Communication Exchanges:
An examination of communication in individuals
with non-verbal autism within self-contained classrooms.

By
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B.S.W., Ryerson University, 2006

A Thesis Submitted in Partial Fulfillment of
the Requirements for the Degree of
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in the School of Child and Youth Care

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Supervisory Committee

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Abstract

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Autism prevalence has dramatically increased over the last 10 years, currently affecting 1 in 88 individuals. Individuals with autism face impairments in communication, with one-third to one-half of children with autism not developing natural speech and remaining non-verbal. Individuals with autism are increasingly being integrated into the educational system, within general and self-contained classrooms. A lack of research is apparent regarding the communicative techniques of individuals with non-verbal autism; thus, posing the question: how do children with non-verbal autism communicate?

This study set out to examine the communicative techniques of five individuals with non-verbal autism, in their self-contained classrooms. Participants were videotaped during three or four observational periods. Videotaped observations were analyzed using the Modified-Classroom Observation for Measuring Intentional Communication tool (M-COSMIC), which identified the communicative partner, function, role, and form used by each participant. Results showed that all participants shared the same main communicative partner: an educational assistant; and the communicative forms of eye contact and action. Differences amongst participants appeared in the utilization of communicative categories. Three participants utilized functions from the behaviour regulation category; the remaining two participants communicated using functions from the dyadic social interaction and joint attention categories.

The results of this study indicate that classroom professionals may need increased education regarding main communication techniques and communicative complexity used by individuals with non-verbal autism. As well, this study shows a gap in collaboration between educational assistants and classroom teachers, with no recognition of examining communication holistically. These findings suggest the need for further open-ended research allowing for the inclusion of all communicative forms, and accounting for the extensive factors impacting communication competence.
# Table of Contents

Supervisory Committee .................................................................................................................. ii
Abstract .......................................................................................................................................... iii
Table of Contents ............................................................................................................................. iv
List of Tables .................................................................................................................................... vii
List of Figures .................................................................................................................................... ix
Acknowledgements ......................................................................................................................... x
Dedication .......................................................................................................................................... xii

## Chapter 1: Introduction .................................................................................................................. 1

The Exploding Problem .................................................................................................................... 1
Situating Myself in the Research ...................................................................................................... 1
Why this Study? .............................................................................................................................. 3

## Chapter 2: Literature Review ......................................................................................................... 4

Introduction ...................................................................................................................................... 4
Approach ......................................................................................................................................... