100%	100%	100%	100%	100%	100%	100%	-------	100%	100%	100%	100%
Inconsistency of perception	100%	100%	100%	100%	-------	100%	100%	100%	100%	100%	100%	100%	-------
Fragmented perception (partial perception)	-------	-------	-------	100%	100%	100%	-------	100%	100%	-------	100%	-------	-------
Distorted Perception	-------	66.67 %	-------	33.33 %	-------	33.33 %	33.33 %	66.67 %	33.33 %	66.67 %	66.67 %	-------	33.33 %
Sensory agnosia (difficulty interpreting a sense)	50%	100%	100%	50%	100%	100%	100%	50%	50%	50%	50%	-------	-------
Delayed perception	33.33 %	66.67 %	33.33 %	66.67 %	100%	33.33 %	-------	-------	100%	66.67 %	66.67 %	-------	33.33 %
Vulnerability to sensory overload	100%	100%	100%	100%	100%	100%	-------	100%	-------	-------	100%	-------	-------
Mono-processing (number of channels working at a time)	-------	-------	100%	-------	-------	100%	-------	100%	-------	-------	100%	-------	-------
Peripheral perception (avoidance of direct perception)	100%	-------	100%	-------	-------	-------	100%	100%	100%	-------	-------	-------	-------
Systems shutdowns	50%	50%	50%	50%	50%	50%	50%	100%	100%	50%	100%	-------	-------
Compensating for unreliable sense by other senses	100%	100%	100%	-------	-------	-------	100%	100%	100%	100%	100%	100%	100%
'Losing oneself' in stimuli. Resonance	-------	50%	100%	-------	50%	-------	-------	-------	50%	-------	100%	50%	50%
Daydreaming	-------	-------	100%	-------	-------	-------	-------	-------	-------	100%	-------	-------	-------
Synaesthesia	-------	-------	-------	-------	100%	50%	-------	50%	-------	50%		-------	-------
Perceptual memory	100%	100%	100%	100%	100%	100%	-------	100%	100%	100%	-------	100%	100%
Associative (serial) memory	50%	50%	50%	75%	100%	75%	-------	25%	75%	-------	75%	50%	50%
Perceptual thinking	-------	100%	100%	-------	-------	-------	42.86 %	-------	100%	42.85 %	-------	-------	100%

Table 13: *Overview of Proprioceptive Embodiment of all 13 children*

	Children with Severe Autism						Children with Mild to Moderate Autism						
Sensory Experiences	Az	Wn	Aa	Im	Hl	Ah	Mm	Zb	Ma	An	As	Il	Rn
Gestalt Perception	100%	-------	100%	100%	100%	100%	-------	100%	-------	-------	100%	-------	-------
Intensity with which senses work	Hypr 33.33 % Hypo 37.5 %	Hypr ------- Hypo 37.5 %	Hypr 33.33 % Hypo 25%	Hypr 33.33 % Hypo 12.5 %	Hypr 66.67 % Hypo 12.5 %	Hypr 66.67 % Hypo 37.5 %	Hypr 66.67 % Hypo -------	Hypr 33.33 % Hypo 50%	Hypr 33.33 % Hypo 25%	Hypr ------- Hypo -------	Hypr 33.33 % Hypo 50%	Hypr ------- Hypo 12.5 %	Hypr ------- Hypo -------
Sensitivity to (disturbance by) some stimuli	-------	-------	100%	-------	100%	100%	-------	-------	-------	-------	100%	-------	-------
Fascination with certain stimuli	100%	100%	-------	100%	-------	100%	-------	100%	100%	-------	-------	-------	-------
Inconsistency of perception	50%	50%	50%	100%	-------	50%	-------	50%	-------	-------	100%	-------	-------
Fragmented perception (partial perception)	-------	-------	-------	-------	-------	-------	-------	100%	-------	100%	-------	-------	-------
Distorted Perception	50%	50%	50%	50%	100%	-------	50%	100%	-------	100%	50%	-------	50%
Sensory agnosia (difficulty interpreting a sense)	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	100%	-------	-------
Delayed perception	100%	-------	-------	-------	100%	-------	100%	100%	-------	-------	-------	100%	-------
Vulnerability to sensory overload	100%	-------	100%	100%	-------	-------	-------	100%	-------	100%	100%	-------	-------
Mono-processing (number of channels working at a time)	-------	100%	100%	-------	-------	-------	-------	100%	-------	-------	-------	-------	-------
Peripheral perception (avoidance of direct perception)	100%	-------	-------	-------	100%	-------	-------	100%	-------	-------	-------	-------	-------
Systems shutdowns	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Compensating for unreliable sense by other senses	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
'Losing oneself' in stimuli. Resonance	-------	-------	100%	-------	-------	100%	-------	-------	-------	-------	-------	-------	-------
Daydreaming	-------	-------	-------	-------	-------	100%	-------	-------	-------	-------	-------	-------	-------
Synaesthesia	-------	-------	100%	-------	100%	100%	-------	100%	100%	100%		-------	-------
Perceptual memory	-------	100%	-------	100%	100%	100%	100%	100%	-------	-------	-------	100%	100%
Associative (serial) memory	-------	-------	-------	-------	100%	100%	-------	100%	100%	100%	-------	-------	-------
Perceptual thinking	100%	100%	100%	-------	100%	100%	100%	-------	100%	-------	100%	100%	-------

4.3.1 Heterogeneous Visual Embodiment as Identified Through Language and Behaviour Data

According to behaviour data, Az, Wn, An, Ma, and Rn seemed to have 20% visual gestalt; however, the in-depth comparison showed that all had different experiences that led to visual gestalt – Az (severe autism), Ma, An and Rn (mild-moderate autism) noticed tiny changes in the environment; Wn (severe autism) did not recognize familiar environment if approached from different direction. On the other hand, the language data of Az, Wn, An and Rn did not show any signs of visual gestalt; however, Ma displayed two instances of visual gestalt in the discourses – pertaining to first action in sequence, he was unable to filter irrelevant visual information from the environment, so could not foreground the relevant linguistic information; regarding core objects and actions of birthday party, his inability to separate the optional eatables, that were usually served besides cake, from the core entities hinted towards his gestalt perception. The behaviour data of Aa (severe autism), Mm, Im, Il (mild-moderate autism) showed hints of 40% visual gestalt and what led to their visual gestalt was their similar experiences, except for one case – Aa, Il, Mm resisted any change while at other times would notice tiny change in the environment; Im resisted any change in the environment and could not be fooled by optical illusions. On the contrary, the language data of Im and Il did not show any signs of visual gestalt as compared to Aa and Mm. The discourses of Aa had two instances of visual gestalt – regarding first action in sequence, the holistic processing of 'work time' was too overwhelming to let her separate stationery items that she used from the actual core slotfillers; regarding core actions and objects of birthday party, her fascination with stuffed toys she was playing with earlier did not let her shift attention to process what adult speaker was saying. The school routine discourse of Mm had one instance of visual gestalt regarding schema of object (school) identity – the story book that she was holding did not let her process the auditory information of the adult speaker. She was resisting the change of attention from book to the speaker. In few cases, fascination of some stimuli resulted in gestalt perception since children could not sort out which information to attend to.

The behaviour data regarding fluctuation between hyper and hypo vision Wn, Aa, Im, Ah (severe autism) and Mm, Zb, Ma, An (mild-moderate autism) reported signs of 100% inconsistent visual perception – they had a tendency to respond to same visual stimuli differently (indifference/pleasure/distress). Az, Hl (severe autism) and As, Il, Rn (mild-moderate autism) did not report any signs of inconsistent visual perception.

When behaviour data in terms of hypervision was compared, An, Zb, Ma, Im, Wn, As, Ah showed similarities and differences despite same percentage – 20%. Wn, Ah (severe autism) and An (mild-moderate autism) covered or squinted eyes at bright light while looking intensely at objects and people; Im (severe autism) and Zb (mild-moderate autism) got scared by sharp flashes of light and lightening, etc.; Ma (mild-moderate autism) constantly looked at minute particles and picked up smallest pieces of fluff; and As (mild-moderate autism) disliked dark and bright light. The behaviour data of Az, Mm, Aa, Hl and Il reported 40% hypervision but the experiences that led to this were somewhat different – Mm (mild-moderate autism) disliked dark and bright light and constantly looked at minute particles; Az (severe autism) and Il (mild-moderate autism) constantly looked at minute particles, picked up smallest pieces of fluff and covered, closed or squinted eyes at bright light; Aa (severe autism) disliked dark and bright light and covered, closed or squinted eyes at bright light; and Hl (severe autism) got scared by sharp flashes of light and closed, covered or squinted eyes at bright light. In the same vein, Az, Aa, Hl, Ah (severe autism) and Rn, An (mild-moderate autism) reported to have 33.33% tendency to get disturbed by some visual stimuli. All of them either covered or closed or squinted their eyes in response to sensitive stimuli. Rn, however, got easily tired/frustrated under fluorescent lights. Wn, and Im (severe autism) and Mm, Zb, Ma, As and Il (mild-moderate autism) were not reported to have any problem with any visual stimuli. However, the language data of the same children did not disclose any signs of hypervision or disturbance with visual stimuli for that matter.

The behaviour data of An, Mm, Hl, Rn, As displayed 33.33% hypovision but the experiences that led to this hyposensitivity were way too different – Mm (mild-moderate autism) was attracted to lights and looked intensely at objects and people; As (mild-moderate autism) got fascinated with reflections, bright coloured objects and ran hands around the edge of the object; An (mild-moderate autism) looked intensely at objects and people and liked to have perimeter hugging; Rn (mild-moderate autism) got attracted to light and fascinated with reflections, bright coloured objects; and Hl (severe autism) got attracted to lights and liked to have perimeter hugging. The language data of only An showed his inability to figure out the presence of objects – he had not visually processed the candles and other core objects of the event, although the event had taken place a day before the discourse was recorded.

When it comes to fragmented perception, children again showed different experiences with same percentages in behaviour data. Az, Im, Hl, Ah (severe autism) and As, Il (mild-moderate autism) displayed 20% experience of fragmented visual perception – Az, Ah, As had a tendency to get lost easily in response to some visual stimuli; Im, Hl, Il resisted any visual change in the environment. Wn, Aa (severe autism) and Mm (mild-moderate autism) displayed 40% visual fragmentation – Wn did not recognize familiar environment if approached from different direction and got lost easily; Aa, Mm resisted any visual change and tended to get lost easily in any visual stimuli. Zb (mild-moderate autism) with 80% visual fragmentation experienced almost all of the eccentricities – she resisted any visual change in the environment, did not recognize people in unfamiliar clothes, selected for attention minor aspects of objects in the environment instead of the whole thing and got lost easily in some visual stimuli. The language data of only Aa, Mm and Zb showed instances of visual fragmentation. In Aa, the overselectivity of all stationery items for first action in sequence of school routine did not let her process ‘work time’ as one meaningful unit. Therefore, she showed a tendency to get lost in visual stimuli – stationery items – and hence processed the work time in bits and pieces. That binding problem was also seen in the discourse of birthday party – instead of talking about other core items and/or optional slotfillers for other food items that are usually served along with cake, she started listing different items of chocolate flavor. The communicative situation regarding object identity showed signs of resistance to change and tendency to get lost in visual stimuli in Mm – she was lost in the story book and was not willing to change the topic from that book to the question of adult speaker. Zb selected one minor object from the situation of birthday party and that was her head teacher. Her discourse regarding birthday event also disclosed her tendency to get lost in one visual stimulus that she had selected in the birthday party. Therefore, she was unable to retrieve anything else, but only the presence of her teacher with reference to birthday event.

The distorted visual perception of the children also highlighted varied experiences through behaviour data. Wn (severe autism) with 20% of this visual experience was reported to have difficulty catching the ball; Aa, Im, Ah (severe autism) and Mm, Ma, An (mild-moderate autism) showed signs of 40% distorted visual perception – Aa had difficulty catching the ball and feared heights, stairs and escalators; Im, An faced difficulty catching the ball and made compulsive repetitive hand, head or body movements; Ah, Ma hit/rubbed eyes when distressed and made compulsive repetitive hand, head or body movements that fluctuated between near and far; Mm faced difficulty catching ball and hit/rubed eyes when distressed. Az (severe autism), and Zb, Rn (mild-moderate autism) were all reported to have 60% distorted visual perception but their experiences were different – Az, Zb found it difficult to catch the ball, hit/rubbed eyes when distressed and made compulsive hand, body movements that were repetitive and fluctuated between near and far; Rn had difficulty catching the ball, appeared startled when being approached suddenly and feared heights, stairs, escalators. Hl (severe autism) and As (mild-moderate autism) reported to have 80% distortion in visual perception – Hl had difficulty catching the ball, appeared startled when being approached suddenly, hit/rubbed eyes when distressed and made compulsive repetitive movements of hand, head and body; As feared heights, stairs, escalators, had difficulty catching the ball, appeared startled when behind approached suddenly and made compulsive, repetitive hand, body and head movements that fluctuated between near and far; Il (mild-moderate autism) did not report to experience any eccentricities in terms of visual distortion. The language data of Az, Mm, An, Rn exhibited signs of visual distortion. For example, Az and Rn named their old teacher aids as their current teachers for the schema of person identity in the event of school routine. Mm, on the other hand, did not utter the name of her teacher – she uttered 'speech teacher' instead. An could not talk about the core actions and objects of birthday event – he was referring to either his friends or eating of the cake.

The behaviour data of Az, Aa (severe autism) Mm, Zb, An, Il, Rn (mild-moderate autism) did not report any experience of delay in perceiving things visually. However, Hl (severe autism) was reported to experience 100% delay in visual perception – he responded to visual stimuli late and any experience could be perceived as new and unfamiliar by him, irrespective of the number of times he had experienced them visually. Wn, Im, Ah (severe autism) and Ma, As (mild-moderate autism) experienced delayed visual perception to only 50%; the experiences however were different – Wn, Ah responded to visual stimuli with a delay; Im, Ma and As perceived any experience as new and unfamiliar no matter how many times they had experienced them. On the contrary, the language data of both discourses did not reveal any tendency to process visual information with delay.

The behaviour data of Az, Wn, Hl, Ah (severe autism) and Zb, Ma, As (mild-moderate autism) reported their tendency to experience 100% visual overload – all of them either withdrew themselves from visual stimuli or threw tantrums or hurt themselves. Aa, Im (severe autism) and Mm, An, Il, Rn (mild-moderate autism) did not report to experience visual overload. The discourse of only one child reported to have visual overload. As had attended a birthday party few days ago at center; however, he could not tell anything about core objects or actions of the event. He might not have attended the visual stimuli due to his visual overload as he was avoiding eye contact almost throughout the discourse.

The behaviour data of all children reported the tendency for visual shutdowns except for Rn (mild-moderate autism). Az, Wn, Aa, Im, Hl, and Ah (severe autism), and Mm and An (mild-moderate autism) were reported to have a 50% tendency towards visual whiteouts – Wn and Im appeared to be mindless followers while Az, Aa, Hl, and Ah surprised with knowing unknown information. However, Zb, Ma, As and Il (mild-moderate autism) reported to experience 100% visual whiteouts – they appeared to be mindless followers and surprised with knowing unknown information. The language data could not inform about presence of visual shutdowns in any child.

Likewise, the behaviour data of all children seemed to experience visual agnosia except Rn (mild-moderate autism). Az, Wn, Aa, Im (severe autism) and Ma, An, As and Il (mild-moderate autism) were found to have 50% tendency to experience visual agnosia – Az felt or acted blind while Wn, Aa, Im Ma, An, As and Il displayed their specific ritualistic behaviours. Hl, Ah (severe autism) and Mm, Zb (mild-moderate autism) reported to have 100% tendency to experience visual agnosia – all of them not only felt or acted blind at times but also displayed their peculiar ritualistic behaviours. The linguistic data of only Wn reported one instance of visual agnosia – in both discourses, she was not attending the adult speaker visually. She was avoiding eye contact and in response to the voice of adult speaker was engaged in her ritualistic behaviour of looking away or on the floor.

4.3.2 Heterogeneous Auditory Embodiment as Identified Through Language and Behaviour Data

The behaviour data of Az (severe autism), As and Il (mild-moderate autism) did not show any signs of auditory gestalt. On the contrary, the discourse analysis of As showed signs of auditory gestalt during the discourse of bithrday party event. His echolalic utterances were an effort to screen out the environmental sounds (of fan or other sounds that other children were making outside) to attend to the voice of adult. The behaviour data of other children showed different experiences. Wn, Aa, Im, Ah (severe autism) and Zb (mild-moderate autism) showed 100% signs of auditory gestalt – they got easily frustrated when they tried to do something in a crowded, noisy room and did not seem to understand instructions if more than one person was talking. Hl (severe autism), Ma and Rn (mild-moderate autism) displayed 50% auditory gestalt – Hl got easily frustrated when he tried to do something in a noisy, crowded room; Ma and Rn did not seem to understand instructions if more than one person was talking to them. The language data of Zb and Rn did not show any signs of auditory gestalt. However, both discourses of Aa, and Im while one discourse of Wn, Hl and Ma reported signs of gestalt hearing.

There was extreme variation for the intensity with which the hearing of all 13 verbal children with autism was reported to work. The combined fluctuation, except for Hl (severe autism) and Rn (mild-moderate autism), was reported for all other children; they showed signs of 100% inconsistency for auditory perception – they might have responded differently (distress/pleasure/indifference) to same auditory stimuli (noises/sounds). Az (severe autism) could not stand certain sounds and started making repetitive noises to block out other sounds; however, he liked traffics, crowds and vibration and got attracted by certain sounds and noises. During the discourse of birthday party, Az was withdrawing himself from the voice of adult speaker by either being non-attentive or by making weird sounds. Then to block the voice, he started asking an irrelevant question. Wn (severe autism) disliked sea, thunderstorms, crowds, sounds, noises and haircut while at the same time liked certain other sounds of her choice and liked tearing papers and crumpled them in hands. Aa avoided noises and sounds and covered her ears at many sounds but liked making loud rhythmic noises on her own. Im (severe autism) liked vibration, but on the other hand, avoided sounds and noises of thunderstorm, sea, crowds, etc., and either covered his ears or started making repetitive noises to block unwanted sounds; he was a very light sleeper and got frightened by animals. Ah (severe autism) liked kitchen, bathroom and vibration, but avoided certain sounds and either covered his ears and/or started making repetitive noises to block out other sounds; he was also reported to get frightened by animals. Mm (mild-moderate autism) disliked haircut, crowds, sea and thunderstorm; however, she liked kitchen and bathroom and got attracted by certain sounds and noises. Zb (mild-moderate autism) disliked sea, crowds, thunderstorm and haircut, but got attracted by sounds/noises, liked vibration, liked to make loud rhythmic noises and to tear and crumple papers. Ma (mild-moderate autism) was a very light sleeper, got frightened by animals and made repetitive noises to block out other sounds; on the other hand, he got attracted by some sounds/noises, made loud rhythmic noises, banged objects/doors and liked kitchen and bathroom. The language data of Wn, Aa, Ah, Mm, Zb, Ma did not disclose any signs of hyper-audition. Hl (severe autism) made loud rhythmic noises on his own but avoided other disturbing sounds or any noise and either covered his ears or started making repetitive noises to block out other sounds like Im; he too was a light sleeper, got frightened by animals and disliked haircut. The language data of Hl showed signs of hyper-hearing when he was being asked about schema of place of action – he started making some repetitive noise as if to block the voice of the adult speaker. An (mild-moderate autism) liked to bang objects and doors, but at the same time he was a light sleeper, and avoided sounds and noises like crowds, sea, thunderstorm and covered his ears at any other sounds. The discourse of An showed signs of hyper hearing when he was being asked about core actions and objects of birthday party in sequence – first he blocked the voice of adult speaker by making sounds and then he engaged himself with some irrelevant stimuli in the environment. As (mild-moderate autism) was a light sleeper, avoided noises/sound, disliked crowds, sea and thunderstorm; he tended to cover his ears at many sounds and sometimes made repetitive noises to block out other sounds. At other times, he liked vibration, got attracted by some sounds/noises and made loud rhythmic noises too. Il (mild-moderate autism) disliked thunderstorm, crowds, sea and made repetitive noises to block out other sounds; on the contrary, he also tended to like kitchen, bathroom, traffic and crowds and got attracted by sounds and noises. Rn (mild-moderate autism) was reported to dislike haircut and to make repetitive noises to block out other sounds; however, he was also reported to like vibration, crowds and traffic; to bang doors, objects; to get attracted by sounds/noises; and to make loud rhythmic noises. The linguistic data of Il and Rn did not show any signs of fluctuation of hypo or hyper hearing.

The behaviour data of Az, Wn, Aa, Im, Hl, Ah (severe autism) and Zb, As (mild-moderate autism) showed 100% tendency to experience auditory overload – they experienced sudden outburst of self-abuse or threw tantrums or withdrew themselves in response to auditory stimuli. Mm, Ma, An, Il and Rn (mild-moderate autism) were not reported to have experienced auditory overload. Az, Im (severe autism) and Zb, Ma, An, As (mild-moderate autism) were reported to experience 50% sensory agnosia – Az felt/acted deaf; Im, Zb, Ma, An, As got engaged in their particular ritualistic behaviours. Rn and Il did not report to experience auditory agnosia. Zb, Ma, As (mild-moderate autism) displayed 100% signs of auditory shutdowns – they all appeared to be mindless followers and surprised others with knowing unknown information. On the other hand, Az, Wn, Aa, Im, Hl, Ah (severe autism) and Mm, An (mild-moderate autism) displayed 50% signs of auditory shutdowns – Az, Aa, Hl, Ah, Mm, An surprised with knowing unknown information; Wn, Im appeared to be mindless followers. Rn and Il did not report to experience auditory shutdowns.

The language data of Ma, Il and Rn did not show signs of auditory overload, auditory agnosia or auditory shutdown. Due to auditory overload and the resultant agnosia, Az could not talk about birthday event. He was only evading the auditory stimuli which was adult voice. Wn stopped responding near the end of school routine discourse due to her agnosia and overload; moreover, she was also unable to tell anything pertinent to birthday party. In Aa, the auditory overload did not turn into auditory agnosia – it appeared to be a temporary shutdown after which she started responding regarding second sequence of school routine. Similarly, Im also appeared to experience this temporary shutdown during discourse of first action in sequence; on the contrary, during the discourse of birthday party, he could not respond with relevant linguistic choices and was trying to withdraw himself from voice of adult speaker due to the auditory overload he was experiencing throughout. Due to overload, Hl first tried to withdraw himself from the questions of the adult speaker by being non-responsive. When the overload became unbearable, he became engaged in his ritualistic non-verbal behaviour of leaning and swinging. At the end of school routine discourse, he stood up and uttered ‘speech time finish'; similarly, in birthday party discourse, he did not respond with correct linguistic items and was busy in either withdrawing himself from the adult speaker or was being non-responsive. Due to extreme auditory agnosia and overload, Ah could not talk about anything. Mm displayed signs of auditory overload regarding schema of object identity and second action in sequence. The overload then shifted to agnosia and she stopped responding during the communicative situations of third and fourth actions in sequence of school routine. Zb displayed signs of both overload and resultant agnosia near the end of school routine discourse, while An showed signs of auditory overload during the discourse of birthday party. Due to extreme auditory overload, As could not respond with relevant linguistic items during birthday party discourse; on the contrary, the discourse of school routine displayed this tendency in As near the end of discourse – where he was unable to talk about his last action in sequence.

The behaviour data of Az, Aa, Hl (severe autism) and Il (mild-moderate autism) did not report about them to experience any distortion while hearing. Wn (severe autism), Zb, An and As (mild-moderate autism) were reported to have 66.67% of auditory distorted perception – all of them had pronunciation problems and could not distinguish between some sounds, except for An who hit his ears when he felt distressed and had pronunciation problems. Im, Ah (severe autism), and Mm, Ma, Rn (mild-moderate autism) reported 33.33% tendency to experience auditory distorted perception – Im, Ah hit ears when distressed; Mm, Ma, Rn had pronunciation problems. The language data of only Mm and Ma showed signs of distorted hearing. During the discourse of school routine, Mm could not talk about schema of person identity with correct linguistic unit, while Ma distorted the auditory stimuli but repaired his response with correct linguistic item while talking about first action in sequence.

The behaviour data of Az, Wn, Aa (severe autism) and Mm, An, Il, Rn (mild-moderate autism) did not show any signs of fragmented hearing. On the contrary, language data of Az, Wn showed their tendency towards fragmented hearing. Wn could process only word 'go' and confused it with going to her hometown, while Az processed only one linguistic item 'teacher' instead of the whole sentence and confused music teacher with his work time. The behaviour data reported to experience auditory fragmented perception in Im, Hl, Ah (severe autism) and Zb, Ma, As (mild-moderate autism) – they had a tendency to hear few words instead of the whole sentence. The language of only Im, Zb, Ma, As suggested this fragmentation in the discourse of school routine only.

The behaviour data of Mm, Zb, Il (mild-moderate autism) did not report any signs of delayed audition. However, the language data of all these three suggested this possibility during their discourses of school routine only. The behaviour data of Az, Aa, Ah (severe autism) and Rn (mild-moderate autism) showed 33.33% tendency to have delayed hearing – all of them responded to questions, instructions and sounds with a delay. Wn, Im (severe autism) and An, As (mild-moderate autism) with apparent 66.67% delayed audition had different experiences – Wn, An experienced echolalia in high-pitched, monotonous, parrot-like voice and responded to instructions, questions and sounds with a delay; Im, As produced echolalia in monotonous, high-pitched, parrot-like voice and any experience could become new and unfamiliar to them, irrespective of the number of times they had experienced the same thing. The language data of Az, Aa, Im, Wn, Rn and As suggested the possibility of this experience.

4.3.3 Heterogeneous Proprioceptive Embodiment as Identified Through Language and Behaviour Data

The behaviour data of Wn (severe autism) Mm, Ma, An, Il, Rn (mild-moderate autism) did not report any signs of proprioceptive gestalt. The discourse data of school routine of Wn and An suggested their tendency to experience proprioceptive gestalt. The linguistic choices of Wn informed about her inability to background ‘circle time’ and foreground ‘OT time’ that was being asked for. The linguistic choices of An regarding last action in sequence informed about his inability to separate relevant information from irrelevant information. The behaviour data of Az, Aa, Im, Hl, Ah (severe autism) and Zb, As (mild-moderate autism) reported about their 100% proprioceptive gestalt: they all were clumsy and moved stiffly. The discourses of school routine in Az, Im, Zb and As, and of both discourses in Aa indicated their probable tendency to experience proprioceptive gestalt. At few places, they could not separate relevant information from the irrelevant one; hence, they were responding with irrelevant linguistic choices.

The behaviour data of Az, Aa, Im (severe autism), and Zb, Ma, As (mild-moderate autism) reported to experience 33.33% hyper-proprioception. Az, Im, Ma turned the whole body to look at something; Aa, Zb, As observed odd body posturing. Hl, Ah (severe autism) and Mm (mild-moderate autism) reported to have hypo-proprioception of about 66.67% – Hl, Ah observed odd body posturing and had difficulty manipulating small objects; Mm observed odd body posturing and turned the whole body to look at something. Conversely, the behaviour data of Wn (severe autism), An, Il and Rn (mild-moderate autism) did not report to have hypo proprioception.

The findings of behaviour data pertaining to hypo-proprioception reported that almost all of them showed varied signs. The proprioception of Az, Wn, Ah (mild-moderate autism) was hypo to 37.5% – Az had low muscle tone, often leaned against people, furniture, wall and rocked back and forth; Wn did not sense her body sensations, bumped into objects and people, and often leaned against people/furniture/walls; Ah was unaware of his body position in space, bumped into objects, people and appeared floppy. Im, Hl (severe autism), Il (mild-moderate autism) reported to experience 12.5% hypo-proprioception – Im bumped into objects, people; Hl often leaned against people, furniture, walls; Il experienced lack of awareness of his body position in space. Aa, Ma showed 25% hypo-proprioception – both bumped into people, objects and often leaned against people/furniture/walls. Zb, As (mild-moderate autism) reported to have 50% hypo-proprioception – Zb was unaware of her body position and sensations, often leaned against people/furniture/walls and rocked back and forth; As had low muscle tone, lack of awareness of his body position in space, bumped into objects/people and rocked back and forth. Only three children – Mm, An and Rn (mild-moderate autism) – did not report to experience any hyposensitive proprioception. On the contrary, the language data of Wn, An, Il, Rn Im, Ma and As manifested this tendency. Due to the unawareness regarding their own body positioning in space, Im could not talk about second and third action in the sequence of school routine; Ma and Ah could not talk about birthday party; Wn could not talk about where she spent school time for around four hours, five days a week; An could not talk about second, third, fourth and fifth sequence of birthday party; Il could not talk about school routine and birthday party; and Rn could hardly talk about both events.

The behaviour data of Az, Aa, Im (severe autism) and Zb, An, As (mild-moderate autism) reported 100% tendency to experience proprioceptive overload – they got tired easily especially when standing or when in noisy, bright places. The rest of them did not show any such signs of overload. The language data of only As and Hl displayed this tendency. None of them showed any signs of proprioceptive shutdowns – neither in language data nor in behaviour data. Moreover, the language and behaviour data of only As (mild-moderate autism) showed 100% tendency to experience proprioceptive agnosia – he did not seem to know what his body was doing. Therefore, he could not talk about both real-life events even after prompts.

The behaviour data of only Zb and An (mild-moderate autism) showed signs of 100% fragmented proprioception – both of them complained about their limbs and body parts. The rest of them did not report to experience any such fragmentation. Conversely, the language data of Wn, Aa, Im, Hl, Zb, Ma, An suggested this tendency. Wn showed binding problem during the third action in sequence of school routine discourse; Aa displayed the processing tendency to be in bits, so could not talk about work time as one meaningful activity; Im also showed tendency to overselect and to experience binding problem during the communicative situation regarding first action in sequence of school routine; the linguistic choices of Zb suggested her overselectivity and binding problem during the discourse of first and third action in sequence of school routine; and Ma and An displayed the prevalence of this tendency throughout their discourses of school routine.

The behaviour data of Az, Wn, Aa, Im (severe autism) and Mm, As, Rn (mild-moderate autism) reported to have 50% distorted proprioception – they all had difficulty catching the ball. Hl (severe autism) and Zb, An (mild-moderate autism) reported 100% distorted proprioception – thay had difficulty catching the ball and with jumping, hopping, riding tri/bicycle. Ah (severe autism) Ma and Il (mild-moderate autism) displayed no signs of distorted proprioception. However, the language data of school routine discourses of only As, An, Mm, Im, Wn and Az manifested this tendency to have trouble in understanding the relation between their own bodies, objects and actions in space.

4.2 Interim Discussion: Relation Between Embodiment, Language and Conceptualization

We interact with the world through our bodies. We process information from the outside world through our eyes, ears, nose, tongue, touch and taste. Hence, "[o]ur construal of reality is likely to be mediated in large measure by the nature of our bodies" (Evans & Green, 2006, p. 45). The same is true for people with autism. Experience of verbal children with autism as 'autistic experience' define their embodiment in different aspects. They are 'children with autism' and this is their identity. This identity entails a list of traits that define their unique experiences – different experience of social initiation and response, different experience of non-verbal communication, different experience of social awareness and social relationships, different experience in terms of behaviour, interests and activities, different interaction with objects, different sensory experiences.

The way our bodies interact with the world, utilizing all senses that we possess – audition, sight, smell, taste, touch, proprioception, and vestibular shape our way of looking at things. The varied embodiment and diverse experiential realisms (Evans & Green, 2006) can guide us about the nature of initial, essential experiences our body encounters through our senses. The sensory experiences, that form the basis of any concept, can give a clue to and understanding of the information input via senses and can help grasping about their perceptual and cognitive styles. The Section 4.1 discussed the nature of possible sensory perceptual experiences the language use of verbal children with autism disclosed, and that seem to determine their processing – understanding, perception and conceptualization – of both the events: 'School Routine' & 'Birthday Party'. The findings respond to the first and second research questions: What do the discourses of verbal children with autism inform about the nature of knowledge structures and the sensory perceptual processing in general and with specific reference to their perception and understanding of the real-life events?

No two people think alike, nor do they verbalize the concepts related to anything using same linguistic expressions. Moreover, their perspectives of conceptualizing events, objects, space, etc. correlate with the realms of their own experiences. The verbalization of those concepts/thoughts helps identify mental representations and cognitive processes, which in turn provide clue to the nature of experiences (embodiment). Given that all 13 children had varied embodiment, they processed, perceived and stored information related to both events differently, and all of them displayed different reasons of absence of concepts/schemas. Appendix E gives child-wise tabulated information in this regard. As for the conception of both events, the findings highlighted that since the event of "School Routine" was experienced five days a week by all children, most of the schemas were found present. See Tables 14 and

15. On the contrary, the schemas related to the event of "Birthday Party" were found absent in almost all 13 verbal children with autism, with the exception of only few. See Tables 16 and 17.

The section 4.2 answers the third research question: "What do the sensory perceptual profiles of verbal children with autism suggest about the embodied experiences of verbal children with autism?" In line with the quest, the analysis suggests the individual embodiment of verbal children with autism as 'heterogeneous embodied experience' in the light of their peculiar yet varied sensory perceptual profiles. Their sensory behaviours were observed and then noted down through the Sensory Perceptual Checklist Revised (SPCR) (Bogdashina, 2003). The behaviour analysis was guided by Bogdashina (2003, pp. 162-165).

With respect to all the suggested categories, all 13 children displayed heterogeneous sensory profiles. Methodological triangulation is a 'vehicle for cross validation when two or more distinct methods are found to be congruent and yield comparable data' (Jick, 1979, p. 602). The triangulation of person and methodological data testified the relation between embodiment, language and conceptualization of children with autism. When the findings of language data of all 13 verbal children with autism were compared with the behaviour data, the findings endorsed the presence of some sensory-perceptual experiences while at the same time, suggested the presence of some other processing experiences that were not identified in the findings of behaviour data. The findings of third question regarding sensory perceptual processing, that they displayed during verbal interactions of not more than 10 minutes, are highlighted in findings of second question to see the correspondence between both data sets – verbal and behavioural. The Tables 18, 19 and 20 highlight the relation between embodiment, language and conceptualization in autism.

Table 14: *Conception & Processing of School Routine (Children with Severe Autism)*

Conception & Processing of School Routine			Place (of actions)	Object identity	Person identity	Sequence: 1st action	Sequence: 2nd action	Sequence: 3rd action	Sequence: 4th action	Sequence: 5th action
Children with Severe Autism	***Az***	***Schema***	✓	x	x	✓	x	✓	x	**N.A**
		Processing	delayed auditory & proprioceptive; serial proprioceptive & auditory memory; proprioceptive gestalt	**?**	distorted vision & proprioception	associative (serial) visual memory	delayed proprioception and proprioceptive gestalt; fascination of auditory & visual stimuli; proprioceptive fascination.	associative proprioceptive memory	distorted proprioception; fragmented hearing	
	Wn	***Schema***	x	**N.A**	✓	✓	✓	x	✓	x
		Processing	hypo-proprioception; auditory gestalt;		delayed audition	delayed audition	distorted proprioception; fragmented hearing; delayed audition	hypo-proprioception; proprioceptive gestalt; fragmented proprioception	***Intact*** **(but with wrong sequence)**	auditory & visual agnosia; auditory overload; visual peripheral processing
	Aa	***Schema***	✓	**N.A**	✓	✓	✓	**N.A**	**N.A**	**N.A**
		Processing	***Intact***		***Intact***	proprioceptive gestalt; visual gestalt; visual & proprioceptive fragmentation; auditory overload; auditory gestalt; delayed audition & proprioception;	delayed audition			
	Im	***Schema***	x	**N.A**	✓	x	x	x	x	**N.A**
		Processing	distorted proprioception; auditory/proprioceptive gestalt;		**?**	distorted proprioception; fragmented hearing & proprioception; distorted proprioception; hypo-proprioception; auditory overload;	hypo-proprioception	hypo-proprioception; distorted proprioception; fragmented audition.	associative auditory memory; distorted proprioception.	
	Hl	***Schema***	x	**N.A**	✓	x	x	x	x	**N.A**
		Processing	auditory overload; auditory peripheral processing; auditory agnosia; hyper-audition		delayed auditory processing	sensory overload (proprioceptive & auditory); auditory agnosia; auditory overload; fragmented proprioception.				
	Ah	***Schema***	x	x	x	x	x	x	x	**N.A**
		Processing	visual & auditory overload; auditory agnosia; visual fascination							

Table 15: *Conception & Processing of School Routine (Children with Mild-Moderate Autism)*

Conception & Processing of School Routine			Place (of actions)	Object identity	Person identity	Sequence: 1st action	Sequence: 2nd action	Sequence: 3rd action	Sequence: 4th action	Sequence: 5th action
Children with Mild-Moderate Autism	***Mm***	***Schema***	✓	x	x	✓	x	x	x	**N.A**
		Processing	delayed auditory perception	auditory overload; distorted proprioception; fascination towards visual stimuli; visual gestalt; visual fragmentation; auditory agnosia;	distorted visual/ auditory perception	---	auditory gestalt	auditory agnosia		
	Zb	***Schema***	✓	✓	✓	✓	x	x	✓	**N.A**
		Processing	***Intact***	visual perceptual thinking	***Intact***	fragmented proprioception	fragmented hearing; proprioceptive gestalt	auditory overload; auditory agnosia; fragmented proprioception	fragmented hearing; visual perceptual memory; delayed hearing; auditory overload; auditory agnosia	
	Ma	***Schema***	x	✓	✓	✓	✓	x	x	**N.A**
		Processing	fragmented proprioception; auditory gestalt;	***Intact***	***Intact***	delayed audition; fragmented proprioception; visual and auditory gestalt; distorted audition;	fragmented audition; associative auditory and proprioceptive memory;	fragmented proprioception;	fragmented proprioception;	
	An	***Schema***	**N.A**	**N.A**	✓	✓	✓	x	x	x
		Processing			***Intact***	fragmented proprioception; delayed audition; delayed proprioception;	associative visual/proprioceptive memory	fragmented proprioception;	proprioceptive gestalt; delayed proprioception; associative proprioceptive memory	proprioceptive gestalt; distorted proprioception
	As	***Schema***	x	**N.A**	✓	✓	x	x	x	**N.A**
		Processing	distorted proprioception & vision; proprioceptive overload; fragmented audition; proprioceptive gestalt		fragmented hearing; delayed hearing; proprioceptive overload	delayed audition & proprioception; proprioceptive gestalt; proprioceptive overload; proprioceptive agnosia; fragmented hearing	hypo-proprioception; proprioceptive gestalt; proprioceptive agnosia	proprioceptive agnosia; proprioceptive overload	auditory overload	
	Il	***Schema***	x	✓	✓	x	x	x	x	**N.A**
		Processing	hypo-proprioception	***Intact***	delayed hearing	hypo-proprioception				
	Rn	***Schema***	✓	**N.A**	x	x	x	x	x	**N.A**
		Processing	delayed audition		distorted vision & proprioception	hypo-proprioception				

Table 16: *Conception & Processing of Birthday Party (Children with Severe Autism)*

Conception & Processing of Birthday Party			**1st Sequence**		**2nd Sequence**		**3rd Sequence**		**4th Sequence**		**5th Sequence**		**6th Sequence**		**7th Sequence**	
			Action: bringing the cake	**Object : cake**	**Action: decorating place with balloons**	**Object: balloon**	**Action: putting candles on the cake**	**Object: candles**	**Action: blowing the candles**	**Object: candles**	**Action : cutting the cake**	**Object: knife**	**Action: eating the cake**	**Object : cake**	**Action: receiving gifts**	**Object: gifts**
Children with Severe Autism	***Az***	***Schema***	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		Processing	auditory agnosia; hyper-audition; auditory overload													
	Wn	***Schema***	x	x	x	x	x	x	x	x	x	x	✓	x	x	x
		Processing	auditory & visual agnosia; delayed proprioception; associative auditory memory; hypo-proprioception; auditory overload; fascination towards auditory stimuli													
	Aa	***Schema***	✓	✓	x	x	x	x	x	x	x	x	x	x	x	✓
		Processing	delayed audition; monoprocessing; visual & proprioceptive fascination		proprioceptive & visual gestalt; fragmented visual perception; gestalt auditory perception;											***Intact***
	Im	***Schema***	x	✓	x	x	✓	✓	x	x	✓	x	x	x	x	x
		Processing	auditory overload; auditory gestalt				delayed audition; associative visual memory;		hypo-proprioception; auditory overload		serial auditory memory	auditory overload; hypo-proprioception				
	Hl	***Schema***	x	x	x	✓	x	✓	x	x	x	x	x	x	x	x
		Processing	delayed audition; associative (visual/auditory) memory, proprioceptive overload; auditory agnosia; auditory gestalt; visual gestalt; auditory overload;													
	Ah	***Schema***	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		Processing	visual fascination; sensory overload													

Table 17: *Conception & Processing of Birthday Party (Children with Mild-Moderate Autism)*

Conception & Processing of Birthday Party			**1st Sequence**		**2nd Sequence**		**3rd Sequence**		**4th Sequence**		**5th Sequence**		**6th Sequence**		**7th Sequence**	
			Action: bringing the cake	**Object : cake**	**Action: decorating place with balloons**	**Object: balloon**	**Action: putting candles on the cake**	**Object: candles**	**Action: blowing the candles**	**Object: candles**	**Action: cutting the cake**	**Object : knife**	**Action: eating the cake**	**Object : cake**	**Action: receiving gifts**	**Object: gifts**
Children with Mild-Moderate Autism	***Mm***	***Schema***	✓	✓	x	✓	x	x	✓	✓	✓	x	✓	✓	x	✓
		Processing	serial auditory memory													
	Zb	***Schema***	x	✓	x	x	x	x	x	x	x	x	x	x	x	x
		Processing		associative proprioceptive memory;	fragmented visual perception; visual gestalt; visual hypo-sensitivity; associative proprioceptive memory											
	Ma	***Schema***	x	x	x	x	x	x	x	x	✓	x	x	x	x	x
		Processing	hypo-proprioception; visual gestalt; hypo-vision								associative auditory memory;	hypo-proprioception; visual gestalt; hypo-vision				
	An	***Schema***	✓	✓	x	x	x	x	x	x	x	x	✓	✓	✓	✓
		Processing	associative memory	delayed audition	hypo-proprioception; hyper-audition auditory overload; visual fragmentation; hypo-vision; distorted vision and proprioception								associative auditory/visual memory			
	As	***Schema***	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		Processing	auditory gestalt; auditory overload; visual overload													
	Il	***Schema***	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		Processing	hypo-proprioception; hypo-vision; sensory agnosia													
	Rn	***Schema***	x	✓	x	✓	x	x	x	x	x	x	x	x	x	x
		Processing	hypo-proprioception	delayed audition;	hypo-proprioception	delayed audition;	hypo-proprioception									

Table 18: *Relation between Embodiment (Visual), Language and Conceptualization (across all cases)*

	Children with Severe Autism						Children with Mild to Moderate Autism						
Sensory Experiences	Az	Wn	Aa	Im	Hl	Ah	Mm	Zb	Ma	An	As	Il	Rn
Gestalt Perception	20%	20%	40%	40%	60%	-------	40%	80%	20%	20%	-------	40%	20%
Intensity with which senses work	Hypr 40% Hypo -----	Hypr 20% Hypo -------	Hypr 40% Hypo 16.67 %	Hypr 20% Hypo 16.67 %	Hypr 20% Hypo 33.33 %	Hypr 20% Hypo 83.33 %	Hypr 40% Hypo 33.33 %	Hypr 20% Hypo 66.67 %	Hypr 20% Hypo 66.67 %	Hypr 20% Hypo 33.33 %	Hypr 20% Hypo 33.33 %	Hypr 40% Hypo 16.67 %	Hypr ----- Hypo 33.33 %
Sensitivity to (disturbance by) some stimuli	33.33 %	-------	33.33 %	-------	33.33 %	33.33 %	-------	-------	-------	33.33 %	-------	-------	33.33 %
Fascination with certain stimuli	100%	-------	100%	-------	100%	100%	100%	100%	-------	100%	100%	-------	-------
Inconsistency of perception	-------	100%	100%	100%	-------	100%	100%	100%	100%	100%	-------	-------	-------
Fragmented perception (partial perception)	20%	40%	40%	20%	20%	20%	40%	80%	-------	-------	20%	20%	-------
Distorted Perception	60%	20%	40%	40%	80%	40%	40%	60%	40%	40%	80%	-------	60%
Sensory agnosia (difficulty interpreting a sense)	50%	50%	50%	50%	100%	100%	100%	100%	50%	50%	50%	50%	-------
Delayed perception	-------	50%	-------	50%	100%	50%	-------	-------	50%	-------	50%	-------	-------
Vulnerability to sensory overload	100%	100%	-------	-------	100%	100%	-------	100%	100%	-------	100%	-------	-------
Mono-processing (number of channels working at a time)	-------	100%	-------	-------	100%	100%	-------	-------	-------	-------	100%	-------	-------
Peripheral perception (avoidance of direct perception)	100%	100%	100%	-------	100%	100%	100%	-------	-------	-------	100%	-------	100%
Systems shutdowns	50%	50%	50%	50%	50%	50%	50%	100%	100%	50%	100%	100%	-------
Compensating for unreliable sense by other senses	100%	100%	100%	100%	100%	-------	100%	100%	100%	100%	100%	100%	100%
'Losing oneself' in stimuli. Resonance	-------	100%	100%	-------	-------	-------	-------	100%	-------	-------	-------	-------	-------
Daydreaming	-------	-------	100%	-------	-------	-------	-------	100%	-------	100%	-------	-------	-------
Synaesthesia	50%	50%	50%	-------	50%	50%	-------	50%	50%	50%		-------	-------
Perceptual memory	100%	100%	100%	-------	100%	100%	-------	100%	100%	100%	-------	100%	100%
Associative (serial) memory	-------	-------	-------	-------	-------	-------	-------	100%	-------	-------	-------	100%	-------
Perceptual thinking	28.57 %	42.86 %	42.86 %	57.14 %	14.29 %	57.14 %	42.86 %	14.29 %	42.86 %	42.85 %	-------	57.14 %	28.57 %

Table 19: *Relation between Embodiment (Auditory), Language and Conceptualization (across all cases)*

	Children with Severe Autism						Children with Mild to Moderate Autism						
Sensory Experiences	Az	Wn	Aa	Im	Hl	Ah	Mm	Zb	Ma	An	As	Il	Rn
Gestalt Perception	------	100%	100%	100%	50%	100%	40%	100%	50%	20%	-------	-------	50%
Intensity with which senses work	Hyper 14.28 % Hypo: 42.86 %	Hyper 42.86 % Hypo: 28.57 %	Hyper 28.57 % Hypo: 14.29 %	Hyper 85.71 % Hypo: 14.29 %	Hyper 85.71 % Hypo: 14.29 %	Hyper 57.14 % Hypo: 28.57 %	Hyper 42.86 % Hypo: 28.57 %	Hyper 28.57 % Hypo: 57.14 %	Hyper 42.86 % Hypo: 57.14 %	Hyper 71.43 % Hypo: 14.29 %	Hyper 71.43 % Hypo: 48.86 %	Hyper 28.57 % Hypo: 42.86 %	Hyper 28.57 % Hypo: 71.43 %
Sensitivity to (disturbance by) some stimuli	-------	50%	50%	50%	50%	50%	50%	50%	100%	100%	50%	-------	50%
Fascination with certain stimuli	100%	100%	100%	100%	100%	100%	100%	100%	-------	100%	100%	100%	100%
Inconsistency of perception	100%	100%	100%	100%	-------	100%	100%	100%	100%	100%	100%	100%	-------
Fragmented perception (partial perception)	-------	-------	-------	100%	100%	100%	-------	100%	100%	-------	100%	-------	-------
Distorted Perception	-------	66.67 %	-------	33.33 %	-------	33.33 %	33.33 %	66.67 %	33.33 %	66.67 %	66.67 %	-------	33.33 %
Sensory agnosia (difficulty interpreting a sense)	50%	100%	100%	50%	100%	100%	100%	50%	50%	50%	50%	-------	-------
Delayed perception	33.33 %	66.67 %	33.33 %	66.67 %	100%	33.33 %	-------	-------	100%	66.67 %	66.67 %	-------	33.33 %
Vulnerability to sensory overload	100%	100%	100%	100%	100%	100%	-------	100%	-------	-------	100%	-------	-------
Mono-processing (number of channels working at a time)	-------	-------	100%	-------	-------	100%	-------	100%	-------	-------	100%	-------	-------
Peripheral perception (avoidance of direct perception)	100%	-------	100%	-------	-------	-------	100%	100%	100%	-------	-------	-------	-------
Systems shutdowns	100%	50%	50%	50%	50%	50%	50%	100%	100%	50%	100%	-------	-------
Compensating for unreliable sense by other senses	100%	100%	100%	-------	-------	-------	100%	100%	100%	100%	100%	100%	100%
'Losing oneself' in stimuli. Resonance	-------	50%	100%	-------	50%	-------	-------	-------	50%	-------	100%	50%	50%
Daydreaming	-------	-------	100%	-------	-------	-------	-------	-------	-------	100%	-------	-------	-------
Synaesthesia	-------	-------	-------	-------	100%	50%	-------	50%	-------	50%		-------	-------
Perceptual memory	100%	100%	100%	100%	100%	100%	-------	100%	100%	100%	-------	100%	100%
Associative (serial) memory	50%	50%	50%	75%	100%	75%	-------	25%	75%	-------	75%	50%	50%
Perceptual thinking	-------	100%	100%	-------	-------	-------	42.86 %	-------	100%	42.85 %	-------	-------	100%

Table 20: *Relation between Embodiment (Proprioceptive), Language and Conceptualization (across all cases)*

	Children with Severe Autism						Children with Mild to Moderate Autism						
Sensory Experiences	Az	Wn	Aa	Im	Hl	Ah	Mm	Zb	Ma	An	As	Il	Rn
Gestalt Perception	100%	-------	100%	100%	100%	100%	-------	100%	-------	-------	100%	-------	-------
Intensity with which senses work	Hypr 33.33% Hypo 37.5%	Hypr ------- Hypo 37.5%	Hypr 33.33% Hypo 25%	Hypr 33.33% Hypo 12.5%	Hypr 66.67% Hypo 12.5%	Hypr 66.67% Hypo 37.5%	Hypr 66.67% Hypo -------	Hypr 33.33% Hypo 50%	Hypr 33.33% Hypo 25%	Hypr ------- Hypo -------	Hypr 33.33% Hypo 50%	Hypr ------- Hypo 12.5%	Hypr ------- Hypo -------
Sensitivity to (disturbance by) some stimuli	-------	-------	100%	-------	100%	100%	-------	-------	-------	-------	100%	-------	-------
Fascination with certain stimuli	100%	100%	-------	100%	-------	100%	-------	100%	100%	-------	-------	-------	-------
Inconsistency of perception	50%	50%	50%	100%	-------	50%	-------	50%	-------	-------	100%	-------	-------
Fragmented perception (partial perception)	-------	-------	-------	-------	-------	-------	-------	100%	-------	100%	-------	-------	-------
Distorted Perception	50%	50%	50%	50%	100%	-------	50%	100%	-------	100%	50%	-------	50%
Sensory agnosia (difficulty interpreting a sense)	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	100%	-------	-------
Delayed perception	100%	-------	-------	-------	100%	-------	100%	100%	-------	-------	-------	100%	-------
Vulnerability to sensory overload	100%	-------	100%	100%	-------	-------	-------	100%	-------	100%	100%	-------	-------
Mono-processing (number of channels working at a time)	-------	100%	100%	-------	-------	-------	-------	100%	-------	-------	-------	-------	-------
Peripheral perception (avoidance of direct perception)	100%	-------	-------	-------	100%	-------	-------	100%	-------	-------	-------	-------	-------
Systems shutdowns	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Compensating for unreliable sense by other senses	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
'Losing oneself' in stimuli. Resonance	-------	-------	100%	-------	-------	100%	-------	-------	-------	-------	-------	-------	-------
Daydreaming	-------	-------	-------	-------	-------	100%	-------	-------	-------	-------	-------	-------	-------
Synaesthesia	-------	-------	100%	-------	100%	100%	-------	100%	100%	100%		-------	-------
Perceptual memory	-------	100%	-------	100%	100%	100%	100%	100%	-------	-------	-------	100%	100%
Associative (serial) memory	-------	-------	-------	-------	100%	100%	-------	100%	100%	100%	-------	-------	-------
Perceptual thinking	100%	100%	100%	-------	100%	100%	100%	-------	100%	-------	100%	100%	-------

CHAPTER 5
FINDINGS & CONCLUSION

This chapter discusses the findings of the previous chapter to establish an approach towards autsim – that suggests embodiment as the primary lense to view the linguistic processing of individuals with autism spectrum disorder. The discussion provides a collage like creation that seems to connect three parts of the paradigm (illustrated in Figure 1) into one whole – Embodied Processing:

> The product of the bricoleur's labor is a bricolage, a complex, dense, reflexive collagelike creation that represents the researcher's images, understandings and interpretations of the world or phenomenon under analysis. This bricolage will … connect the parts to the whole, stressing the meaningful relationships that operate in the situations and social worlds studied. (Denzin & Lincoln, 1998, p. 4)

5.1 Preview of Research Focus

Cognitive Semantics studies language and mind in the contexts of embodied experience, meaning, and cognitive patterns. It claims that the conceptual knowledge structures, which underlie the development of language, are experiential and emergent. Two of its guiding principles are semantic structure is conceptual structure and conceptual structure is embodied. Our sensory perceptual experiences develop and determine our embodiment in a specific direction, which helps construct the concepts accordingly. Hence, the knowledge structures which we develop through our interaction with the world are emergent, not innate, and vary in nature. Language use reflects the nature of these knowledge structures/concepts.

In autism, the language use was rarely studied with relation to their physical interaction with the world. The linguistic level in autism was always studied from the perspective of pragmatics, receptive and expressive skills with the aim to establish the nature of deficits in their social communication. The underlying causes of these problems have always been attributed to the theory of mind deficit, weak central coherence and executive dysfunctionality. This line of research has its own contribution to the understanding of the state of autism;

however, this has rendered autism more as a combination of deficits. This line of research declares that neurotypicals have theory of mind, their central coherence is strong, and they perform executive functions efficiently; however, people with autism cannot:

> [The] disgnoses of autism are essentially storytelling in character, narratives that seek to explain contrasts between the normal and the abnormal, sameness and difference, thesis and antithesis. … autistics as evolutionary deviant, … tragic figures. The result is a novelistic, poetically intensified account of sadness – we call this a rhetoric of scientific sadness – in which autistic people are mourned even as they are apparently explained. (Duffy & Dorner, 2011)

There is a need for a change in the discourse regarding autism – where 'sensory problems' is replaced with 'sensory experiences' and where autism is viewed as a "cognitive style" (Happé, 1999; Happé & Frith, 2006) instead of a 'cognitive deficit'. The findings of the current study have attempted to steer the language use of autism away from mere a dysfunctional, eccentric, disordered behaviour; it attempts to move towards language use and development as having determining roots in the real-life sensory experiences of children with autism. The discourse analyses of 13 verbal children with autism through Cognitive Discourse Analysis (CODA – Tenbrink, 2015) not only determined the nature of knowledge structures/schemas in children with autism, but also disclosed the nature of possible sensory perceptual experiences that seem to determine their understanding, perception and conceptualization – processing – of both events. Moreover, Sensory Profile Checklist Revised (SPCR) (Bogdashina, 2003, p. 184) established independently that varied embodiment of all 13 verbal children with autism is due to their heterogeneous sensory experiences. The cross-case findings of visual, auditory and proprioceptive experiences of all 13 verbal children with autism are consistent with the CL perspective of experientialism and varied embodiment. Individuals with autism also experience, perceive, think, and feel differently.

The triangulation of both linguistic and behaviour (sensory perception) data suggested areas of overlappings to further substantiate the relation between embodiment (sensory experiences), language and conceptualization in children with autism. Therefore, the linguistic processing in autism seems to depend upon their heterogeneous, embodied sensory processing. Their non-linguistic sensory experience is not a temporary milestone, as in the case of nuerotypicals, rather it lasts for a long time and at times permanently manifests itself in their perceptual styles and linguistic structures. The next section takes this humble yet imperative move a step forward and attempts to provide an adequate account of the linguistic experiences of children with autism in the light of embodiment. This account of embodiment encompasses what Rajendran and Mitchell (2007) anticipated from a new theory in terms of "… its applicability on both severe and less severe cases; its capability to integrate sociolinguistic, perceptual and sensory-motor aspects; and its usefulness to make predictions about the behaviour of everyone diagnosed" (p. 247).

5.2 Language and Conceptualization in Autism: Discussion from the Perspective of Embodiment

Getting in information (linguistic/non-linguistic) and storing it through our experiences and senses – embodiment – is a cognitive process. When we say that cognition is never disembodied, and language can never be processed fully in a context-independent environment, we in fact imply that language acquisition and use is an embodied experience. Tandahl (2009) states that "studying language is studying human cognition" and cognition is always grounded in embodied experience (Barsalou, 2008). With this premise of Cognitive Linguistics, the study was executed on the non-neurotypical population – children with autism. The study neither looked at their discourse deficits nor their knowledge structures to affirm that abnormalities exist due to ToM or WCC – it looked at the relation between language and concept formation from the perspective of Cognitive Semantics – embodiment:

> All experience is filtered by perception and … language is not a description of the real world (nor any possible world), but rather a description of human perception of reality. Therefore, when we examine meaning, our goal is not to find a correspondence between utterances and a world (real or otherwise), but rather to explore the ways in which meaning is motivated by human perceptual and conceptual capacities. (Janda, 2010, p. 9)

And the route which motivates and/or determines perceptual and conceptual faculties in autism is 'embodiment'. We are not surrounded with a world of abstract symbols (language) that have their concrete, objective meanings (concepts) which we understand without recourse to our bodies. This disembodied approach to meaning and understanding is no more appreciated, since 'body' has been acknowledged to have a prime position in the 'mind'. People with autism also input/experience sensory information with the help of their body (hands, eyes, ears, mouth). However, the way we attend/collect, perceive/register, comprehend and interpret/analyze, store and conceptualize the sensory details involve working of the mind – cognition is at work. When it comes to output, the medium of language serves it well and so mirrors our conceptual structures. Hence, the body and mind coordination and correlation – working of embodied cognition – during the task of linguistic and/or non-linguistic information processing can be seen clearly as 'embodied processing' of information, which gives rise to embodied concepts. This embodied processing account of language use and development in autism can give an understanding of which sense (vision, hearing, proprioception, vestibular, haptic, gustatory) makes the sense making of environment, loaded with linguistic cues and items, difficult for people with autism.

Hence, a new cognitive theory of Autism is suggested with its model as illustrated in Figure 6. The suggested model is named as "Embodied Processing" in the light of the findings.

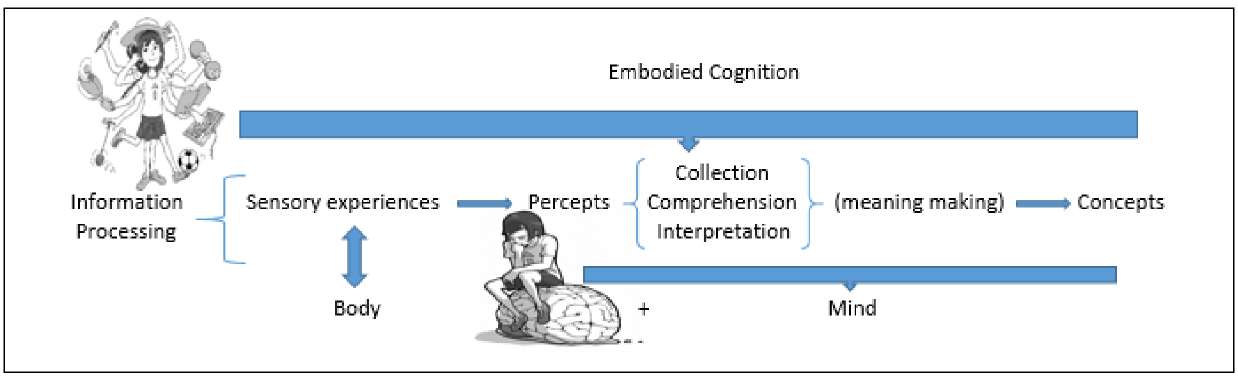

Figure 6: Model of Embodied Processing

When Cognitive Semantics talks of embodied cognition, it is ineluctable to talk about the conceptualization, construal and meaning construction as perspectival and encyclopedic. Embodied cognition thesis posits that different experiences lead to 'variable embodiment' (Evans & Green, 2006), where everyone conceptualizes, construes and constructs his/her own meaning. The thesis of embodied cognition also holds that our mental representations (conceptual structures) are affected by pre-conceptual (sensory) experiences. Our bodily experiences provide us with 'lens' which helps us to give words to certain concepts. These propositions were applied on the behaviours and language of children with autism to see if their concepts window something about their embodiment. The literature in autism hinted a bent towards linking sensory experiences and their relationship with the traits of and behaviours in autism. However, all these studies were done from the standpoint of behavioural and developmental psychology and neuroscience

For the sake, the linguistic data of children with autism was analysed with the help of CODA – a methodology used so far to study mental representations and complex cognitive processes of neurotypicals. The framework based on the 'theory of embodiment' from Cognitive Semantics helped investigating how their sensory-perceptual experiences (embodiment) shape and affect their knowledge structures/conceptual representation (schemas) and what does their language mirror about their concepts and embodiment. The succeeding discussion in the light of findings will further justify and establish this new perspective to look at autism.

5.2.1 Embodiment: Specific Interaction with the World

Johnson (1987) rejects the objectivist, scientific approach of experience as limited to passive reception through senses, and asserts that "[b]y contrast, experience involves everything that makes us human – our bodily, social, linguistic and intellectual being combined in complex interactions that make up our understanding of our world" (p. Preface xvi). This rich notion of experience entails diverse dimensionality and renders embodied structures a fundamental place in understanding and grasping the world.

Findings of language and behaviour data highlighted the different and unique patterns of sensory perceptual experiences of verbal children with autism – visual, auditory and proprioceptive embodiment. The findings verify the findings of the robust empirical and behaviour studies (e.g. Baker, Lane, Angley, & Young, 2008; Behrmann, Thomas, & Humphreys, 2006; Remington, Swettenham, Campbell, & Coleman, 2009) that highlighted the processing problems that the individuals with autism encounter. Though the studies were conducted from the perspective of cognitive psychology, they ascertained that the eccentricities in perception and processing contribute to their different experiences.

Monticelli (2013) cites Plessner's idea of bodily involvement in perceptual experience and the part that our bodies play to construct sensory world as "bodily attitude" (p. 39). Plessner regards the integration of different sensory modalities into a probable meaningful and substantial life-world as problem of "the unity of senses". The phenomenological movement and the approaches of embodied mind offer a solution to this problem by endorsing the perspective of "enactive embodied character of sensory perception in all its modalities … the meaningful organization of a perceptual environment through the affordances it provides" (pp. 39-40), and "bodily involvement in sensory experience" (p. 44).

By giving examples of the experiments conducted by developmental psychologists, to figure out how babies utilize their bodies to learn initial concepts like stepping, etc., Barrett (2011) rests his case: since all bodies are not the same, "[w]e learn how to exploit our specific bodily resources, and that requires 'customized' learning strategies and developmental trajectories" (p. 177). Hence, our 'specific bodily resources' offer distinct kind of embodiment in the context of which "we all see the world in our distinctively human like way" (p. 176). Evans & Greens (2006) proposes this situation as 'varied embodiment' (p. 45). Every action is then embodied action and our different physical and pre-conceptual (sensory-perceptual) experiences are in fact 'varied embodiment in action' and serve as the basis of our subjective construal of the world and its conceptualization.

Howe and Stagg (2016) asserts that in autism, sensory issues are not a constant state – all depends upon the sensory modality that is at work, the nature of sensory input and the situation the person is in at that time. The children like Az and Aa, although showed sensory problems in all three modalities, their language use displayed mostly intact schemas for "School Routine" event; on the contrary, both got distracted by the sensory experiences they were experiencing at the given time and could not utter much about the second event "Birthday Party". The findings were consistent with the findings of (Falter, Elliott, & Bailey, 2012). The language use of most children indicated that they could not process most parts of the Birthday Party event and some parts of the School Routine event. The varied sensory perceptual experiences that their language use disclosed also seem to determine their embodiment which shaped their concepts accordingly. The findings were in resonance with the findings of studies (Bhat, Galloway, & Landa, 2012; LeBarton & Iverson, 2016; LeBartona & Landaa, 2019) that established the impact of motor skills on determining the milestones for communication, especially expressive skills.

Hence, these and other similar findings of the present study testify all these assertions and can confidently underline the importance of embodiment in the linguistic utterances of individuals with autism.

5.2.2 Language and Concepts as Having Bodily Bases

Language is imperative to carry out daily activities by comprehending and expressing the message. Our physical and pre-conceptual experiences are the basis of our construal and linguistic knowledge. Given the thesis of embodiment, our sensory-perceptual experiences determine and/or delimit our embodiment. This in turn determines conceptual systems. The conceptual development or dormancy is based upon intact or dormant perceptual processing and this is the very postulation of embodied cognition thesis: concepts have perceptual base.

The verbalizations of verbal children with autism in the current study not just highlighted the presence or absence of concepts, but also revealed the underlying sensory perceptual processing that is reported to dispose concepts. Moreover, the qualitative analysis of linguistic data revealed the expected association between absence and presence of concepts, and sensory processing of verbal children with autism. Evans and Green (2006) classified sensory experience and introspective experience as two main divisions of human experience (embodiment). Moreover, they herald that human conceptualization "structure concepts … relating to introspective experience in terms of concepts that derive from sensory experience" (p. 65). Hence, it is the perception that determines our experience, both sensory and subjective, and that experience in turn constructs our knowledge structures.

The detailed two-layered analysis of the language of children with autism through Cognitive Discourse Analysis (CODA) was in line with the stance words are points of access to cognition. The Cognitive Discourse Analysis (CODA) of the discourses brought to light both the conception of events in terms of its relevant schemas and processing of information – both online and offline. Besides this, the findings regarding presence of schema highlighted interesting findings pertaining to the level of autism – the severity of autism did not show any effect on either presence or absence of concepts and the relevant sensory experiences. It was their varied embodiment that were found to play a determining role.

The analysis of first layer of discourse also identified patterns of correlation between presence/absence of concepts and the possible sensory-perceptual processing. The findings showed a clearcut linkage of the presence of concepts with two types of experiences – delayed processing and associative (serial) memory. This pattern was seen throughout the discourses of all 13 children with autism when the information was elicited regarding real-life events. On the other hand, the absence of concepts shed light on the possible presence of varied sensory perceptual experiences – fragmented, distorted, hyper, hypo, etc. Moreover, since schemas (concepts) are the result of persistent and potent patterns of our sensory perceptual interactions (Johnson, 1987; Oakley, 2007), the findings established the justification of their presence or absence of schema – what they did not experience, due to their sensory perceptual constraints, they did not register and hence the relative concept was found missing.

The research findings of language data validated the peculiar embodiment of all 13 children with autism in the context of certain concepts regarding two events – School Routine and Birthday Party. Moreover, when the findings of language data of all 13 verbal children with autism were compared with their behaviour data, the findings endorsed the presence of some sensory-perceptual experiences while at the same time, suggested the presence of some other processing experiences that were not identified in the findings of behaviour data. The findings are in consonance with the findings of Chamak, Bonniau, Jaunay, and Cohen (2008) and Jones, Quigney, and Huws (2003) where personal narratives of autistic people illustrated a strong association between sensory perceptual experiences, sense-making and communication in autism. This varied embodiment can be a crucial point to consider for language development trajectories in autism.

Tyler and Evans (2003) argued that meanings are systematically grounded in the nature of human spatio-physical experience. They announced this embodied approach to study language as both cognitive and experiential – cognitive because "'reality' is determined by the nature of our bodies" and experiential because "our representation of reality is contingent upon a world out there, which in turn is meaningful, precisely because it, and our interactions with it, have non-trivial consequences for our survival" (p. Preface x). Lindsay and Norman (1972) also endorsed the possibility by stating that "[t]he way in which a given language refers to perceptual experiences can have a considerable effect on the encoding and retention of sensory information" (p. 438).

An interesting finding germane to both events and their knowledge structures was that discourses of both children with severe autism and children with mild to moderate autism displayed no drastic differences in terms of the presence or absence of concepts. This finding further correlates with the literature (Howe & Stagg, 2016) that affirmed the importance of experiences as compared to the level of autism. However, the finding does not correlate with the findings of (Hudry, et al., 2010) who announced the potential causal relation between autism severity and development of expressive and receptive language skills in autism. Moreover, regarding both events – school routine and birthday party – and their pertinent schemas, the language use of some children displayed intact knowledge structures, but regarding few concepts only. The probable explanation is unpredictable (Ferna´ndez-Andre´s, Pastor-Cerezuela, Sanz-Cervera, & Ta´rraga-Mı´nguez, 2015) and non-constant (Howe & Stagg, 2016). According to Bogdashina (2003), our pre-conceptual experiences (stimulus and sensation in Fig 2) form our perceptions in the light of which we interpret things as they literally are. "We learn to form concepts. The information that does not fit the concepts is screened out as irrelevant" (p. 47), and the concept that does not fit the context is also screened out. Non-autistic people form concepts both 'from outside (environmental stimuli) and inside (mental images we store in the brain)'. "We cannot look at things without interpretation. We impose our concepts on them" (p. 51). Hence the concrete environment, loaded with stimuli and sensations, helps us interpret and comprehend the concepts. Likewise, the everyday experience of people with autism is inevitably embodied. The clinical labels like 'severe', 'mild' should not be reduced to deficits – ToM, WCC and EF. This way, the strengths and capabilities of autistics will not get a projection (Mottron L. , 2017).

Furthermore, while confirming the link between autism and sensory experiences, Horder, Wilson, Mendez, and Murphy (2014) suggested that sensory traits could potentially measure the severity of autism. Baker, Lane, Angley, and Young (2008) also found a correlation between severe sensory processing problems and severe symptoms of autism. Kim and Lord (2010) also reported that severity of restricted, repetitive behaviours in autism are positively correlated with severity in autism. However, the linguistic and behaviour findings of the current study did not show this kind of correlation between sensory experiences and the severity of autism. Nevertheless, the above-mentioned studies tried to establish the strong relation between both the dyads of impairments, which is important in terms of diagnosis. Hence, the different findings should not be seen as a challenge against the diagnosis criteria; however, this needs to be researched further since both behaviour and linguistic data highlighted that both severe and mild-moderate showed marked severity in terms of sensory perceptual experiences. Moreover, both events were perceived almost similarly by both groups. One cogent reason might be that language assessment in autism, especially in terms of pragmatic, receptive and expressive skills, used unnatural language data in most cases. The findings of unrestricted language data analyzed in the current study revealed different findings and could be considered more reliable to set the language benchmarks of people with autism (Tager-Flusberg, et al., 2009). Tager-Flusberg, et al. (2009) reported confidently that the natural language supported by parent reports and standardized tests provide valid assessments of child’s language abilities and levels. Hence, relative corrective measures will have profound effect on language development of children with autism.

Bogdashina (2005) asserts that we interpret and comprehend any meaning through negotiation with the world around us. Since concepts are experiential in nature, our sensory experiences form the bases of our subjective experiences which help us impose our knowledge structures (concepts) while interpreting and comprehending the world around us. We, therefore, not only learn to discriminate between different sensory experiences but also learn to attach meaning to a particular concept based on our embodiment. So, our everyday comprehension is inevitably embodied. The language comprehension (receptive skills) in autism seems to follow the same route. Semantic structures are conceptual structures. “We can only talk about what we perceive and conceive and the things we can conceive and perceive derive from embodied experience” (Evans & Green, 2006, p. 46).

Cognitive Semantics studies mind not from psycholinguistics perspectives, but through culturally and experientially embodied conceptual structures. It employs “language as a key methodological tool for uncovering conceptual organization and structure” (Evans & Green, 2006, p. 153). Linguistic structures are conceptual structures and according to Leonard Talmy

(2000), "[R]esearch on cognitive semantics is research on conceptual content and its organization in language" (cited in Evans & Green, 2006, p 156). The children with autism only talked about what they could conceive and perceive in the light of their unique, varied embodiment, and their linguistic resources gave interesting insights about their probable concepts. Although the verbal level of children with autism was way too different from the verbal level of non-autistics of their ages, the limited linguistic resources that thay had by the time they were being interacted with, also hinted towards the nature of their concepts. In fact, the limitations provided interesting findings pertinent to the presence and/or absence of schemas pertaining to both events.

Regarding the event of School Routine, the schema of sequence was found missing altogether in all 13 verbal children with autism. None of them described the tasks in sequence when they were asked the open-ended question: "What do you do at school?" Absence of schema of sequence, but presence of schemas of actions, triggered by compatible prompts, implies that the overall perception of both the events is either distorted or fragmented among all 13 verbal children with autism. This induces deviant attention or binding problem where all actions of the event have been perceived, though with some issues, and processed into bits and parts – not as a whole event. This can be regarded as conscious way of processing where the individual narrows down the attention to cope with the sensory overload. Fragmented perception leads to insufficient memory resources since memory resource has details only in bits and pieces, and any visual, auditory or proprioceptive prompt triggers memory. The findings of the current study are partially consistent with the findings of the narrative abilities and event schemas where Hilvert (2015) reported that children with autism had difficulty in creating causal connection between events. However, they could recall core elements of the events, but not the flexible ones.

Regarding School Routine discourse, the language use of four children Hl, Ah (both severe autistic) and Il, Rn (both mild-moderate autistic) neither showed signs of presence of core elements of the event, nor the temporal-causal order. The language use of rest of nine children showed varied results. However, they showed approximately 90% positive findings in terms of presence of core elements – though majority displayed traces of delayed perception and/or associative memory. Contrary to the findings of School Routine, the findings regarding the presence of core elements of Birthday Party event were not in consonant with the findings of Hilvert (2015) to a greater extent. The language use of six children out of 13 showed the presence of schema of ‘cake’ – two had severe autism and four had mild-moderate autism; two children showed the signs of presence of schema of ‘candle’ – one was severe autistic while other was mild-moderate autistic; three showed presence of ‘gift’ schema – one was severe autistic, while other two were mild-moderate autistic; three showed presence of ‘cutting of cake’ schema – one was severe autistic, while other two were mild-moderate autistic; three showed presence of ‘eating of cake’ schema – one was severe autistic, while other two were mild-moderate autistic; only one mild-moderate autistic showed the presence of schema of ‘blowing the candles’. The findings of Maras and Bowler (2011) were also in accordance with the inability to provide schema specific accurate details in most cases.

The interesting and surprising finding was that the discourses of three children displayed the presence of flexible/non-scripted schema “bringing of the cake” for the birthday party. This finding is in sharp contrast with the finding of Hilvert (2015) and Loth, Gómez, and Happé (2008) who reported to have no likelihood of these individuals to have the memory record of flexible/not core elements of the events.

As for creating a causal link between events, persons and actions, the language use of only three children showed signs of causal temporal order in the present study – Az and Aa (both severe autism) during the discourse of School Routine and Mm (mild-moderate autism) during the discourse of Birthday Party. These findings were in line with the findings regarding the nature of event schemas reported by Loth, Gómez, and Happé (2008). They found that 13 out of 21 individuals with ASD were good at temporal-causal order of the events in question. The findings were also in line with the findings of Maras and Bowler (2011) who reported the ability of some autistics to speak while retaining temporal-causal order.

Guerin (2012) defines schemas as “a tool for learning, because their effort to repeat and assimilate events lead them to generalize and gradually embody more abstract information about the world”. In other words, schemas are generalized knowledge structures derived from a specific, repetitive bevavior and its relevant experiences. That behaviour can be related to an object, an action or an event that entails a sequence and that has a specific context in which that event or action is performed. Understanding words in context has something to do with the pragmatics. The findings regarding some clues of their individual schemas are in line with the findings of pragmatic skills (MacFarlane, et al., 2017) and narrative skills (Colle, Baron-Cohen, Wheelwright, & Lely, 2008; Goldman, 2008) in autism, and with the notion of form-is-easy-meaning-is-difficult (Naigles & Tek, 2017) from the perspective of comprehension in autism.

For example, Mm is a child with mild to moderate autism, but the amount of knowledge that her language use displayed regarding birthday event was almost the same as was displayed by Im, a child with severe autism. The common knowledge structures extracted by both were about cake, balloons and cutting of the cake. However, since Mm had had the knowledge of candles (the pertinent act of blowing them during birthday event) and the gifts, she managed to talk about them. On the contrary, the kind of knowledge Im displayed regarding candles was putting them on the cake; he could not elicit anything pertinent to gifts. The language use of only these two displayed somewhat fragmented processing of the event. Throughout, both the discourses of all children displayed different levels of knowledge structures despite their different levels of autism. The age, however, was not studied in that respect and is suggested for future research.

Isaacs and Lawrence (2015) inform how the series of systematic experiments done by Jean Piaget since 1935 give us a thumbnail portrayal of his framework of thought. Piaget announces children as agents, who control and organize their experiences – experiences are the products of their activities. The activities involve first the exploration of the world through their senses and then the manipulation of their senses alternately and/or simultaneously. Hence, if the product is the experience, the process entails much more than mere exploration and manipulation; it also involves what Piaget calls assimilation, accommodation and adaptation (p. 12).

Hellendoorn, Wijnroks, and Leseman (2015) argued that continuous experience with the environment, perception-action cycles, construct the meaning accordingly. They claimed to suggest a label of ‘specific learning mechanism’ instead of labeling autism as a deficit and proposed that ‘invariance detection’ is altered in ASD and not impaired. Reiterating what Piaget announced, Guerin (2012) elaborates that when a new object is presented to children, they try to first assimilate its schema with the existing schemas. If the new object happens to be a bit different, they try to accommodate the new schema with the existing schemas that are somewhat similar in stucture. If accommodation is significant, then schema is differentiated to produce a new schema appropriate to the new situation. Priors like these are also talked about in terms of ‘difference’ and not a ‘weakness’ (Hellendoorn, Wijnroks, & Leseman, 2015). This perspective is in line with the perspective of this study, where the findings are not discussed as any deficit and/or a cause of top-down cognitive processing in autism. Instead, the study has tried to occupy the niche for theorizing and researching the role of body – embodiment – to find answers for the dyad of impairments as mentioned in DSM-V (American Psychiatric Association, 2013).

5.3 Pedagogical Implications of Research: Language Use, Language Acquisition, Language Development

Language intervention strategies for people with autism can benefit a great deal from the findings of the study. Concept formation is of utmost importance to make meaning out of this chaotic world we are dealing with. Besides the nature of concepts, the significance and usefulness of the knowledge and understanding of the process of meaning making that children with autism undergo, and hence develop and establish certain concepts need to be viewed in the context of their language acquisition, language use, and language development. Language is the only tool, a medium that when used explains both the nature and processing of concepts. The findings of the study highlighted some important implications for both parents and professionals (speech language pathologists and teacher aids) who deal with the language and communication issues of people with autism. The findings can help understand the possible barriers of language acquisition in autism. This is crucial to design language activities while catering to individual learning needs, besides implementing general language intervention and teaching policies for this population. Linguists can play their part, in coordination with speech language pathologists and teacher aids of people with autism, by designing activities based upon lexical and grammatical content; this can help checking if the language use of people with autism includes both lexical and grammatical content and to determine the level of both.

Linguists can play an assisting and influential role in guiding autism centers to dedicate maximum focus and resources to meet language learning needs of people with autism. This way, the individuals with autism can achieve high communication potential. Linguists can play a key role in planning and implementing curriculum that is oriented towards language learning in the light of individual embodiment. Both sensory and language profiles need to be recorded on daily basis to look for developmental trajectories in the light of individual embodied processing.

Language research in autism has been mainly focused on pragmatics, semantics, comprehension and production. Despite same context, language acquisition and learning have always showed remarkable individual differences; the factors involve intelligence, culture, nature of interaction, etc., and they vary from person to person (Eigsti, Marchena, Schuh, & Kelley, 2011). The same factors can also constrain language acquisition and learning. The heterogeneous experiential profiles of children with autism highlighted the significance of understanding and establishing the role of their sensory perceptual experiences as an important factor that hamper their language acquisition. The study also underlines the importance of comprehensive assessment to identify the determining effects of this factor of embodiment on their language skills.

Language starts with ears. The recepive language skills in autism have also been reported to be less efficient as compared to expressive language skills; however, the findings vary. Failure to develop speech is common in autism, but it is a matter of concern. Moreover, the level of comprehension and the level of linguistic utterances are also of crucial importance. The children with extreme speech problems like these must be evaluated in terms of their auditory problems that they experience. The nature of their auditory embodiment can disclose the important areas to focus language intervention strategies accordingly.

Since two interactive real-life events were discussed with people with autism, the responses provide valuable insights to their daily understanding and registering of information. The academic routine of school that they observe throughout the week for five days brought to light that their eccentric sensory experiences in terms of proprioception either hampered or helped them register, store and then recall the event. Both ABA and PECS are assets to the intervention strategies; combining these strategies with real life situations and involving individuls in that particular situation will be a great help in storing information systematically. Attending a birthday party or any such event does not seem to automatically activate the processing of its sequence, actions and objects. The findings brought to light an important area of concern and that is inability to process information in terms of sequence. Teaching days of the week in sequence would be an exhausting activity; on the contrary, sequence in the daily routine tasks like getting up and having breakfast, going to school, coming back and spending time at home, etc. can help improve the conversational abilities to some extent.

Implementation of PECS help the child register and process information regarding any event visually, while execution of TEACCH provides visual structure to the environment and daily activities. However, the auditory input gets reduced. This reduced auditory linguistic input and increased visual input have their inherent difficulties that do not let the individual with autism make sense of the ever-changing environment around them. The environment is registered in the mind as a static object with no dynamic and functional aspects (Noens & Berckelaer-Onnes, 2005). The unrestrained, natural language use requires integration of both static and functional information. This seems to aggravate their state of form-meaning-disconnection. Therefore, they are sometimes found to have memory resources regarding concrete linguistic items, but rarely do they display memory resources pertaining to abstract concepts. The comprehensive analysis of their auditory and proprioceptive embodiment while teaching them language tasks can compliment and augment their learning. Moreover, since language use is a functional, dynamic phenomenon, what is shown through these visual strategies need to be transformed into adequate action. Only then language use of people with autism can follow a more natural trajectory, and as a result, the difficulties and strengths can be highlighted. Besides this, the nature of language development can be traced in a more systematic manner and their language comprehension in actual context can be studied effectively. This can guide towards possible language interventions in autism.

Before finalizing any pedagogical strategies, for example PECS and TEACCH, and the like, the speech language pathologists should assess individuals with autism on their visual modality. As the findings suggest, some showed intact visual, auditory and proprioceptive processing at certain places while flawed processing in the same modalities at other places. The detailed qualitative evaluation of the sensory perceptual experiences of people with autism can help explain why few or some perform well while others do not with PECS, TEACCH and other such pedagogical strategies.

Moreover, both parents and teachers who directly interact with autistic population must have general awareness about this state (Arif, Niazy, Hassan, & Ahmed, 2013) and about the effective methods to teach language and communication skills (Low, Llee, & Ahmad, 2017). This calls for a prior training and the findings of the current study guide towards this – the training needs to be provided in terms of sensory sensitivities that this population experiences. The teacher aids assigned to each child should have knowledge about the specific areas of auditory, visual, proprioceptive, etc., experiences of this population so that their strengths and weaknesses can be utilized effectively for their language development. The performance of each autistic child on sensory intervention strategies needs to be observed and recorded in comparison with language intervention strategies. Both linguistic and sensory improvement need to be studied side by side to find the determining causal links between the two. Given that the diversity of developmental trajectories of language in autism (Boucher, 2012; Tager-Flusberg, Paul, & Lord, 2005) and their diverse linguistic profiles (Kjelgaard & Tager-Flusberg, 2001) have been established with the help of the findings of the current study, a longitudinal observation and reporting can provide a better understanding of their language skills. The professionals from the field of occupational therapy, speech language therapy and linguistics can work together to design language curriculum and language intervention strategies.

Importance of using linguistic cues in the relevant social context can reduce word learning bias to nouns and there can be a progressive learning towards verb acquisition in relation to sentence structures (Arunachalam & Luyster, 2015). The findings of the current study also informed that school schema was partially present as compared to birthday party schema; the significance of the frequency of bodily interaction and the due attention given by individuals to the environment has been established. This suggests that language intervention strategies need to incorporate bodily interaction and deliberate attention of people with autism towards the environment, and to connect words with the meaning and context. This will help reduce word learning biases and the constraints that words disconnected with meaning put on the understanding of social cues. Therefore, the teacher aids and the professionals need to devise strategies to interact with people with autism in a specific context, while implementing language intervention strategies. This would generally involve making the individuals aware of their surroundings and of their own presence while connecting linguistic cues to their meanings in the given social context.

5.4 Strengths and Limitations of the Study

Price and Murnan (2013) defined limitations as opportunities to identify the needs for potential future research. In terms of participants and sample, the population was selected from one resource center – Autism Resource Center (ARC), Westridge, Rawalpindi. Therefore, all available 13 verbal children with autism of ARC, regardless of different age, gender and autism levels, became the sample population of the study. Although this was done with specific aim to include sample who undergo sensory therapy at center and whose teacher aids are also aware of this aspect of their state since they were important informant in this respect, the ages of the children were not considered while analyzing linguistic and behaviour data. Given that autism is a developmental disorder and the state of people with autism change with age (Tager-Flusberg, 2004), this limitation seems to identify a need for future research to replicate the study by dividing children into different age brackets and by comparing the nature of knowledge structures their language use discloses. A longitudinal study, while keeping age as main variable, can also unleash the nature and speed of language development and concept formation in people with autism.

Despite this limitation, the current study is still a valuable contribution to the field of autism through the lenses of CL. The study explored the way people with autism process sensory input from the external world through their unique sensory-perceptual experiences and ascertained the way perceptual knowledge (schemas) of autistics is structured at conceptual level. In other words, the study discovered the determining role of the non-verbal (sensory perceptual) behaviours in the language use of verbal children with autism and ascertained their cognitive styles. Besides this, the study tried to determine the extent to which their embodied cognition, embodied experience and experiential realism in relation to their percepts (on-line perception) and concepts (off-line cognition) are a manifestation of their peculiar meaning-making. It provides the significant stage to further carry out the language research in autism, with confidence now, from the standpoint of embodied processing.

5.5 Recommendations for Future Research

Since the current study tried to establish the relationship between embodiment, conceptualization and language in the realm of Cognitive Semantics, it assumes to provide a first step towards research in other related areas of language in autism. The following directions are suggested from the standpoint of embodied processing for future language research in autism.

1. The determining effects of schemas (basic knowledge structures) on the construction of frames and categories (encyclopedic knowledge) in autism can further reveal the nature of meaning representation in the language use of people with autism.
2. Language is a developmental phenomenon. Language in autism also develop through intervention strategies. Hence, future linguists can conduct longitudinal studies to identify the nature of developmental trajectories in people with autism at different age level/stages, with reference to their embodiment.
3. The interaction with selected sample also revealed their tendency to communicate through lexical content most of the time. Their lexical content can be further studied in terms of use and learning of nouns with specific reference to visual embodiment, and verbs with specific reference to their proprioceptive embodiment. The use of adjectives in the language use of individuals with autism and the use of grammatical items like prepositions, adverbs, conjunctions, and the like can also give valuable insights in terms of their embodied linguistic processing. These different areas of research in linguistics from the perspective of 'embodied processing' can provide solutions to the problems related to language development and language use in autism.
4. As focus of current research was on language and conceptualization of verbal children with autism in the light of their sensory perceptual experiences – embodiment, future reseach can focus on finding out the extent to which the sensory experiences of individuals with autism, both verbal and non-verbal, help and/or impede their language development. This can be done through longitudinal study where language development can be observed in relation to their sensory experiences. The longitudinal study will further help testifying the determining role of individual embodiment on individual language skills. Moreover, the research regarding relation between sensory

perceptual experiences, language and communication issues can compliment the reseach regarding relationship between sensory experiences and traits of autism in a more holistic, comprehensive manner.

5. Future research can replicate the study with some nuerotypicals of the same age and compare their mental representations pertaining to the event schemas. The difference can then highlight the discrepancy between both embodied models.
6. As suggested by few studies, the need is to find out if there is any correlation between sensory experiences, the severity and the level of autism.
7. The aim of the study was not to find any connection between sensory experiences and severity of autism for the sake of suggesting something to the diagnostic criteria. Nonetheless, future research can dig deep into this for comparative studies to see any such correlation.

5.5 Conclusion

Cognitive Linguistics is an expansive enterprise that adopted a combination of theories and methodologies from neighboring disciplines like cognitive science and psychology. Besides suggesting different methodologies, it offers a handful of theories to explore and verify the relationship between language and conceptualization. The present study optimized both the productive methodological and theoretical flexibility of Cognitive Linguistics/Semantics and provided a new yet practical lense to view autism.

The knowledge and understanding of nature of physical schemas in relation with the embodiment can contribute significantly to the autism research in the context of their language learning. Moreover, since embodiment is the prime tenant of every theory in cognitive semantics, the future research in this area is suggested in the light of their embodied processing. The in-depth analysis of embodied cognition of individuals with autism has attempted to provide a groundwork for future research in autism from the perspective of Cognitive Linguistics. The current study is a valuable contribution to the field of autism through the lenses of CL.

The discourse regarding autism needs a change – a positive one where ‘cognitive deficits’ should be replaced with ‘cogitive styles’ and sensory dysfunctions/disorders should be replaced with ‘sensory experiences’. There is a dire need to open our minds to their differences (Picture Autism, 2016). The study is concluded with the suggestion of Bogdashina (2010) who endorsed that “[t]here is by no means a dysfunctional world. It is rather a completely different world” (p. 24); and with the words of Clark (1998) who magnifies Cognitive Semantics as

> a science whose tools and models are surprisingly different – a cognitive science of the embodied mind. It is surely not the last new science of mind. But it is one more step along that most fascinating of journeys: the mind’s quest to know itself and its place in nature. (p. Preface xiii)

Hence, this humble yet fascinating view of embodiment – embodied mind, embodied concepts and embodied language – should supplant the existing cognitive approaches to view and study language in autism.

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APPENDIX A

Verbalization Styles/Abilities of All 13 Children with Autism

Az

CARS 2 declares his *verbal communication* to be mildly abnormal. His speech, though meaningful, exhibits overall retardation with limited verbal initiation. Sometimes, he responds with guttural sounds and sometimes he gets engaged in one-sided conversations – animal sounds. His family members and familiar and unfamiliar adults understand his speech and can make meaning out of it most of the times. He observes *non-verbal communication* appropriately according to his age and the situation.

The observation by SLP informs us about his *general linguistic level*. He can use sentences which contain either one word, two words, three words, or four words at the same time. As for his *receptive skills*, he is reported to get confused in the situations like 'who did what to whom'; he looks blank quite often, loses concentration during the talk with an adult and never responds meaningfully to questions within few seconds – he takes time. Having said that, he sometimes understands questions (both 'yes/no' & 'wh'), verbal hints and most part of the conversation, and tries to respond to statements, comments and questions. Most of the times, he listens without interrupting and begins a task or responds after instructions/commands/statements are over. As for his *expressive skills*, he imitates sounds, and sometimes asks for appropriate information ('yeh kiya hua' in response to any sound & 'yeh kiya hai') and makes appropriate requests while expressing an appropriate need/desire (wo day dain). Sometimes he smiles when he receives appreciation and displays proper turn taking style, where sometimes he is seen not just to initiate a conversation with an adult but also to maintain it – though he sometimes also loses track of conversation (as mentioned earlier). He asks questions out of curiosity (hum kahaan jaa rehay hain?).

Aa

CARS 2 announces her verbal communication to be mildly abnormal. Although most of the speech is meaningful, it shows overall retardation. Her stereotyped speech includes ‘repetitive guttural sound’ and ‘repetitive humming’. Her non-verbal communication is reported to be mildly abnormal and immature – she reaches for the things instead of pointing at them and cannot use gestures appropriately and according to the situation.

According to the general observation of SLP, she knows hr name, responds to it, can make use of quite a few consecutive sentences; her sentence length is upto four or more words and her speech is meaningful too. Familiar adults and family members understand her but unfamiliar adults sometimes feel it difficult to understand her. Her receptive skills are quite satisfactory. She remembers information, eps the information in the sequence. She not only understands much of the talk, but also responds to the questions and statements within few seconds. she can answer ‘yes/no’ and ‘wh’ questions and responds meaningfully to what is asked from her. She can also interpret environmental noises and sounds and most of the time listens to others without interrupting. However, sometimes she loses focus of the conversation. Likewise, her expressive skills are satisfying too. She can express her needs and desires, can complain and can disagree. She makes polite requests, repairs her answers if the adults do not understand it and ask her to repeat. She also revises her wrong answers by herself. She asks questions out of curiosity, and for more information. She composes questions, esp ‘wh’ and ‘yes/no’ questions sometimes and identifies feelings. She can sometimes explain them too. She can also begin a conversation and maintain and end it too. Most of the times, she does not interrupt and displays accurate turn taking style. She can also convey her message to adults in a way that is understandable by them.

Im

CARS 2 reports his *verbal communication* as mildly abnormal. Speech is usually meaningful, but retarded in general – with instances of echolalia, jargons and pronoun reversal. *Non-verbal communication* is mild to moderately abnormal – usually he cannot articulate his needs through gestures or pointings and mostly cannot understand the body language of others.

According to the *general observation* of SLP, he oftentimes uses several successive sentences and his one sentence can have one, two, three, four or more words. Having said that, he is only understood by familiar adults and family members. As for his *receptive skills*, he is reported to remember information but can not memorize common sequences like days of the week. However, he understands most of what is communicated to him, either verbally or through intonation, and performs according to commands and requests. He understands questions and attempts to respond; can answer 'yes/no' and 'wh' questions. He is observed getting attention of the adults sometimes appropriately. Unlike his receptive behaviour, his *expressive skills* are not satisfactory. Only sometimes he can initiate and maintain topic of conversation – he performs proper turn taking style and convene correctly. At times, he expresses his specific need verbally. On the other hand, he can not give adequate information in response to any question. He can not express his emotions, nor can he ask questions or use gestures. He never asked 'wh' or 'yes/no' questions. His pronoun usage is incorrect too and he can not make himself understandable to others.

Hl

CARS 2 announces his *verbal communication* to lie somewhere between mild to moderately abnormal. Meaningful speech is usually absent; his speech is a mixture of pronoun reversal, (rhythmic) jargons and echolalia (both immediate and delayed). His *non-verbal communication* lies at some place between normal and mildly abnormal – he points at things immaturely sometimes and other times the use of pointing and gestures is appropriate to the situation.

According to the *general observation* of SLP, he knows his name and responds when he is addressed by his name. As for his sentence level, he can make one-word sentence to a sentence of four word and more words. Sometimes his speech is meaningful and only his family members understand him. His *receptive skills* are limited: he cannot remember information, especially that is in sequence; he does not try responding to the questions and statements and if he does, he does not respond meaningfully (but only with prompt); he does not answer ‘wh’ and/or ‘yes/no’ questions; and he cannot concentrate during any conversation. Nevertheless, he understands much of what is said to him and carries out commands and requests, but sometimes looks blank and confused. He also sometimes listens to the other speaker and does not interrupt. His *expressive skills* are not satisfactory at all; he cannot initiate, maintain and /or conclude the talk; he cannot convey his point to the other person; he cannot repair his wrong/incomplete response; he cannot express his feelings; he does not ask ‘yes/no’ and/or ‘wh’ questions; and he cannot use pronouns correctly. On the other hand, he imitates musical sounds like songs and ads; he expresses desires and needs but not in the form of a proper sentence – points at the thing that he needs and takes its name only. Another thing important to highlight is that only with threats and prompts, he gives sufficient information – otherwise not. He complains sometimes, but uses one word only; sometimes, he asks questions out of curiosity.

Ah

CARS 2 affirms that his *verbal communication* lie between mildly abnormal to moderately abnormal. His speech includes jargons, echolalia and obsessive use of language related to Dora or any other animate character that he gets fascinated with. His speech is mostly meaningless. However, his *non-verbal* communication is reported as situation and age appropriate.

The SLP declares his *general* speech and language skills as somewhat satisfactory – from knowing his name to responding to it, he uses up to four or more words in his sentences and can use several successive sentences, though theses sentences are the expressions of cartoon movies that he repeats due to ‘delayed echolalia’. His speech is not meaningful and only familiar adults and family members can understand his peculiar speech and make meaning out of it. His *receptive skills* are reported as unsatisfactory – he cannot concentrate during conversation; his way of getting attention is inappropriate; he does not understand questions, nor does he try to respond; he does not answer ‘yes/no’ and/or ‘wh’ questions – the only ‘wh’ question that he responds to is ‘what’s this’. Nevertheless, sometimes, he understands much of the talk while other times he looks confused and blank. He also sometimes understands questions, commands and requests and performs accordingly. Besides this, he sometimes feels trouble remembering information, especially if it is in sequence – days of the week, months of the year, etc. His *expressive skills* are announced as unsatisfactory – only sometimes, he expresses his needs and desires. Otherwise, he can neither initiate, nor maintain or conclude any talk. He cannot ask questions, neither ‘yes/no’ nor ‘wh’, or request for more information. He cannot give adequate information and does not display appropriate turn taking style; he cannot revise his incomplete or wrong response, nor can he convey his message across. He cannot identify and/or explain his emotions and feelings, nor can he complain about anything.

Mm

CARS 2 informs her verbal communication to be somewhere between normal and mildly abnormal. Most of her speech is intelligible with some instances of delayed echolalia. Her non-verbal communication is somewhere between situation and age appropriate and mildly abnormal. She tries to reach for something that she wants instead of pointing at them.

According to the *general observation* of SLP, she can use a sentence comprises of four or more words, and not just knows her name, but also responds too when called. Her speech is relevant and not only familiar but even unfamiliar adults understand her speech. As for her *expressive skills*, she can initiate, maintain and end any conversation. She can make herself and her desires understood. She can sometimes identify and express feelings but refers to herself by her name (Mm is happy; Ma is sad). She is also seen requesting for and offering help. Her *receptive skills* are satisfactory too. She understands questions and statements, does not interrupt and listen complete instructions before starting off with any task. She can answer ‘wh’ and ‘yes/no’ questions, and most of the times responds to the questions and statements meaningfully. However, she is sometimes observed to look confused and blank as if she did not understand anything.

Zb

<u>CARS 2</u> reveals her *verbal communication* to be somewhere between normal and mildly abnormal – most speech is meaningful but shows overall retardation. Speech shows some signs of delayed echolalia and use of jargons/peculiar words. Nevertheless, other times her speech is appropriate to the situation. As for her *non-verbal communication*, it also lies somewhere between normal and mildly abnormal – sometimes gestures vaguely or trues to reach for the object instead of pointing at it. Other times, she points appropriately and asks for it too.

The *general* <u>observation of SLP</u> suggests that she knows her name and responds to it too. She can use sentences with one, two, three and four or more words and can often use many successive sentences. However, sometimes her speech gets irrelevant. Therefore, she is understood only by her family members and familiar adults. Her *expressive skills* are somehow satisfactory – only sometimes she can start, maintain and end a conversation; sometimes she expresses desires or her needs and makes herself understood; sometimes she asks ‘wh’ and ‘yes/no’ questions; and sometimes she formulates questions too. Likewise, her *receptive skills* are somehow satisfying – she is good at carrying out commands and requests; understands questions and much of what is told her; can answer ‘yes/no’ questions and responds within few seconds. However, she only sometimes answers ‘wh’ questions, often looks confused or blank; sometimes can not concentrate during the conversation; sometimes struggle to answer and that also meaningfully; and sometimes can not remember information.

Ma

CARS 2 declares his verbal communication as mildly abnormal to moderately abnormal. The speech is sometimes meaningful with some instances of echolalia while at other times is shows retardation. His non-verbal communication is reported as sometimes normal and situation appropriate, while sometimes mildly abnormal since he reaches for the things and point at them immaturely and vaguely.

According to the general observation of SLP, his speech is relevant, and everyone can understand him – familiar/unfamiliar people and family members. Although he can not use several consecutive sentences, but he can make up sentences of up to four and more words. He knows his name, responds to it and knows more than 10 words. His *receptive skills* are somewhat satisfactory. He understands most of the things communicated to him, answers ‘yes/no’ and ‘wh’, responds to statements within few seconds and performs according to the directions and requests; however, the verbal response is sometimes meaningful and sometimes irrelevant. He often looks blank and sometimes can not concentrate during the conversation. He remembers information especially common sequences like days of the week, etc. As for his *expressive skills*, he can express his needs and desires, make polite requests, express his feelings, blame others and display proper turn taking style. Moreover, he can ask ‘yes/no’ and ‘wh’ questions. On the other hand, he can not initiate, maintain or end any talk nor can he repair his incomplete message. Sometimes he gives adequate information while sometimes he does not. He identifies feelings and emotions, but only sometimes can explain them and make complaints as well.

As

CARS 2 indicates his *verbal communication* to be moderately abnormal. Meaningful speech is absent. His communication via *non-verbal* means fall somewhere between normal and mildly abnormal – sometimes it is appropriate according to situation and his age, while other times he observes immature use of gestures and point at things vaguely.

According to the *general observation* of SLP, he sometimes can use one word or three words at a time, but can use two words at a time. His *expressive skills* are not satisfactory since he only sometimes expresses desires or requests assistance and only sometimes manages to maintain a conversation. However, he is seen demonstrating appropriate turn taking behaviour and facial expressions and posture according to his mood. Likewise, his *receptive skills* are not satisfying either. He sometimes answers 'wh' questions and also sometimes manages to listen to the other person without interrupting. He has difficulty remembering information esp. sequence of days, and can not concentrate during conversation.

As for his semantic structure, only immediate echolalia was observed.

An

CARS 2 announces his *verbal communication* as normal to mildly abnormal – most speech is relevant and meaningful with the usage of some jargons and peculiar words. Most of the times, his speech is appropriate to the situation. His *non-verbal communication* is sometimes appropriate while other times it shows some signs of immaturity.

According to the *general observation* of SLP, he knows his name, responds to it and can use from one to four or more words in his sentences. Moreover, he can also make use of distinct sentences consecutively during the talk. His family members and other people, whether they are familiar with him or not, understand his speech. As for his *receptive skills* they are quiet satisfying. He remembers information but sometimes forgets the common sequences like days of the week, etc. He understands most of what is conveyed to him through questions (‘yes/no’ & ‘wh’) and statements, and responds within few seconds; he does not seem or sound as blank or confused. He can interpret environmental sounds and is very good at reading non-verbal hints like facial expressions and gestures; he also understands intonation and sometimes performs according to commands and requests. Most of the times, he listens others without interrupting. However, he has a habit of obtaining attention in inappropriate ways and at inappropriate times and loses focus of the conversation. Similarly, his *expressive skills* are satisfactory too. He expresses his desires and needs, blame others, complains and sometimes makes polite requests too. He asks ‘wh’ and ‘yes/no’ questions, asks questions out of curiosity, disagrees and argues, and uses pronouns correctly. He can also initiate, but sometimes maintain and end conversation and can convey his message to others too.

Il

CARS 2 indicates his verbal communication as mildly abnormal – the speech is delayed with some instances of echolalia (both delayed and immediate), but most of the time it is meaningful. His non-verbal communication is reported to be appropriate according to his age and to the situation that he experiences.

According to the general observation of SLP, he knows his name and responds to it too. His sentences can have upto four or more words and he often times uses consecutive sentences in his speech which are meaningful and relevant. That's why he is understood by adults, both familiar and unfamiliar, and his family members. His receptive skills are somewhat satisfactory too. He understands questions (only 'yes/no' and not 'wh') and statements and responds meaningfully to them within few seconds. he can interpret environmental sounds and responds to the too. He also performs according to commands and requests and do not interrupt the speaker. He remembers information and common sequences, like days of the week, etc. However, he finds it difficult to concentrate during the conversation. On the other hand, his expressive skills are unsatisfactory. . He cannot convey his message effectively. He does not display appropriate turn taking and does not give sufficient information. He also cannot ask 'yes/no' and/or 'wh' questions. Only sometimes, he expresses his needs and desires and sometimes can initiate, maintain and end the conversation too.

Rn

CARS 2 confirms his verbal communication to lie somewhere between mildly abnormal to moderately abnormal. With some instances of meaningful speech, he speech shows overall delay and sometimes speech is altogether absent. Sometimes he speaks meaningfully, but sometimes he uses peculiar, unintelligible jargons which are difficult to interpret. He uses non-verbal communication sometimes appropriately, while at other times, he points vaguely at the objects and tries to reach for the things.

According to the general observation of SLP, his speech is only sometimes relevant and only his family members can understand him – but that only sometimes. Other familiar and unfamiliar adults cannot understand his speech. However, he knows his name, responds to it and can use up to four or more words in his sentences. He is never seen using many consecutive sentences. As for his receptive skills, he understands most of the information, whether it is in the form of statements or questions. He only understands ‘wh’ questions and responds to them within few seconds. Despite that he performs according to the requests and commands most of the times and does not look confused and/or blank, he has some difficulty concentrating during the talk. His expressive skills are reported to be unsatisfactory – he cannot initiate and/or end a conversation, nor can he repair his incomplete response; he cannot use facial expressions and gestures; he cannot display proper turn taking style; he cannot explain and/or identify his feelings; he cannot ask for further information nor can he convey his message to others; and he cannot use pronouns correctly. The only expressive skills that he displays are providing with sufficient information when asked for it, complaining, disagreeing verbally, and expressing his needs and desires.

APPENDIX B

CARS 2: Embodiment of All 13 Children with Autism

Az

1. **Body Use**

3	Moderately abnormal body use. Behaviours that are clearly strange or unusual for a child of this age may include strange finger movements, peculiar finger or body posturing, staring or picking at the body, self-directed aggression, rocking, spinning, finger-wiggling, or toe-walking.

2. **Listening Response**

1	Age appropriate listening response. The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.
1.5	**(if between these points)**
2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. **Verbal Communication**

2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.

4. **Non-Verbal Communication**

1	Normal use of non-verbal communication, age and situation appropriate

5. **Visual Response**

1	Age appropriate visual response – The child's visual response is normal and appropriate for that age. Vision is used together with other senses as a way to explore new objects.
1.5	**(if between these points)**
2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Wn

1. Body Use

1	Age appropriate body use. The child moves with the same ease, agility, and coordination of a normal child of the same age.

2. Listening Response

2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. Verbal Communication

4	Severely abnormal verbal communication. Meaningful speech is not used. The child may make infantile squeals, weird or animal-like sounds, complex noises approximating speech, or may show persistent, bizarre use of some recognizable words or phrases.

4. Non-Verbal Communication

2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. Visual Response

3	Moderately abnormal visual response – The child must be reminded frequently to look at what he or she is doing. He or she may stare into space, avoid looking people in the eye, look at objects from an unusual angle, or hold objects very close to the eyes.

Aa

1. Body Use

2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.

2. Listening Response

1	Age appropriate listening response. The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.
1.5	**(if between these points)**
2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. Verbal Communication

2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.

4. Non-Verbal Communication

2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. Visual Response

2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Im

1. **Body Use**

2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.

2. **Listening Response**

2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. **Verbal Communication**

2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.

4. **Non-Verbal Communication**

2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.
2.5	**(if between these points)**
3	Moderately abnormal use of non-verbal communication – The child is generally unable to express needs or desires nonverbally and cannot understand the nonverbal communication of others.

5. **Visual Response**

2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Hl

1. **Body Use**

2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.

2. **Listening Response**

2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. **Verbal Communication**

2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.

4. **Non-Verbal Communication**

1	Normal use of non-verbal communication, age and situation appropriate
1.5	**(if between these points)**
2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. **Visual Response**

1	Age appropriate visual response – The child's visual response is normal and appropriate for that age. Vision is used together with other senses as a way to explore new objects.
1.5	**(if between these points)**
2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Ah

1. **Body Use**

2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.
2.5	**(if between these points)**
3	Moderately abnormal body use. Behaviours that are clearly strange or unusual for a child of this age may include strange finger movements, peculiar finger or body posturing, staring or picking at the body, self-directed aggression, rocking, spinning, finger-wiggling, or toe-walking.

2. **Listening Response**

1	Age appropriate listening response. The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.
1.5	**(if between these points)**
2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. **Verbal Communication**

2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.
2.5	**(if between these points)**
3	Moderately abnormal verbal communication. Speech may be absent. When present, verbal communication may be a mixture of some meaningful speech and some peculiar speech such as jargon, echolalia, or pronoun reversal. Peculiarities in meaningful speech include excessive questioning or preoccupation with particular topics.

4. **Non-Verbal Communication**

1	Normal use of non-verbal communication, age and situation appropriate

5. **Visual Response**

1	Age appropriate visual response – The child's visual response is normal and appropriate for that age. Vision is used together with other senses as a way to explore new objects.
1.5	**(if between these points)**
2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Mm

1. **Body Use**

1	Age appropriate body use. The child moves with the same ease, agility, and coordination of a normal child of the same age.
1.5	**(if between these points)**
2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.

2. **Listening Response**

1	Age appropriate listening response. The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.
1.5	**(if between these points)**
2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. **Verbal Communication**

1	Normal verbal communication, age and situation appropriate.
1.5	**(if between these points)**
2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.

4. **Non-Verbal Communication**

1	Normal use of non-verbal communication, age and situation appropriate
1.5	**(if between these points)**
2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. **Visual Response**

2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Zb

1. Body Use

1	Age appropriate body use. The child moves with the same ease, agility, and coordination of a normal child of the same age.
1.5	**(if between these points)**
2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.

2. Listening Response

1	Age appropriate listening response. The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.
1.5	**(if between these points)**
2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. Verbal Communication

1	Normal verbal communication, age and situation appropriate.
1.5	**(if between these points)**
2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.

4. Non-Verbal Communication

1	Normal use of non-verbal communication, age and situation appropriate
1.5	**(if between these points)**
2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. Visual Response

1	Age appropriate visual response – The child's visual response is normal and appropriate for that age. Vision is used together with other senses as a way to explore new objects.
1.5	**(if between these points)**
2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Ma

1. Body Use

1	Age appropriate body use. The child moves with the same ease, agility, and coordination of a normal child of the same age.

2. Listening Response

1	Age appropriate listening response. The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.

3. Verbal Communication

2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.
2.5	**(if between these points)**
3	Moderately abnormal verbal communication. Speech may be absent. When present, verbal communication may be a mixture of some meaningful speech and some peculiar speech such as jargon, echolalia, or pronoun reversal. Peculiarities in meaningful speech include excessive questioning or preoccupation with particular topics.

4. Non-Verbal Communication

1	Normal use of non-verbal communication, age and situation appropriate
1.5	**(if between these points)**
2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. Visual Response

2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

As

1. Body Use

2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.

2. Listening Response

2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. Verbal Communication

3	Moderately abnormal verbal communication. Speech may be absent. When present, verbal communication may be a mixture of some meaningful speech and some peculiar speech such as jargon, echolalia, or pronoun reversal. Peculiarities in meaningful speech include excessive questioning or preoccupation with particular topics.

4. Non-Verbal Communication

1	Normal use of non-verbal communication, age and situation appropriate
1.5	**(if between these points)**
2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. Visual Response

1	Age appropriate visual response – The child's visual response is normal and appropriate for that age. Vision is used together with other senses as a way to explore new objects.
1.5	**(if between these points)**
2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

An

1. **Body Use**

1	Age appropriate body use. The child moves with the same ease, agility, and coordination of a normal child of the same age.
1.5	**(if between these points)**
2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.

2. **Listening Response**

2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.
2.5	**(if between these points)**
3	Moderately abnormal listening response. The child's responses to sounds vary; often ignores a sound the first few times it is made; may be startled or cover ears when hearing some everyday sounds.

3. **Verbal Communication**

1	Normal verbal communication, age and situation appropriate.
1.5	**(if between these points)**
2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.

4. **Non-Verbal Communication**

1	Normal use of non-verbal communication, age and situation appropriate
1.5	**(if between these points)**
2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. **Visual Response**

1	Age appropriate visual response – The child's visual response is normal and appropriate for that age. Vision is used together with other senses as a way to explore new objects.
1.5	**(if between these points)**
2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Il

1. Body Use

1	Age appropriate body use. The child moves with the same ease, agility, and coordination of a normal child of the same age.

2. Listening Response

1	Age appropriate listening response. The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.
1.5	**(if between these points)**
2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. Verbal Communication

2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.

4. Non-Verbal Communication

1	Normal use of non-verbal communication, age and situation appropriate

5. Visual Response

1	Age appropriate visual response – The child's visual response is normal and appropriate for that age. Vision is used together with other senses as a way to explore new objects.
1.5	**(if between these points)**
2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

Rn

1. **Body Use**

1	Age appropriate body use. The child moves with the same ease, agility, and coordination of a normal child of the same age.
1.5	**(if between these points)**
2	Mildly abnormal body use. Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.

2. **Listening Response**

1	Age appropriate listening response. The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.
1.5	**(if between these points)**
2	Mildly abnormal listening response. There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.

3. **Verbal Communication**

2	Mildly abnormal verbal communication. Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.
2.5	**(if between these points)**
3	Moderately abnormal verbal communication. Speech may be absent. When present, verbal communication may be a mixture of some meaningful speech and some peculiar speech such as jargon, echolalia, or pronoun reversal. Peculiarities in meaningful speech include excessive questioning or preoccupation with particular topics.

4. **Non-Verbal Communication**

1	Normal use of non-verbal communication, age and situation appropriate
1.5	**(if between these points)**
2	Mildly abnormal use of non-verbal communication – Immature use of non-verbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.

5. **Visual Response**

1	Age appropriate visual response – The child's visual response is normal and appropriate for that age. Vision is used together with other senses as a way to explore new objects.
1.5	**(if between these points)**
2	Mildly abnormal visual response – The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirror or lighting than peers, may occasionally stare off into space or may also avoid looking people in the eye

APPENDIX C

Sensory Profile Checklist – Revised

Name of the child: ______________________________

Birthdate: ____________________________________

Diagnosed: ____________________________________

When? ____

Where? ____

Instructions:

Please tick the appropriate answer to indicate the statement described as:

- **WT** – was true any time in the past: in brackets specify the age of the child when the statement was true e.g. (two – five years)
- **T** – true now (if it was true and is true now, tick both answers)
- **F** – false (if the statement is not true)
- **NS** – not sure or do not know

Additional information is welcome: write it in front of the question.

Please feel free to write in Urdu if that is convenient for you.

Please try to answer all the questions

No.	Behaviours	WT	T	F	NS	Additional information
1.	Resists any change					
2.	Notices any tiny change in the environment					
3.	Does not recognize a familiar environment if approaches it from a different direction					
4.	Does not recognize people in unfamiliar clothes					
5.	Is not fooled by optical illusions					
6.	Constantly looks at minute particles, picks up smallest pieces of fluff					
7.	Dislikes dark and bright lights					
8.	Is frightened by sharp flashes of light, lightening, etc.					
9.	Looks down most of the time					
10.	Covers, closes, or squint eyes at bright light					
11.	Is attracted to lights					
12.	Looks intensely at objects and people					
13.	Moves fingers or objects in front of eyes					

14.	Is fascinated with reflections, bright coloured objects					
15.	Runs a hand around the edge of the object					
16.	Perimeter hugging					
17.	Gets easily frustrated/tired under fluorescent lights					
18.	Gets frustrated with certain colours (please specify)					
19.	Is fascinated with coloured and shining objects (please specify)					
20.	May respond differently (pleasure – indifference – distress) to the same visual stimuli					
21.	Selects for attention minor aspects of objects in the environment instead of the whole thing (e.g. a wheel rather than a whole toy car, etc.)					
22.	Gets lost easily					
23.	Fears heights, stairs, escalators					
24.	Has difficulty catching ball					
25.	Appears startled when being approached suddenly					
26.	Makes compulsive repetitive hand, head or body movements that fluctuate between near and far					
27.	Hits/rubs eyes when distressed					
28.	Feels/acts blind					
29.	Ritualistic behaviour					
30.	Response to visual stimuli is delayed (e.g. fails to close eyes when the light is being switched on)					
31.	Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing					
32.	Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli					
33.	Does not seem to see if listening to something					
34.	Avoids direct eye contact					
35.	Appears to be a mindless follower					
36.	Surprises with knowing ‘unknown’ information					
37.	Smells, licks, touches or taps objects					
38.	Seems to be absorbed with lights, colours, patterns					
39.	Seems to know what other people (who are not present) are doing					
40.	Covers/rubs/blinks, etc. eyes in response to a sound/touch/smell/taste movement					

41.	Complains about (is frustrated with) the wrong colours of letters/numbers, etc. on coloured blocks, etc.					
42.	Displays a good visual memory					
43.	Reactions are triggered by lights, colours, patterns					
44.	Easily solves jigsaw puzzles					
45.	Remembers routes and places					
46.	Memorizes enormous amount of information at a glance					
47.	Poor at mathematics					
48.	Learns nouns first					
49.	Has difficulties with adverbs and prepositions					
50.	Idiosyncratic patterns in language development (e.g. names one thing to denote the other, etc.)					
51.	Gets easily frustrated when trying to do something in a noisy crowded room					
52.	Does not seem to understand instructions if more than one person is talking					
53.	Covers ears at many sounds					
54.	Is a very light sleeper					
55.	Is frightened by animals					
56.	Dislikes thunderstorm, sea, crowds					
57.	Dislikes haircut					
58.	Avoids sounds and noises					
59.	Makes repetitive noises to block out other sounds					
60.	Bangs objects, doors					
61.	Likes vibration					
62.	Likes kitchen and bathroom					
63.	Likes traffic, crowds					
64.	Is attracted by sounds, noises					
65.	Tears papers, crumples paper in the hand					
66.	Makes loud rhythmic noises					
67.	Gets frustrated with certain sounds (please specify)					
68.	Tries to destroy/break objects producing sounds					
69.	Is fascinated with certain sounds (please specify)					
70.	May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)					
71.	Hears a few words instead of the whole sentence					
72.	Pronunciation problems					
73.	Unable to distinguish between some sounds					

74.	Hits ears when distressed					
75.	Feels/acts deaf					
76.	Response to sounds, questions, instructions is delayed					
77.	Echolalia in monotonous, high-pitched, parrot like voice					
78.	Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli					
79.	Does not seem to hear if looking at something					
80.	Reacts to instructions better when they are ‘addressed to the wall’					
81.	Looks for the source of the sound					
82.	Seems to be absorbed (merged) with sounds					
83.	Seems to be able to ‘read’ thoughts, feelings, etc. of others					
84.	Complains about ‘non-existent’ conversations, sounds					
85.	Covers/hits ears in response to lights/colours/touch/texture/smell/taste movement					
86.	Complains about (is frustrated with) a sound in response to colours/textures/touch/scent/flavour/movement					
87.	Displays a good auditory memory (for nursery rhymes, songs, etc.)					
88.	Reactions are triggered by sounds/words					
89.	Uses idiosyncratic routinized responses					
90.	Uses songs, commercials etc, to respond					
91.	Cannot keep track of conversation					
92.	Composes musical pieces, songs					
93.	Unable to distinguish between tactile stimuli of different intensity (e.g. light and rough touch)					
94.	Resists being touched					
95.	Cannot tolerate new clothes; avoids wearing shoes					
96.	Overreacts to heat/cold/pain					
97.	Avoids getting messy					
98.	Dislikes food of certain texture (please specify)					
99.	Moves away from people					
100.	Insists on wearing the same clothes					
101.	Likes pressure, tight clothing					
102.	Seeks pressure by crawling under heavy objects, etc.					
103.	Hugs tightly					
104.	Enjoys rough and tumble play					
105.	Prone to self-injuries					

106.	Low reaction to pain, temperature					
107.	Cannot tolerate certain textures (please specify)					
108.	Is fascinated with certain textures (please specify)					
109.	May respond differently (pleasure – indifference –distress) to the same tactile stimuli (clothes, touch, heat pain, etc.)					
110.	Complains about parts of the clothes					
111.	Hits/bites themselves when distressed					
112.	Feels/acts numb					
113.	Sudden outbursts of self-abuse/tantrum or withdrawal in response to tactile stimuli					
114.	Does not seem to feel being touched if looking at/listening to something					
115.	Fails to define either texture or location of touch					
116.	Can tolerate only ‘instrumental’ (not ‘social’) touch					
117.	Sometimes does not react to any tactile stimuli					
118.	Seems to be absorbed (merged) with certain textures					
119.	Seems to feel pain of others					
120.	Complains about beings touched/hot/cold, etc. in the absence of the stimuli					
121.	Complains about (is frustrated with) feeling colours, sound, etc. when being touched					
122.	Complains about (is frustrated with) feeling being touched when being looked at					
123.	Complains about (is frustrated with) backache, etc./heat/cold in colourful/noisy/crowded places					
124.	Displays a good tactile memory					
125.	Reactions are triggered by textures/touch/temperature					
126.	Unable to distinguish between strong and weak odours					
127.	Toileting problems					
128.	Runs from smells					
129.	Smells self, people, objects, etc.					
130.	Smears/plays with faces					
131.	Seeks strong odour					
132.	Bedwetting					
133.	Cannot tolerate certain smells (please specify)					
134.	Is fascinated with some smells (please specify)					
135.	May respond differently (pleasure – indifference –distress) to the same smells					

136.	Complains about smells of some pieces of food while ignoring the rest					
137.	Hits nose when distressed					
138.	Has difficulty in interpreting smells					
139.	Response to smell is delayed					
140.	Sudden outbursts of self-abuse/tantrums or withdrawal in response to smells					
141.	Does not seem to feel smell when looking/listening etc.					
142.	Avoids direct smells					
143.	Sometimes does not react to any smell					
144.	Inspects food before eating					
145.	Seemed to be absorbed (merged) with smells					
146.	Complains/talks about 'non-existent' smells					
147.	Covers/rubs/hits nose in response to a visual/auditory stimulus/touch/taste/movement					
148.	Complains about (is frustrated with) the smell in response to a visual/auditory stimulus/touch/taste/movement					
149.	Displays a good memory for smells					
150.	Reactions are triggered by smells					
151.	Unable to distinguish between strong and weak tastes					
152.	Poor eater					
153.	Uses the tip of the tongue for tasting					
154.	Gags/vomits easily					
155.	Craves certain (plain) foods					
156.	Eats everything (pica) [eats everything except food – like dirt, paint, cement, etc.]					
157.	Mouths and lick objects					
158.	Eats mixed food (e.g. sweet and sour)					
159.	Regurgitates [to bring food that has been swallowed back up into the mouth again]					
160.	Cannot tolerate certain food (please specify)					
161.	Is fascinated with certain tastes (please specify)					
162.	May respond differently (pleasure – indifference – distress) to the same food					
163.	Is confused with (complains about) the food he used to like					
164.	Has difficulty in interpreting tastes					
165.	Response to taste is delayed					
166.	Sudden outbursts of self-sbuse/tantrums or withdrawal in response to taste					
167.	Does not feel any taste while eating something and looking at/listening to something					
168.	A very careful eater					
169.	Sometimes does not react to any taste					

170.	Seems to be absorbed (merged) with certain food					
171.	Complains/talks about 'non-existent' taste in mouth					
172.	Makes swallowing movements in response to a visual/auditory stimulus/touch/smell/movement					
173.	Complains about (is frustrated with) some tastes in response to a visual/auditory stimulus/touch/smell/movement					
174.	Displays a good memory for tastes					
175.	Reactions are triggered by certain food					
176.	Clumsy; moves stiffly					
177.	Odd body posturing (places the body in strange positions)					
178.	Difficulty manipulating small objects (e.g. buttons)					
179.	Turns the whole body to look at something					
180.	Low muscle tome					
181.	Has a weak grasp; drops things					
182.	A lack of awareness of body position in space					
183.	Unaware of their own body sensations					
184.	Bumps into objects, people					
185.	Appears floppy; often leans against people, furniture, walls					
186.	Stumbles frequently; has tendency to fall					
187.	Rocks back and forth					
188.	Cannot tolerate certain movements/body positions					
189.	Is often engaged in complex body movements, esp when frustrated or bored					
190.	May have different muscle tone					
191.	Pencil lines, letters, words, etc. are uneven (e.g. too tight, sometimes too faint)					
192.	Complains about limbs, parts of the body					
193.	Difficulty with hopping, jumping, skipping, riding a tricycle/bicycle					
194.	Does not seem to know what their body is doing					
195.	Very poor at sports					
196.	Tires very easily, esp when in noisy/bright places or when standing					
197.	Does not seem to know the position of the body in space/ what the body is doing, when looking at / listening to / talking					
198.	Has difficulty imitating / copying movements					

199.	Does not seem to know how to move their body (unable to change body position to accommodate task)					
200.	Watches her/his feet while walking					
201.	Watches her/his hands while doing something					
202.	Seems to be absorbed with body movements					
203.	Complains about 'non-existent' physical experiences (e.g. *I am flying* etc.)					
204.	Involuntary postures of the body in response to a visual/auditory stimulus/ smell/ taste/ touch					
205.	Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)					
206.	Reactions are triggered by body positions / movements					
207.	Mimics the actions when instructions are being given					
208.	Resists change to head position / movement					
209.	Fearful reactions to ordinary movement activities (e.g. swings, slides, merry-go-round, etc.)					
210.	Has difficulty with walking or crawling on uneven or unstable surfaces					
211.	Dislikes head upside down					
212.	Becomes anxious or distressed when feet leave the ground					
213.	Enjoys swings, merry-go-round					
214.	Spins, runs round and round					
215.	Fears falling or height					
216.	Spins, jumps, rocks, etc. esp when frustrated or bored					
217.	May respond differently (pleasure – indifference – distress) to the same movement activities (swings, slides, spinning etc.)					
218.	Resists new motor activities					
219.	Tiptoeing					
220.	Becomes disoriented after a change in head position					
221.	Seems oblivious to risks of heights, etc.					
222.	Holds head upright, even when learning or bending over					
223.	Gets nauseated or vomits from excessive movement (swings, merry-go-round, cars, etc.)					
224.	Does not seem to mind any movements when looking at / listening to something / talking					
225.	Avoids balancing activities					
226.	Becomes disoriented in noisy/bright places or after physical activities					

227.	Rocks unconsciously during other activities (e.g. watching a video)					
228.	Inspects the surface before walking on it					
229.	Appears to be in constant motion					
230.	Involuntary movements of the body in response to a visual / auditory stimulus / smell / taste / touch					
231.	Experiences movements while being still (e.g. *I am flying* while being in the bed)					
232.	Reactions are triggered by motor activities					

APPENDIX D

SPCR: Embodiment of All 13 Children with Autism

Visual, Auditory and Proprioceptive Experiences/Embodiment of All 13 Verbal Children with Autism

This section includes case-wise tabulated information pertaining to three modalities under investigation.

Embodiment of Az – Tables D1, D2, and D3

Embodiment of Wn – Tables D4, D5, and D6

Embodiment of Aa – Tables D7, D8, and D9

Embodiment of Im – Tables D10, D11, and D12

Embodiment of Hl – Tables D13, D14, and D15

Embodiment of Ah – Tables D16, D17, and D18

Embodiment of Mm – Tables D19, D20, and D21

Embodiment of Zb – Tables D22, D23, and D24

Embodiment of Ma – Tables D25, D26, and D27

Embodiment of As – Tables D28, D29, and D30

Embodiment of An – Tables D31, D32, and D33

Embodiment of Il – Tables D34, D35, and D36

Embodiment of Rn – Tables D37, D38, and D39

Table D1: *Visual Embodiment of Az*

Sensory Experiences		Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1.	Notices any tiny change in the environment	20%
Intensity with which senses work	Hyper:		
	1.	Constantly looks at minute particles, picks up smallest pieces of fluff	Hyper:
	2.	Covers, closes, or squint eyes at bright light	60%
Sensitivity to (disturbance by) some stimuli (Light/colour sensitivity; Disturbance by some patterns)	1.	Covers, closes, or squint eyes at bright light	33.33%
Fascination with certain stimuli (Fascination with pattern, lights, colours)	1.	Is fascinated with coloured and shining objects	100%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1.	Gets lost easily	20%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1.	Has difficulty catching ball	60%
	2.	Makes compulsive repetitive hand, head or body movements that fluctuate between near and far	
	3.	Hits/rubs eyes when distressed	
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1.	Feels/acts blind	50%
Vulnerability to sensory overload (Visual overload)	1.	Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli	100%
Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1.	Avoids direct eye contact	100%
Systems Shutdowns (Visual 'whiteouts')	1.	Surprises with knowing 'unknown' information	50%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1.	Smells, licks, touches or taps objects	100%
Synaesthesia (Seeing sounds, smell, temperature, etc.)	1.	Covers/rubs/blinks, etc. eyes in response to a sound/touch/smell/taste movement	50%
Perceptual memory (Visual (photographic) memory)	1.	Displays a good visual memory	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1.	Remembers routes and places	28.57%
	2.	Poor at mathematics	

Table D2: *Auditory Embodiment of Az*

Sensory Experiences	Behaviours	Hearing
Intensity with which senses work	Hyper: 1. Makes repetitive noises to block out other sounds Hypo: 1. Likes vibration 2. Likes traffic, crowds 3. Is attracted by sounds, noises	Hyper: 14.28% Hypo: 42.86%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-deafness'; feeling/acting 'deaf')	1. Feels/acts deaf	50%
Delayed perception (Delayed processing of auditory stimuli)	1. Response to sounds, questions, instructions is delayed	33.33%
Vulnerability to sensory overload (Sound overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Peripheral perception (avoidance of direct perception) (Hearing if listening to somebody indirectly)	1. Reacts to instructions better when they are 'addressed to the wall'	100%
Systems Shutdowns (Auditory 'tuneouts')	1. Surprises with knowing 'unknown' information	50%
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1. Looks for the source of the sound	100%
Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative ('serial') memory (Triggered by auditory stimuli)	1. Reactions are triggered by sounds/words 2. Cannot keep track of conversation	50%

Table D3: *Proprioceptive Embodiment of Az*

Sensory Experiences		Behaviours	Proprioception
Gestalt Perception (Inability to coordinate body position and movements of body parts)	1.	Clumsy; moves stiffly	100%
Intensity with which senses work	Hyper:		
	1.	Turns the whole body to look at something	Hyper: 33.33%
	Hypo:		
	1.	Low muscle tone	
	2.	Appears floppy; often leans against people, furniture, walls	Hypo: 37.5%
	3.	Rocks back and forth	
Fascination with certain stimuli (Fascination with certain body movements)	1.	Is often engaged in complex body movements, esp. when frustrated or bored	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1.	May have different muscle tone	50%
Distorted perception (Distorted perception of the body)	1.	Has difficulty catching ball	50%
Delayed perception (Delayed perception of body postures, body sensations)	1.	Very poor at sports	100%
Vulnerability to sensory overload (Proprioceptive overload)	1.	Tires very easily, esp. when in noisy/bright places or when standing	100%
Peripheral perception (avoidance of direct perception) (Peripheral proprioceptive perception)	1.	Has difficulty imitating / copying movements	100%
Perceptual thinking ('Body positions, movements, images')	1.	Mimics the actions when instructions are being given	100%

Table D4: *Visual Embodiment of Wn*

Sensory Experiences	Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. Does not recognize a familiar environment if approaches it from a different direction	20%
Intensity with which senses work	Hyper: 1. Covers, closes, or squint eyes at bright light Hypo: 1. Looks intensely at objects and people	Hyper: 20% Hypo: 16.67%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; ‘in’ – ‘out’)	1. May respond differently (pleasure – indifference – distress) to the same visual stimuli	100%
Fragmented Perception (Seeing in ‘bits’, prosopagnosia)	1. Does not recognize a familiar environment if approaches it from a different direction 2. Gets lost easily	40%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Has difficulty catching ball	20%
‘Sensory agnosia’ (difficulty interpreting a sense) (‘Meaning-blindness’; Feeling/acting ‘blind’)	1. Ritualistic behaviour	50%
Delayed perception (Delayed processing of visual stimuli)	1. Response to visual stimuli is delayed (e.g. fails to close eyes when the light is being switched on)	50%
Vulnerability to sensory overload (Visual overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other senses while seeing)	1. Does not seem to see if listening to something	100%
Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1. Avoids direct eye contact	100%
Systems Shutdowns (Visual ‘whiteouts’)	1. Appears to be a mindless follower	50%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
‘Losing oneself’ in stimuli. Resonance (Merging, getting in resonance with lights, colours, patterns)	1. Seems to be absorbed with lights, colours, patterns	100%
Synaesthesia (Seeing sounds, smell, temperature, etc.)	1. Covers/rubs/blinks, etD. eyes in response to a sound/touch/smell/taste movement	50%
Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Easily solves jigsaw puzzles 2. Poor at mathematics 3. Idiosyncratic patterns in language development (e.g. names one thing to denote the other, etc.)	42.86%

Table D5: *Auditory Embodiment of Wn*

Sensory Experiences		Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. 2.	Gets easily frustrated when trying to do something in a noisy crowded room Does not seem to understand instructions if more than one person is talking	100%
Intensity with which senses work	Hyper: 1. 2. 3.	 Dislikes thunderstorm, sea, crowds Dislikes haircut Avoids sounds and noises	 Hyper: 42.86%
	Hypo: 1. 2.	 Is attracted by sounds, noises Tears papers, crumples paper in the hand	 Hypo: 28.57%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1.	Gets frustrated with certain sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1.	Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1.	May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Distorted perception (Hearing distorted sounds, etc.)	1. 2.	Pronunciation problems Unable to distinguish between some sounds	66.67%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-deafness'; feeling/acting 'deaf')	1. 2.	Feels/acts deaf Ritualistic behaviour	100%
Delayed perception (Delayed processing of auditory stimuli)	1. 2.	Response to sounds, questions, instructions is delayed Echolalia in monotonous, high-pitched, parrot like voice	66.67%
Vulnerability to sensory overload (Sound overload)	1.	Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Systems Shutdowns (Auditory 'tuneouts')	1.	Appears to be a mindless follower	50%
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1.	Looks for the source of the sound	100%
'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with sound)	1.	Seems to be absorbed (merged) with sounds	50%
Perceptual memory (Audiographic/sound memory)	1.	Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative ('serial') memory (Triggered by auditory stimuli)	1. 2.	Reactions are triggered by sounds/words Cannot keep track of conversation	50%
Perceptual thinking (Thinking in 'auditory pictures')	1.	Composes musical pieces, songs	100%

Table D6: *Proprioceptive Embodiment of Wn*

Sensory Experiences	Behaviours	Proprioception
Intensity with which senses work	Hyper: 1. Difficulty manipulating small objects (e.g. buttons) Hypo: 1. Unaware of their own body sensations 2. Bumps into objects, people 3. Appears floppy; often leans against people, furniture, walls	Hyper: 33.33% Hypo: 37.5%
Fascination with certain stimuli (Fascination with certain body movements)	1. Is often engaged in complex body movements, esp. when frustrated or bored	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. Pencil lines, letters, words, etc. are uneven (e.g. too tight, sometimes too faint)	50%
Distorted perception (Distorted perception of the body)	1. Has difficulty catching ball	50%
Mono-processing (number of channels working at a time) (Shutting down other senses while being aware of body positions)	1. Does not seem to know the position of the body in space/ what the body is doing, when looking at / listening to / talking	100%
Perceptual memory (Proprioceptive memory)	1. Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)	100%
Perceptual thinking ('Body positions, movements, images')	1. Mimics the actions when instructions are being given	100%

Table D7: *Visual Embodiment of Aa*

Sensory Experiences	Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. Resists any change 2. Notices any tiny change in the environment	40%
Intensity with which senses work	Hyper: 1. Dislikes dark and bright lights 2. Covers, closes, or squint eyes at bright light Hypo: 1. Is attracted to lights	Hyper: 40% Hypo: 16.67%
Sensitivity to (disturbance by) some stimuli (Light/colour sensitivity; Disturbance by some patterns)	1. Covers, closes, or squint eyes at bright light	33.33%
Fascination with certain stimuli (Fascination with pattern, lights, colours)	1. Is fascinated with coloured and shining objects	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to the same visual stimuli	100%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. Resists any change 2. Gets lost easily	40%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Fears heights, stairs, escalators 2. Has difficulty catching ball	40%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Ritualistic behaviour	50%
Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1. Avoids direct eye contact	100%
Systems Shutdowns (Visual 'whiteouts')	1. Surprises with knowing 'unknown' information	50%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with lights, colours, patterns)	1. Seems to be absorbed with lights, colours, patterns	100%
Daydreaming ('Seeing' thoughts, emotions of other people, events that do not relate to oneself)	1. Seems to know what other people (who are not present) are doing	100%
Synaesthesia (Seeing sounds, smell, temperature, etc.)	1. Complains about (is frustrated with) the wrong colours of letters/numbers, etD. on coloured blocks, etc.	50%
Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Easily solves jigsaw puzzles 2. Remembers routes and places	28.57%

Table D8: *Auditory Embodiment of Aa*

Sensory Experiences	Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. Gets easily frustrated when trying to do something in a noisy crowded room 2. Does not seem to understand instructions if more than one person is talking	100%
Intensity with which senses work	Hyper: 1. Covers ears at many sounds 2. Avoids sounds and noises Hypo: 1. Makes loud rhythmic noises	Hyper: 28.57% Hypo: 14.29%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1. Gets frustrated with certain sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; ‘in’ – ‘out’)	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
‘Sensory agnosia’ (difficulty interpreting a sense) (‘Meaning-deafness’; feeling/acting ‘deaf’)	1. Feels/acts deaf 2. Ritualistic behaviour	100%
Delayed perception (Delayed processing of auditory stimuli)	1. Response to sounds, questions, instructions is delayed	33.33%
Vulnerability to sensory overload (Sound overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other channels while hearing)	1. Does not seem to hear if looking at something	100%
Peripheral perception (avoidance of direct perception) (Hearing if listening to somebody indirectly)	1. Reacts to instructions better when they are ‘addressed to the wall’	100%
Systems Shutdowns (Auditory ‘tuneouts’)	1. Surprises with knowing ‘unknown’ information	50%
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1. Looks for the source of the sound	100%
‘Losing oneself’ in stimuli. Resonance (Merging, getting in resonance with sound)	1. Seems to be absorbed (merged) with sounds 2. Seems to be able to ‘read’ thoughts, feelings, etD. of others	100%
Daydreaming (‘Hearing’ thoughts of other people, events)	1. Complains about ‘non-existent’ conversations, sounds	100%
Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative (‘serial’) memory (Triggered by auditory stimuli)	1. Reactions are triggered by sounds/words 2. Cannot keep track of conversation	50%
Perceptual thinking (Thinking in ‘auditory pictures’)	1. Composes musical pieces, songs	100%

Table D9: *Proprioceptive Embodiment of Aa*

Sensory Experiences	Behaviours	Proprioception
Gestalt Perception (Inability to coordinate body position and movements of body parts)	1. Clumsy; moves stiffly	100%
Intensity with which senses work	Hyper: 1. Odd body posturing (places the body in strange positions) Hypo: 1. Bumps into objects, people 2. Appears floppy; often leans against people, furniture, walls	Hyper: 33.33% Hypo: 12.5%
Sensitivity to (disturbance by) some stimuli (Disturbance by some body positions)	1. Cannot tolerate certain movements/body positions	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May have different muscle tone	50%
Distorted perception (Distorted perception of the body)	1. Has difficulty catching ball	50%
Vulnerability to sensory overload (Proprioceptive overload)	1. Tires very easily, esp. when in noisy/bright places or when standing	100%
Mono-processing (number of channels working at a time) (Shutting down other senses while being aware of body positions)	1. Does not seem to know the position of the body in space/ what the body is doing, when looking at / listening to / talking	100%
'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with movements)	1. Seems to be absorbed with body movements	100%
Synaesthesia (Involuntary body postures in response to visual, auditory, tactile, etc. stimuli)	1. Involuntary postures of the body in response to a visual/auditory stimulus/ smell/ taste/ touch	100%
Perceptual thinking ('Body positions, movements, images')	1. Mimics the actions when instructions are being given	100%

Table D10: *Visual Embodiment of Im*

Sensory Experiences	Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. Resists any change 2. Is not fooled by optical illusions	40%
Intensity with which senses work	Hyper: 1. Is frightened by sharp flashes of light, lightening, etc. Hypo: 1. Looks intensely at objects and people	Hyper: 20% Hypo: 16.67%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to the same visual stimuli	100%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. Resists any change	20%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Has difficulty catching ball 2. Makes compulsive repetitive hand, head or body movements that fluctuate between near and far	40%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Ritualistic behaviour	50%
Delayed perception (Delayed processing of visual stimuli)	1. Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing	50%
Systems Shutdowns (Visual 'whiteouts')	1. Appears to be a mindless follower	50%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Easily solves jigsaw puzzles 2. Remembers routes and places 3. Learns nouns first 4. Has difficulties with adverbs and prepositions 5. Idiosyncratic patterns in language development (e.g. names one thing to denote the other, etc.)	71.42%

Table D11: *Auditory Embodiment of Im*

Sensory Experiences		Behaviours	Hearing
Gestalt Perception	1.	Gets easily frustrated when trying to do something in a noisy crowded room	100%
(Inability to screen out background noise)	2.	Does not seem to understand instructions if more than one person is talking	
Intensity with which senses work	Hyper:		
	1.	Covers ears at many sounds	Hyper:
	2.	Is a very light sleeper	85.71%
	3.	Is frightened by animals	
	4.	Dislikes thunderstorm, sea, crowds	
	5.	Avoids sounds and noises	
	6.	Makes repetitive noises to block out other sounds	
	Hypo:		Hypo:
	1.	Likes vibration	14.29%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1.	Gets frustrated with certain sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1.	Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1.	May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Fragmented Perception (Hearing 'in bits')	1.	Hears a few words instead of the whole sentence	100%
Distorted perception (Hearing distorted sounds, etc.)	1.	Hits ears when distressed	33.33%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-deafness'; feeling/acting 'deaf')	1.	Ritualistic behaviour	50%
Delayed perception	1.	Echolalia in monotonous, high-pitched, parrot like voice	66.67%
(Delayed processing of auditory stimuli)	2.	Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing	
Vulnerability to sensory overload (Sound overload)	1.	Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Systems Shutdowns (Auditory 'tuneouts')	1.	Appears to be a mindless follower	50%
Perceptual memory (Audiographic/sound memory)	1.	Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative ('serial') memory	1.	Reactions are triggered by sounds/words	75%
(Triggered by auditory stimuli)	2.	Uses idiosyncratic routinized responses	
	3.	Cannot keep track of conversation	

Table D12: *Proprioceptive Embodiment of Im*

Sensory Experiences		Behaviours	Proprioception
Gestalt Perception (Inability to coordinate body position and movements of body parts)	1.	Clumsy; moves stiffly	100%
Intensity with which senses work	Hyper:		Hyper:
	1.	Turns the whole body to look at something	33.33%
	Hypo:		
	1.	Bumps into objects, people	Hypo: 12.5%
Fascination with certain stimuli (Fascination with certain body movements)	1.	Is often engaged in complex body movements, esp. when frustrated or bored	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; ‘in’ – ‘out’)	1.	May have different muscle tone	100%
	2.	Pencil lines, letters, words, etc. are uneven (e.g. too tight, sometimes too faint)	
Distorted perception (Distorted perception of the body)	1.	Has difficulty catching ball	50%
Vulnerability to sensory overload (Proprioceptive overload)	1.	Tires very easily, esp. when in noisy/bright places or when standing	100%
Perceptual memory (Proprioceptive memory)	1.	Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)	100%

Table D13: *Visual Embodiment of Hl*

Sensory Experiences	Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. Resists any change 2. Notices any tiny change in the environment 3. Is not fooled by optical illusions	60%
Intensity with which senses work	Hyper: 1. Is frightened by sharp flashes of light, lightening, etc. 2. Covers, closes, or squint eyes at bright light Hypo: 1. Is attracted to lights 2. Perimeter hugging	Hyper: 60% Hypo: 33.33%
Sensitivity to (disturbance by) some stimuli (Light/colour sensitivity; Disturbance by some patterns)	1. Covers, closes, or squint eyes at bright light	33.33%
Fascination with certain stimuli (Fascination with pattern, lights, colours)	1. Is fascinated with coloured and shining objects	100%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. Resists any change	20%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Has difficulty catching ball 2. Appears startled when being approached suddenly 3. Makes compulsive repetitive hand, head or body movements that fluctuate between near and far 4. Hits/rubs eyes when distressed	80%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Feels/acts blind 2. Ritualistic behaviour	100%
Delayed perception (Delayed processing of visual stimuli)	1. Response to visual stimuli is delayed (e.g. fails to close eyes when the light is being switched on) 2. Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing	100%
Vulnerability to sensory overload (Visual overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other senses while seeing)	1. Does not seem to see if listening to something	100%
Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1. Avoids direct eye contact	100%
Systems Shutdowns (Visual 'whiteouts')	1. Surprises with knowing 'unknown' information	50%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
Synaesthesia (Seeing sounds, smell, temperature, etc.)	1. Covers/rubs/blinks, etc. eyes in response to a sound/touch/smell/taste movement .	50%
Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Memorizes enormous amount of information at a glance	14.29%

Table D14: *Auditory Embodiment of Hl*

Sensory Experiences	Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. Gets easily frustrated when trying to do something in a noisy crowded room	50%
Intensity with which senses work	Hyper: 1. Covers ears at many sounds 2. Is a very light sleeper 3. Is frightened by animals 4. Dislikes haircut 5. Avoids sounds and noises 6. Makes repetitive noises to block out other sounds Hypo: 1. Makes loud rhythmic noises	Hyper: 85.71% Hypo: 14.29%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1. Gets frustrated with certain sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Fragmented Perception (Hearing ‘in bits’)	1. Hears a few words instead of the whole sentence	100%
‘Sensory agnosia’ (difficulty interpreting a sense) (‘Meaning-deafness’; feeling/acting ‘deaf’)	1. Feels/acts deaf 2. Ritualistic behaviour	100%
Delayed perception (Delayed processing of auditory stimuli)	1. Response to sounds, questions, instructions is delayed 2. Echolalia in monotonous, high-pitched, parrot like voice 3. Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing	100%
Vulnerability to sensory overload (Sound overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Systems Shutdowns (Auditory ‘tuneouts’)	1. Surprises with knowing ‘unknown’ information	50%
‘Losing oneself’ in stimuli. Resonance (Merging, getting in resonance with sound)	1. Seems to be able to ‘read’ thoughts, feelings, etc. of others	50%
Synaesthesia (Hearing colours, flavors, touch, etc.)	1. Covers/hits ears in response to lights/colours/touch/texture/smell/taste movement 2. Complains about (is frustrated with) a sound in response to colours/textures/touch/scent/flavor/movement	100%
Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative (‘serial’) memory (Triggered by auditory stimuli)	1. Reactions are triggered by sounds/words 2. Uses idiosyncratic routinized responses 3. Uses songs, commercials etc. to respond 4. Cannot keep track of conversation	100%

Table D15: *Proprioceptive Embodiment of Hl*

Sensory Experiences		Behaviours	Proprioception
Gestalt Perception (Inability to coordinate body position and movements of body parts)	1.	Clumsy; moves stiffly	100%
Intensity with which senses work	Hyper:		Hyper:
	1.	Odd body posturing (places the body in strange positions)	66.67%
	2.	Difficulty manipulating small objects (e.g. buttons)	
	Hypo:		Hypo:
	1.	Appears floppy; often leans against people, furniture, walls	12.5%
Sensitivity to (disturbance by) some stimuli (Disturbance by some body positions)	1.	Cannot tolerate certain movements/body positions	100%
Distorted perception (Distorted perception of the body)	1. 2.	Difficulty with hopping, jumping, skipping, riding a tricycle/bicycle Has difficulty catching balls	100%
Delayed perception (Delayed perception of body postures, body sensations)	1.	Very poor at sports	100%
Peripheral perception (avoidance of direct perception) (Peripheral proprioceptive perception)	1.	Has difficulty imitating / copying movements	100%
Synaesthesia (Involuntary body postures in response to visual, auditory, tactile, etc. stimuli)	1.	Involuntary postures of the body in response to a visual/auditory stimulus/ smell/ taste/ touch	100%
Perceptual memory (Proprioceptive memory)	1.	Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)	100%
Associative ('serial') memory (Triggered by body positions, movements)	1.	Reactions are triggered by body positions / movements	100%
Perceptual thinking ('Body positions, movements, images')	1.	Mimics the actions when instructions are being given	100%

Table D16: *Visual Embodiment of Ah*

Sensory Experiences	Behaviours	Vision
Intensity with which senses work	Hyper: 1. Covers, closes, or squint eyes at bright light Hypo: 1. Is attracted to lights 2. Looks intensely at objects and people 3. Moves fingers or objects in front of eyes 4. Is fascinated with reflections, bright coloured objects 5. Perimeter hugging	Hyper: 20% Hypo: 83.33%
Sensitivity to (disturbance by) some stimuli (Light/colour sensitivity; Disturbance by some patterns)	1. Covers, closes, or squint eyes at bright light	33.33%
Fascination with certain stimuli (Fascination with pattern, lights, colours)	1. Is fascinated with coloured and shining objects	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to the same visual stimuli	100%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. Gets lost easily	20%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Makes compulsive repetitive hand, head or body movements that fluctuate between near and far 2. Hits/rubs eyes when distressed	40%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Feels/acts blind 2. Ritualistic behaviour	100%
Delayed perception (Delayed processing of visual stimuli)	1. Response to visual stimuli is delayed (e.g. fails to close eyes when the light is being switched on)	50%
Vulnerability to sensory overload (Visual overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other senses while seeing)	1. Does not seem to see if listening to something	100%
Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1. Avoids direct eye contact	100%
Systems Shutdowns (Visual 'whiteouts')	1. Surprises with knowing 'unknown' information	50%
Synaesthesia (Seeing sounds, smell, temperature, etc.)	1. Covers/rubs/blinks, etc. eyes in response to a sound/touch/smell/taste movement	50%
Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Easily solves jigsaw puzzles 2. Remembers routes and places 3. Memorizes enormous amount of information at a glance 4. Poor at mathematics 5. Learns nouns first	71.42%

Table D17: *Auditory Embodiment of Ah*

Sensory Experiences	Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. Gets easily frustrated when trying to do something in a noisy crowded room 2. Does not seem to understand instructions if more than one person is talking	100%
Intensity with which senses work	Hyper: 1. Covers ears at many sounds 2. Is frightened by animals 3. Avoids sounds and noises 4. Makes repetitive noises to block out other sounds Hypo: 1. Likes vibration 2. Likes kitchen and bathroom	Hyper: 57.14% Hypo: 28.57%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1. Gets frustrated with certain sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Fragmented Perception (Hearing 'in bits')	1. Hears a few words instead of the whole sentence	100%
Distorted perception (Hearing distorted sounds, etc.)	1. Hits ears when distressed	33.33%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-deafness'; feeling/acting 'deaf')	1. Feels/acts deaf 2. Ritualistic behaviour	100%
Delayed perception (Delayed processing of auditory stimuli)	1. Response to sounds, questions, instructions is delayed	33.33%
Vulnerability to sensory overload (Sound overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other channels while hearing)	1. Does not seem to hear if looking at something	100%
Systems Shutdowns (Auditory 'tuneouts')	1. Surprises with knowing 'unknown' information	50%
Synaesthesia (Hearing colours, flavors, touch, etc.)	1. Covers/hits ears in response to lights/colours/touch/texture/smell/taste movement	50%
Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative ('serial') memory (Triggered by auditory stimuli)	**1.** Reactions are triggered by sounds/words **2.** Uses idiosyncratic routinized responses **3.** Cannot keep track of conversation	75%

Table D18: *Proprioceptive Embodiment of Ah*

Sensory Experiences	Behaviours	Proprioception
Gestalt Perception (Inability to coordinate body position and movements of body parts)	1. Clumsy; moves stiffly	100%
Intensity with which senses work	Hyper: 1. Odd body posturing (places the body in strange positions) 2. Difficulty manipulating small objects (e.g. buttons) Hypo: 1. A lack of awareness of body position in space 2. Bumps into objects, people 3. Appears floppy; often leans against people, furniture, walls	Hyper: 66.67% Hypo: 37.5%
Sensitivity to (disturbance by) some stimuli (Disturbance by some body positions)	1. Cannot tolerate certain movements/body positions	100%
Fascination with certain stimuli (Fascination with certain body movements)	1. Is often engaged in complex body movements, esp. when frustrated or bored	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May have different muscle tone	50%
'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with movements)	1. Seems to be absorbed with body movements	100%
Daydreaming (Experiencing physical movements while being still)	1. Complains about 'non-existent' physical experiences (e.g. I am flying etc.)	100%
Synaesthesia (Involuntary body postures in response to visual, auditory, tactile, etc. stimuli)	1. Involuntary postures of the body in response to a visual/auditory stimulus/ smell/ taste/ touch	100%
Perceptual memory (Proprioceptive memory)	1. Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)	100%
Associative ('serial') memory (Triggered by body positions, movements)	1. Reactions are triggered by body positions / movements	100%
Perceptual thinking ('Body positions, movements, images')	1. Mimics the actions when instructions are being given	100%

Table D19: *Visual Embodiment of Mm*

Sensory Experiences	Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. Resists any change 2. Notices any tiny change in the environment	40%
Intensity with which senses work	Hyper: 1. Constantly looks at minute particles, picks up smallest pieces of fluff 2. Dislikes dark and bright lights Hypo: 1. Is attracted to lights 2. Looks intensely at objects and people	Hyper: 40% Hypo: 33.33%
Fascination with certain stimuli (Fascination with pattern, lights, colours)	1. Is fascinated with coloured and shining objects	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to the same visual stimuli	100%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. Resists any change 2. Gets lost easily	40%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Has difficulty catching ball 2. Hits/rubs eyes when distressed	40%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Feels/acts blind 2. Ritualistic behaviour	100%
Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1. Avoids direct eye contact	100%
Systems Shutdowns (Visual 'whiteouts')	1. Surprises with knowing 'unknown' information	50%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Easily solves jigsaw puzzles 2. Remembers routes and places 3. Memorizes enormous amount of information at a glance	42.86%

Table D20: *Auditory Embodiment of Mm*

Sensory Experiences	Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. Gets easily frustrated when trying to do something in a noisy crowded room	50%
Intensity with which senses work	Hyper: 1. Is a very light sleeper 2. Dislikes thunderstorm, sea, crowds 3. Dislikes haircut Hypo: 1. Likes kitchen and bathroom 2. Is attracted by sounds, noises	Hyper: 42.86% Hypo: 28.57%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1. Gets frustrated with certain sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; ‘in’ – ‘out’)	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Distorted perception (Hearing distorted sounds, etc.)	1. Pronunciation problems	33.33%
‘Sensory agnosia’ (difficulty interpreting a sense) (‘Meaning-deafness’; feeling/acting ‘deaf’)	1. Ritualistic behaviour	50%
Vulnerability to sensory overload (Sound overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other channels while hearing)	1. Does not seem to hear if looking at something	100%
Systems Shutdowns (Auditory ‘tuneouts’)	1. Surprises with knowing ‘unknown’ information	50%
Associative (‘serial’) memory (Triggered by auditory stimuli)	1. Cannot keep track of conversation	25%

Table D21: *Proprioceptive Embodiment of Mm*

Sensory Experiences	Behaviours	Proprioception
Intensity with which senses work	Hyper: 1. Odd body posturing (places the body in strange positions) 2. Turns the whole body to look at something	Hyper: 66.67%
Distorted perception (Distorted perception of the body)	1. Has difficulty catching ball	50%
Delayed perception (Delayed perception of body postures, body sensations)	1. Very poor at sports	100%
Perceptual memory (Proprioceptive memory)	1. Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)	100%
Perceptual thinking ('Body positions, movements, images')	1. Mimics the actions when instructions are being given	100%

Table D22: *Visual Embodiment of Zb*

Sensory Experiences		Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. 2. 3. 4.	Resists any change Notices any tiny change in the environment Does not recognize people in unfamiliar clothes Is not fooled by optical illusions	80%
Intensity with which senses work	Hyper: 1. Hypo: 1. 2. 3. 4.	 Is frightened by sharp flashes of light, lightening, etc. Is attracted to lights Looks intensely at objects and people Is fascinated with reflections, bright coloured objects Runs a hand around the edge of the object	Hyper: 20% Hypo: 66.67%
Fascination with certain stimuli (Fascination with pattern, lights, colours)	1.	Is fascinated with coloured and shining objects	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1.	May respond differently (pleasure – indifference – distress) to the same visual stimuli	100%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. 2. 3. 4.	Resists any change Does not recognize people in unfamiliar clothes Selects for attention minor aspects of objects in the environment instead of the whole thing (e.g. a wheel rather than a whole toy car, etc.) Gets lost easily	80%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. 2. 3.	Has difficulty catching ball Makes compulsive repetitive hand, head or body movements that fluctuate between near and far Hits/rubs eyes when distressed	60%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. 2.	Feels/acts blind Ritualistic behaviour	100%
Vulnerability to sensory overload (Visual overload)	1.	Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli	100%
Systems Shutdowns (Visual 'whiteouts')	1. 2.	Appears to be a mindless follower Surprises with knowing 'unknown' information	100%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1.	Smells, licks, touches or taps objects	100%
'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with lights, colours, patterns)	1.	Seems to be absorbed with lights, colours, patterns	100%
Daydreaming ('Seeing' thoughts, emotions of other people, events that do not relate to oneself)	1.	Seems to know what other people (who are not present) are doing	100%
Synaesthesia (Seeing sounds, smell, temperature, etc.)	1.	Covers/rubs/blinks, etc. eyes in response to a sound/touch/smell/taste movement	50%
Perceptual memory (Visual (photographic) memory)	1.	Displays a good visual memory	100%
Associative ('serial') memory (Triggered by visual stimuli)	1.	Reactions are triggered by lights, colours, patterns, etc.	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1.	Remembers routes and places	14.29%

Table D23: *Auditory Embodiment of Zb*

Sensory Experiences		Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. 2.	Gets easily frustrated when trying to do something in a noisy crowded room Does not seem to understand instructions if more than one person is talking	100%
Intensity with which senses work	Hyper: 1. 2.	 Dislikes thunderstorm, sea, crowds Dislikes haircut	Hyper: 28.57%
	Hypo: 1. 2. 3. 4.	 Likes vibration Is attracted by sounds, noises Tears papers, crumples paper in the hand Makes loud rhythmic noises	Hypo: 57.14%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1.	Gets frustrated with certain sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1.	Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1.	May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Fragmented Perception (Hearing 'in bits')	1.	Hears a few words instead of the whole sentence	100%
Distorted perception (Hearing distorted sounds, etc.)	1. 2.	Pronunciation problems Unable to distinguish between some sounds	66.67%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-deafness'; feeling/acting 'deaf')	1.	Ritualistic behaviour	50%
Vulnerability to sensory overload (Sound overload)	1.	Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other channels while hearing)	1.	Does not seem to hear if looking at something	100%
Peripheral perception (avoidance of direct perception) (Hearing if listening to somebody indirectly)	1.	Reacts to instructions better when they are 'addressed to the wall'	100%
Systems Shutdowns (Auditory 'tuneouts')	1. 2.	Appears to be a mindless follower Surprises with knowing 'unknown' information	100%
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1.	Looks for the source of the sound	100%
Synaesthesia (Hearing colours, flavors, touch, etc.)	1.	Complains about (is frustrated with) a sound in response to colours/textures/touch/scent/flavor/movement	50%
Perceptual memory (Audiographic/sound memory)	1.	Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative ('serial') memory (Triggered by auditory stimuli)	1.	Cannot keep track of conversation	25%

Table D24: *Proprioceptive Embodiment of Zb*

Sensory Experiences	Behaviours	Proprioception
Gestalt Perception (Inability to coordinate body position and movements of body parts)	1. Clumsy; moves stiffly	100%
Intensity with which senses work	Hyper: 1. Odd body posturing (places the body in strange positions) Hypo: 1. A lack of awareness of body position in space 2. Unaware of their own body sensations 3. Appears floppy; often leans against people, furniture, walls 4. Rocks back and forth	Hyper: 33.33% Hypo: 50%
Fascination with certain stimuli (Fascination with certain body movements)	1. Is often engaged in complex body movements, esp. when frustrated or bored	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May have different muscle tone	50%
Fragmented Perception (Feeling only some parts of the body)	1. Complains about limbs, parts of the body	100%
Distorted perception (Distorted perception of the body)	1. Has difficulty catching ball	50%
Delayed perception (Delayed perception of body postures, body sensations)	1. Very poor at sports	100%
Vulnerability to sensory overload (Proprioceptive overload)	1. Tires very easily, esp. when in noisy/bright places or when standing	100%
Mono-processing (number of channels working at a time) (Shutting down other senses while being aware of body positions)	1. Does not seem to know the position of the body in space/ what the body is doing, when looking at / listening to / talking	100%
Peripheral perception (avoidance of direct perception) (Peripheral proprioceptive perception)	1. Has difficulty imitating / copying movements	100%
Synaesthesia (Involuntary body postures in response to visual, auditory, tactile, etc. stimuli)	1. Involuntary postures of the body in response to a visual/auditory stimulus/ smell/ taste/ touch	100%
Perceptual memory (Proprioceptive memory)	1. Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)	100%
Perceptual thinking ('Body positions, movements, images')	1. Mimics the actions when instructions are being given	100%

Table D25: *Visual Embodiment of Ma*

Sensory Experiences	Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. Notices any tiny change in the environment	20%
Intensity with which senses work	Hyper: 1. Constantly looks at minute particles, picks up smallest pieces of fluff Hypo: 1. Is attracted to lights 2. Looks intensely at objects and people 3. Is fascinated with reflections, bright coloured objects 4. Perimeter hugging	Hyper: 20% Hypo: 66.67%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to the same visual stimuli	100%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	**1.** Makes compulsive repetitive hand, head or body movements that fluctuate between near and far **2.** Hits/rubs eyes when distressed	40%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Ritualistic behaviour	50%
Delayed perception (Delayed processing of visual stimuli)	1. Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing	50%
Vulnerability to sensory overload (Visual overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli	100%
Systems Shutdowns (Visual 'whiteouts')	1. Appears to be a mindless follower 2. Surprises with knowing 'unknown' information	100%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
Synaesthesia (Seeing sounds, smell, temperature, etc.)	1. Covers/rubs/blinks, etc. eyes in response to a sound/touch/smell/taste movement	50%
Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Easily solves jigsaw puzzles 2. Remembers routes and places 3. Memorizes enormous amount of information at a glance	42.86%

Table D26: *Auditory Embodiment of Ma*

Sensory Experiences	Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. Does not seem to understand instructions if more than one person is talking	50%
Intensity with which senses work	Hyper:	
	1. Is a very light sleeper	Hyper:
	2. Is frightened by animals	42.86%
	3. Makes repetitive noises to block out other sounds	
	Hypo:	
	1. Bangs objects, doors	
	2. Likes kitchen and bathroom	
	3. Is attracted by sounds, noises	Hypo:
	4. Makes loud rhythmic noises	57.14%
Sensitivity to (disturbance by) some stimuli	1. Gets frustrated with certain sounds	100%
(Disturbance by some sounds)	2. Tries to destroy/break objects producing sounds	
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; ‘in’ – ‘out’)	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Fragmented Perception (Hearing ‘in bits’)	1. Hears a few words instead of the whole sentence	100%
Distorted perception (Hearing distorted sounds, etc.)	1. Pronunciation problems	33.33%
‘Sensory agnosia’ (difficulty interpreting a sense) (‘Meaning-deafness’; feeling/acting ‘deaf’)	1. Ritualistic behaviour	50%
Delayed perception	1. Response to sounds, questions, instructions is delayed	100%
(Delayed processing of auditory stimuli)	2. Echolalia in monotonous, high-pitched, parrot like voice	
	3. Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing	
Peripheral perception (avoidance of direct perception) (Hearing if listening to somebody indirectly)	1. Reacts to instructions better when they are ‘addressed to the wall’	100%
Systems Shutdowns	1. Appears to be a mindless follower	100%
(Auditory ‘tuneouts’)	2. Surprises with knowing ‘unknown’ information	
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1. Looks for the source of the sound	100%
‘Losing oneself’ in stimuli. Resonance (Merging, getting in resonance with sound)	1. Seems to be able to ‘read’ thoughts, feelings, etc. of others	50%
Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative (‘serial’) memory	1. Uses idiosyncratic routinized responses	75%
(Triggered by auditory stimuli)	2. Uses songs, commercials etc, to respond	
	3. Cannot keep track of conversation	
Perceptual thinking (Thinking in ‘auditory pictures’)	1. Composes musical pieces, songs	100%

Table D27: *Proprioceptive Embodiment of Ma*

Sensory Experiences	Behaviours	Proprioception
Intensity with which senses work	Hyper: 1. Turns the whole body to look at something Hypo: 1. Bumps into objects, people 2. Appears floppy; often leans against people, furniture, walls	Hyper: 33.33% Hypo: 25%
Fascination with certain stimuli (Fascination with certain body movements)	1. Is often engaged in complex body movements, esp. when frustrated or bored	100%
Synaesthesia (Involuntary body postures in response to visual, auditory, tactile, etc. stimuli)	1. Involuntary postures of the body in response to a visual/auditory stimulus/ smell/ taste/ touch	100%
Associative ('serial') memory (Triggered by body positions, movements)	1. Reactions are triggered by body positions / movements	100%
Perceptual thinking ('Body positions, movements, images')	1. Mimics the actions when instructions are being given	100%

Table D28: *Visual Embodiment of As*

Sensory Experiences	Behaviours	Vision
Intensity with which senses work	Hyper: 1. Dislikes dark and bright lights Hypo: 1. Is fascinated with reflections, bright coloured objects 2. Runs a hand around the edge of the object	Hyper: 20% Hypo: 33.33%
Fascination with certain stimuli (Fascination with pattern, lights, colours)	1. Is fascinated with coloured and shining objects	100%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. Gets lost easily	20%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Fears heights, stairs, escalators 2. Has difficulty catching ball 3. Appears startled when being approached suddenly 4. Makes compulsive repetitive hand, head or body movements that fluctuate between near and far	80%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Ritualistic behaviour	50%
Delayed perception (Delayed processing of visual stimuli)	1. Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing	50%
Vulnerability to sensory overload (Visual overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to visual stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other senses while seeing)	1. Does not seem to see if listening to something	100%
Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1. Avoids direct eye contact	100%
Systems Shutdowns (Visual 'whiteouts')	1. Appears to be a mindless follower 2. Surprises with knowing 'unknown' information	100%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%

Table D29: *Auditory Embodiment of As*

Sensory Experiences	Behaviours	Hearing
Intensity with which senses work	Hyper: **1.** Covers ears at many sounds **2.** Is a very light sleeper **3.** Dislikes thunderstorm, sea, crowds **4.** Avoids sounds and noises **5.** Makes repetitive noises to block out other sounds Hypo: 1. Likes vibration 2. Is attracted by sounds, noises 3. Makes loud rhythmic noises	Hyper: 71.43% Hypo: 48.86%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1. Gets frustrated with certain sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Fragmented Perception (Hearing 'in bits')	1. Hears a few words instead of the whole sentence	100%
Distorted perception (Hearing distorted sounds, etc.)	1. Pronunciation problems 2. Hits ears when distressed	66.67%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-deafness'; feeling/acting 'deaf')	1. Ritualistic behaviour	50%
Delayed perception (Delayed processing of auditory stimuli)	**1.** Echolalia in monotonous, high-pitched, parrot like voice **2.** Any experiences are perceived as new and unfamiliar, regardless of the number of time the child has experienced the same thing	66.67%
Vulnerability to sensory overload (Sound overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Mono-processing (number of channels working at a time) (Shutting down other channels while hearing)	1. Does not seem to hear if looking at something	100%
Systems Shutdowns (Auditory 'tuneouts')	1. Appears to be a mindless follower 2. Surprises with knowing 'unknown' information	100%
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1. Looks for the source of the sound	100%
'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with sound)	1. Seems to be absorbed (merged) with sounds 2. Seems to be able to 'read' thoughts, feelings, etc. of others	100%
Associative ('serial') memory (Triggered by auditory stimuli)	1. Reactions are triggered by sounds/words 2. Uses idiosyncratic routinized responses 3. Cannot keep track of conversation	75%

Table D30: *Proprioceptive Embodiment of As*

Sensory Experiences		Behaviours	Proprioception
Gestalt Perception (Inability to coordinate body position and movements of body parts)	1.	Clumsy; moves stiffly	100%
Intensity with which senses work	Hyper:		
	1.	Odd body posturing (places the body in strange positions)	Hyper: 33.33%
	Hypo:		
	1.	Low muscle tone	
	2.	A lack of awareness of body position in space	Hypo: 50%
	3.	Bumps into objects, people	
	4.	Rocks back and forth	
Sensitivity to (disturbance by) some stimuli (Disturbance by some body positions)	1.	Cannot tolerate certain movements/body positions	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1.	May have different muscle tone	100%
	2.	Pencil lines, letters, words, etc. are uneven (e.g. too tight, sometimes too faint)	
Distorted perception (Distorted perception of the body)	1.	Has difficulty catching ball	50%
'Sensory agnosia' (difficulty interpreting a sense) (Difficulty interpreting body position, body sensations, etc.)	1.	Does not seem to know what their body is doing	100%
Vulnerability to sensory overload (Proprioceptive overload)	1.	Tires very easily, esp. when in noisy/bright places or when standing	100%
Perceptual thinking ('Body positions, movements, images')	1.	Mimics the actions when instructions are being given	100%

Table D31: *Visual Embodiment of An*

Sensory Experiences	Behaviours	Vision
1. Gestalt Perception (Inability to filter visual stimuli)	1. Notices any tiny change in the environment	20%
2. Intensity with which senses work	Hyper:	Hyper:
	1. Covers, closes, or squint eyes at bright light	20%
	Hypo:	
	1. Looks intensely at objects and people	Hypo:
	2. Perimeter hugging	33.33%
3. Sensitivity to (disturbance by) some stimuli (Light/colour sensitivity; Disturbance by some patterns)	1. Covers, closes, or squint eyes at bright light	33.33%
7. Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Has difficulty catching ball 2. Makes compulsive repetitive hand, head or body movements that fluctuate between near and far	40%
8. 'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Ritualistic behaviour	50%
13. Systems Shutdowns (Visual 'whiteouts')	1. Surprises with knowing 'unknown' information	50%
14. Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
16. Daydreaming ('Seeing' thoughts, emotions of other people, events that do not relate to oneself)	1. Seems to know what other people (who are not present) are doing	100%
17. Synaesthesia (Seeing sounds, smell, temperature, etc.)	1. Covers/rubs/blinks, etc. eyes in response to a sound/touch/smell/taste movement	50%
18. Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory	100%
20. Perceptual thinking (Visual thinking (thinking in pictures))	1. Remembers routes and places 2. Memorizes enormous amount of information at a glance 3. Learns nouns first 4. Idiosyncratic patterns in language development (e.g. names one thing to denote the other, etc.)	57.14%

Table D32: *Auditory Embodiment of An*

Sensory Experiences	Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. Gets easily frustrated when trying to do something in a noisy crowded room	50%
Intensity with which senses work	Hyper: 1. Covers ears at many sounds 2. Is a very light sleeper 3. Dislikes thunderstorm, sea, crowds 4. Dislikes haircut 5. Avoids sounds and noises Hypo: 1. Bangs objects, doors	Hyper: 71.43% Hypo: 14.3%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1. Gets frustrated with certain sounds 2. Tries to destroy/break objects producing sounds	100%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; 'in' – 'out')	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Distorted perception (Hearing distorted sounds, etc.)	1. Pronunciation problems 2. Hits ears when distressed	66.67%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-deafness'; feeling/acting 'deaf')	1. Ritualistic behaviour	50%
Delayed perception (Delayed processing of auditory stimuli)	1. Response to sounds, questions, instructions is delayed 2. Echolalia in monotonous, high-pitched, parrot like voice	66.67%
Vulnerability to sensory overload (Sound overload)	1. Sudden outbursts of self-abuse/tantrums or withdrawal in response to auditory stimuli	100%
Systems Shutdowns (Auditory 'tuneouts')	1. Surprises with knowing 'unknown' information	50%
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1. Looks for the source of the sound	100%
'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with sound)	1. Seems to be able to 'read' thoughts, feelings, etc. of others	50%
Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative ('serial') memory (Triggered by auditory stimuli)	1. Reactions are triggered by sounds/words 2. Uses idiosyncratic routinized responses 3. Cannot keep track of conversation	75%
Perceptual thinking (Thinking in 'auditory pictures')	1. Composes musical pieces, songs	100%

Table D33: *Proprioceptive Embodiment of An*

Sensory Experiences		Behaviours	Proprioception
Fragmented Perception (Feeling only some parts of the body)	1.	Complains about limbs, parts of the body	100%
Distorted perception (Distorted perception of the body)	1.	Has difficulty catching ball	100%
	2.	Difficulty with hopping, jumping, skipping, riding a tricycle/bicycle	
Vulnerability to sensory overload (Proprioceptive overload)	1.	Tires very easily, esp. when in noisy/bright places or when standing	100%
Synaesthesia (Involuntary body postures in response to visual, auditory, tactile, etc. stimuli)	1.	Involuntary postures of the body in response to a visual/auditory stimulus/ smell/ taste/ touch	100%
Associative ('serial') memory (Triggered by body positions, movements)	1.	Reactions are triggered by body positions / movements	100%

Table D34: *Visual Embodiment of Il*

Sensory Experiences	Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. Resists any change 2. Notices any tiny change in the environment	40%
Intensity with which senses work	Hyper: 1. Constantly looks at minute particles, picks up smallest pieces of fluff 2. Covers, closes, or squint eyes at bright light Hypo: 1. Moves fingers or objects in front of eyes	Hyper: 40% Hypo: 16.67%
Sensitivity to (disturbance by) some stimuli (Light/colour sensitivity; Disturbance by some patterns)	1. Covers, closes, or squint eyes at bright light	33.33%
Fragmented Perception (Seeing in 'bits', prosopagnosia)	1. Resists any change	20%
'Sensory agnosia' (difficulty interpreting a sense) ('Meaning-blindness'; Feeling/acting 'blind')	1. Ritualistic behaviour	50%
Systems Shutdowns (Visual 'whiteouts')	1. Appears to be a mindless follower 2. Surprises with knowing 'unknown' information	100%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory	100%
Associative ('serial') memory (Triggered by visual stimuli)	1. Reactions are triggered by lights, colours, patterns, etc.	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Easily solves jigsaw puzzles 2. Remembers routes and places 3. Memorizes enormous amount of information at a glance 4. Learns nouns first	57.14%

Table D35: *Auditory Embodiment of Il*

Sensory Experiences	Behaviours	Hearing
Intensity with which senses work	Hyper: 1. Dislikes thunderstorm, sea, crowds 2. Makes repetitive noises to block out other sounds	Hyper: 28.57%
	Hypo: 1. Likes kitchen and bathroom 2. Likes traffic, crowds 3. Is attracted by sounds, noises	Hypo: 42.86%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Inconsistency of perception (fluctuation) (Fluctuation between hyper- and hypo-; ‘in’ – ‘out’)	1. May respond differently (pleasure – indifference – distress) to same auditory stimuli (sounds, noises)	100%
Systems Shutdowns (Auditory ‘tuneouts’)	1. Appears to be a mindless follower 2. Surprises with knowing ‘unknown’ information	100%
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1. Looks for the source of the sound	100%
‘Losing oneself’ in stimuli. Resonance (Merging, getting in resonance with sound)	1. Seems to be able to ‘read’ thoughts, feelings, etc. of others	50%
Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative (‘serial’) memory (Triggered by auditory stimuli)	1. Uses songs, commercials etc. to respond 2. Cannot keep track of conversation	50%

Table D36: *Proprioceptive Embodiment of Il*

Sensory Experiences	Behaviours	Proprioception
Intensity with which senses work	Hypo: 1. A lack of awareness of body position in space	Hypo: 12.5%
Delayed perception (Delayed perception of body postures, body sensations)	1. Very poor at sports	100%
Perceptual memory (Proprioceptive memory)	1. Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)	100%
Perceptual thinking ('Body positions, movements, images')	1. Mimics the actions when instructions are being given	100%

Table D37: *Visual Embodiment of Rn*

Sensory Experiences	Behaviours	Vision
Gestalt Perception (Inability to filter visual stimuli)	1. Notices any tiny change in the environment	20%
Intensity with which senses work	Hypo: 1. Is attracted to lights 2. Is fascinated with reflections, bright coloured objects	Hypo: 33.33%
Sensitivity to (disturbance by) some stimuli (Light/colour sensitivity; Disturbance by some patterns)	1. Gets easily frustrated/tired under fluorescent lights	33.33%
Distorted perception (Poor/distorted depth and space perception; seeing 2D world; distortions of shape, size	1. Fears heights, stairs, escalators 2. Has difficulty catching ball 3. Appears startled when being approached suddenly	60%
Peripheral perception (avoidance of direct perception) (Peripheral vision, avoidance of eye contact)	1. Avoids direct eye contact	100%
Compensating for unreliable sense by other senses (Checking visual perception by other senses)	1. Smells, licks, touches or taps objects	100%
Perceptual memory (Visual (photographic) memory)	1. Displays a good visual memory	100%
Perceptual thinking (Visual thinking (thinking in pictures))	1. Remembers routes and places 2. Learns nouns first	28.57%

Table D38: *Auditory Embodiment of Rn*

Sensory Experiences	Behaviours	Hearing
Gestalt Perception (Inability to screen out background noise)	1. Does not seem to understand instructions if more than one person is talking	50%
Intensity with which senses work	Hyper: 1. Dislikes haircut 2. Makes repetitive noises to block out other sounds Hypo: 1. Bangs objects, doors 2. Likes vibration 3. Likes traffic, crowds 4. Is attracted by sounds, noises 5. Makes loud rhythmic noises	Hyper: 28.57% Hypo: 71.43%
Sensitivity to (disturbance by) some stimuli (Disturbance by some sounds)	1. Tries to destroy/break objects producing sounds	50%
Fascination with certain stimuli (Fascination with sounds)	1. Is fascinated with certain sounds	100%
Distorted perception (Hearing distorted sounds, etc.)	1. Pronunciation problems	33.33%
Delayed perception (Delayed processing of auditory stimuli)	1. Response to sounds, questions, instructions is delayed	33.33%
Compensating for unreliable sense by other senses (Checking auditory perception by other senses)	1. Looks for the source of the sound	100%
'Losing oneself' in stimuli. Resonance (Merging, getting in resonance with sound)	1. Seems to be able to 'read' thoughts, feelings, etc. of others	50%
Perceptual memory (Audiographic/sound memory)	1. Displays a good auditory memory (for nursery rhymes, songs, etc.)	100%
Associative ('serial') memory (Triggered by auditory stimuli)	1. Reactions are triggered by sounds/words 2. Uses songs, commercials etc. to respond	50%
Perceptual thinking (Thinking in 'auditory pictures')	1. Composes musical pieces, songs	100%

Table D39: *Proprioceptive Embodiment of Rn*

Sensory Experiences		Behaviours	Proprioception
Distorted perception (Distorted perception of the body)	1.	Has difficulty catching ball	50%
Perceptual memory (Proprioceptive memory)	1.	Displays a very good proprioceptive memory (e.g. understand directions better if produces exact movements they have to do in order to follow these directions)	100%

APPENDIX E

Cognitive Discourse Analysis of All 13 Children with Autism:

Conception & Processing of Real-life Events

This section includes case-wise tabulated information pertaining to conception and processing of real-life events investigated through CODA.

Conception & Processing of School Routine & Birthday Party in Az – Tables E1 & E2

Conception & Processing of School Routine & Birthday Party in Wn – Tables E3 & E4

Conception & Processing of School Routine & Birthday Party in Aa – Tables E5 & E6

Conception & Processing of School Routine & Birthday Party in Im – Tables E7 & E8

Conception & Processing of School Routine & Birthday Party in Hl – Tables E9 & E10

Conception & Processing of School Routine & Birthday Party in Ah – Tables E11 & E12

Conception & Processing of School Routine & Birthday Party in Mm – Tables E13 & E14

Conception & Processing of School Routine & Birthday Party in Zb – Tables E15 & E16

Conception & Processing of School Routine & Birthday Party in Ma – Tables E17 & E18

Conception & Processing of School Routine & Birthday Party in As – Tables E19 & E20

Conception & Processing of School Routine & Birthday Party in An – Tables E21 & E22

Conception & Processing of School Routine & Birthday Party in Il – Tables E23 & E24

Conception & Processing of School Routine & Birthday Party in Rn – Tables E25 & E26

Table E1: *Conception & Processing of School Routine in Az*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	✓	Delayed auditory & proprioceptive; serial proprioceptive & auditory memory; proprioceptive gestalt
Object identity	x	----
Person identity	✓	Associative (serial) auditory memory
Sequence: 1st action	✓	Associative (serial) visual memory
Sequence: 2nd action	x	Delayed proprioceptive processing and proprioceptive gestalt; fascination of auditory & visual stimuli; proprioceptive fascination.
Sequence: 3rd action	✓	Associative proprioceptive memory
Sequence: 4th action	x	Distorted proprioceptive processing; fragmented processing; fragmented hearing

Table E2: *Conception & Processing of Birthday Party in Az*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	
	Object: cake	x	
2nd Sequence	Action: decorating place with balloons	x	
	Object: balloon	x	
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	Auditory agnosia; Hyper-audition; Auditory overload
4th Sequence	Action: blowing the candles	x	
	Object: candles	x	
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	x	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	x	

Table E3: *Conception & Processing of School Routine in Wn*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	x	Hypo-proprioception; auditory gestalt;
Object identity	----	
Person identity	✓	Delayed audition
Sequence: 1st action	✓	Delayed audition
Sequence: 2nd action	✓	Distorted proprioception; fragmented hearing; delayed audition
Sequence: 3rd action	x	Hypo-proprioception; proprioceptive gestalt; fragmented proprioception
Sequence: 4th action	✓	--
Sequence: 5th action	x	Auditory & visual agnosia; auditory overload; visual peripheral processing

Table E4: *Conception & Processing of Birthday Party in Wn*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	Sensory agnosia; Delayed proprioception; Associative auditory memory; Hypo-proprioception; Auditory overload; Fascination towards auditory stimuli
	Object: cake	x	
2nd Sequence	Action: decorating place with balloons	x	
	Object: balloon	x	
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	
4th Sequence	Action: blowing the candles	x	
	Object: candles	x	
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	✓	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	x	

Table E5: *Conception & Processing of School Routine in Aa*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	✓	---
Object identity	---	---
Person identity	✓	---
Sequence: 1st action	✓	Proprioceptive gestalt; visual gestalt; visual & proprioceptive fragmentation; auditory overload; auditory gestalt; delayed audition & proprioception;
Sequence: 2nd action	✓	Delayed audition
Sequence: 3rd action	x	---

Table E6: *Conception & Processing of Birthday Party in Aa*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	✓	Delayed audition; monoprocessing; visual & proprioceptive fascination;
	Object: cake	✓	
2nd Sequence	Action: decorating place with balloons	x	proprioceptive & visual gestalt; fragmented perception; gestalt auditory perception;
	Object: balloon	x	
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	
4th Sequence	Action: blowing the candles	x	
	Object: candles	x	
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	x	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	✓	---

Table E7: *Conception & Processing of School Routine in Im*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	✓	Distorted proprioception; auditory/proprioceptive gestalt;
Object identity	----	----
Person identity	✓	----
Sequence: 1st action	x	Distorted proprioception; fragmented hearing & proprioception; distorted proprioception; hypo-proprioception; auditory overload;
Sequence: 2nd action	x	Hypo-proprioception
Sequence: 3rd action	x	Hypo-proprioception; distorted proprioception; fragmented audition.
Sequence: 4th action	x	Associative auditory memory; distorted proprioception.

Table E8: *Conception & Processing of Birthday Party in Im*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	;
	Object: cake	✓	auditory overload;
2nd Sequence	Action: decorating place with balloons	x	auditory gestalt;
	Object: balloon	x	
3rd Sequence	Action: putting candles on the cake	✓	Delayed audition;
	Object: candles	✓	Associative visual memory;
4th Sequence	Action: blowing the candles	x	hypo-proprioception;
	Object: candles	x	auditory overload
5th Sequence	Action: cutting the cake	✓	serial auditory memory;
	Object: knife	x	---
6th Sequence	Action: eating the cake	x	auditory overload;
7th Sequence	Action: receiving gifts	x	hypo-proprioception
	Object: gifts	x	

Table E9: *Conception & Processing of School Routine in Hl*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	x	Auditory overload; auditory peripheral processing; auditory agnosia; hyper-audition
Object identity	x	----
Person identity	x	Delayed auditory processing
Sequence: 1st action	x	Sensory overload (proprioceptive & auditory); auditory agnosia; auditory overload; fragmented proprioception.
Sequence: 2nd action	x	
Sequence: 3rd action	x	
Sequence: 4th action	x	

Table E10: *Conception & Processing of Birthday Party in Hl*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	
	Object: cake	x	
2nd Sequence	Action: decorating place with balloons	x	
	Object: balloon	✓	Proprioceptive overload; Auditory agnosia; Delayed audition; Auditory gestalt; Visual gestalt; Auditory overload;
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	
4th Sequence	Action: blowing the candles	x	
	Object: candles	x	
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	x	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	x	

Table E11: *Conception & Processing of School Routine in Ah*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	x	
Object identity	x	Visual & auditory overload;
Person identity	x	Auditory agnosia;
Sequence: 1st action	x	Visual fascination
Sequence: 2nd action	x	
Sequence: 3rd action	x	
Sequence: 4th action	x	

Table E12: *Conception & Processing of Birthday Party in Ah*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	
	Object: cake	x	
2nd Sequence	Action: decorating place with balloons	x	
	Object: balloon	x	
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	Visual fascination;
4th Sequence	Action: blowing the candles	x	Sensory overload
	Object: candles	x	
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	x	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	x	

Table E13: *Conception & Processing of School Routine in Mm*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	✓	Delayed auditory perception
Object identity	x	Auditory overload; distorted proprioception; fascination towards visual stimuli; visual gestalt; visual fragmentation; auditory agnosia;
Person identity	x	Distorted visual/auditory perception
Sequence: 1st action	✓	----
Sequence: 2nd action	x	Auditory gestalt
Sequence: 3rd action	x	Auditory agnosia
Sequence: 4th action	x	

Table E14: *Conception & Processing of Birthday Party in Mm*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	✓	
	Object: cake	✓	
2nd Sequence	Action: decorating place with balloons	x	
	Object: balloon	✓	
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	Serial auditory memory
4th Sequence	Action: blowing the candles	✓	
	Object: candles	✓	
5th Sequence	Action: cutting the cake	✓	
	Object: knife	x	
6th Sequence	Action: eating the cake	✓	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	✓	

Table E15: *Conception & Processing of School Routine in Zb*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	✓	----
Object identity	✓	Visual perceptual thinking
Person identity	✓	----
Sequence: 1st action	✓	Fragmented proprioception
Sequence: 2nd action	x	Fragmented hearing; proprioceptive gestalt
Sequence: 3rd action	x	Auditory overload; auditory agnosia; fragmented proprioception
Sequence: 4th action	✓	Fragmented hearing; visual perceptual memory; delayed hearing; auditory overload; auditory agnosia

Table E16: *Conception & Processing of Birthday Party in Zb*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	X	
	Object: cake	✓	
2nd Sequence	Action: decorating place with balloons	x	
	Object: balloon	x	Fragmented visual perception; Visual gestalt; Visual hypo-sensitivity; Associative proprioceptive memory;
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	
4th Sequence	Action: blowing the candles	x	
	Object: candles	x	
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	x	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	x	

Table E17: *Conception & Processing of School Routine in Ma*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	x	Fragmented proprioception; auditory gestalt;
Object identity	✓	----
Person identity	✓	----
Sequence: 1st action	✓	Delayed audition; fragmented proprioception; visual and auditory gestalt; distorted audition;
Sequence: 2nd action	✓	Fragmented audition; associative auditory and proprioceptive memory;
Sequence: 3rd action	✓	Fragmented proprioception;
Sequence: 4th action	x	Fragmented proprioception;

Table E18: *Conception & Processing of Birthday Party in Ma*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	
	Object: cake	x	Hypo-proprioception;
2nd Sequence	Action: decorating place with balloons	x	Visual gestalt;
	Object: balloon	x	Hypo-vision
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	
4th Sequence	Action: blowing the candles	x	
	Object: candles	x	
5th Sequence	Action: cutting the cake	✓	Associative auditory memory;
	Object: knife	x	Hypo-proprioception;
6th Sequence	Action: eating the cake	x	Visual gestalt;
7th Sequence	Action: receiving gifts	x	Hypo-vision
	Object: gifts	x	

Table E19: *Conception & Processing of School Routine in An*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	----	----
Object identity	----	----
Person identity	✓	----
Sequence: 1st action	✓	Fragmented proprioception; delayed audition; delayed proprioception;
Sequence: 2nd action	✓	Associative visual/proprioceptive memory
Sequence: 3rd action	✓	Fragmented proprioception; mono-processing
Sequence: 4th action	x	Proprioceptive gestalt; delayed proprioception; associative proprioceptive memory
Sequence: 5th action	x	Proprioceptive gestalt; distorted proprioception

Table E20: *Conception & Processing of Birthday Party in An*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	✓	Associative memory
	Object: cake	✓	Delayed audition
2nd Sequence	Action: decorating place with balloons	x	Hypo-proprioception
	Object: balloon	x	Hyper-audition
3rd Sequence	Action: putting candles on the cake	x	Auditory overload
	Object: candles	x	Visual fragmentation
4th Sequence	Action: blowing the candles	x	Hypo-vision
	Object: candles	x	Distorted vision and
5th Sequence	Action: cutting the cake	x	proprioception
	Object: knife	x	
6th Sequence	Action: eating the cake	✓	Associative auditory/visual
7th Sequence	Action: receiving gifts	✓	memory
	Object: gifts	✓	

Table E21: *Conception & Processing of School Routine in As*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	x	Distorted proprioception & vision; proprioceptive overload; fragmented audition; proprioceptive gestalt
Object identity	---	
Person identity	✓	Fragmented hearing; delayed hearing; proprioceptive overload
Sequence: 1st action	✓	Delayed audition & proprioception; proprioceptive gestalt; proprioceptive overload; proprioceptive agnosia; fragmented hearing
Sequence: 2nd action	x	Hypo-proprioception; proprioceptive gestalt; proprioceptive agnosia
Sequence: 3rd action	x	Proprioceptive agnosia; proprioceptive overload
Sequence: 4th action	x	Auditory overload

Table E22: *Conception & Processing of Birthday Party in As*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	
	Object: cake	x	
2nd Sequence	Action: decorating place with balloons	x	
	Object: balloon	x	
3rd Sequence	Action: putting candles on the cake	x	Auditory gestalt;
	Object: candles	x	Auditory overload;
4th Sequence	Action: blowing the candles	x	Visual overload;
	Object: candles	x	Auditory gestalt
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	x	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	x	

Table E23: *Conception & Processing of School Routine in Il*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	x	Hypo-proprioception
Object identity	x	----
Person identity	x	Delayed hearing
Sequence: 1st action	x	
Sequence: 2nd action	x	Hypo-proprioception
Sequence: 3rd action	x	
Sequence: 4th action	x	

Table E24: *Conception & Processing of Birthday Party in Il*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	
	Object: cake	x	
2nd Sequence	Action: decorating place with balloons	x	
	Object: balloon	x	
3rd Sequence	Action: putting candles on the cake	x	Hypo-proprioception;
	Object: candles	x	Hypo-vision;
4th Sequence	Action: blowing the candles	x	Sensory agnosia;
	Object: candles	x	Hypo-vision
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	x	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	x	

Table E25: *Conception & Processing of School Routine in Rn*

Event Schemas	Presence / Absence	Sensory Processing
Place (of actions)	✓	Delayed audition
Object identity	x	----
Person identity	x	Distorted vision
Sequence: 1st action	x	
Sequence: 2nd action	x	Hypo-proprioception
Sequence: 3rd action	x	
Sequence: 4th action	x	

Table E26: *Conception & Processing of Birthday Party in Rn*

Event Schemas		Presence / Absence	Sensory Processing
1st Sequence	Action: bringing the cake	x	Hypo-proprioception
	Object: cake	✓	Delayed audition;
2nd Sequence	Action: decorating place with balloons	x	Hypo-proprioception
	Object: balloon	✓	Delayed audition;
3rd Sequence	Action: putting candles on the cake	x	
	Object: candles	x	
4th Sequence	Action: blowing the candles	x	
	Object: candles	x	Hypo-proprioception
5th Sequence	Action: cutting the cake	x	
	Object: knife	x	
6th Sequence	Action: eating the cake	x	
7th Sequence	Action: receiving gifts	x	
	Object: gifts	x	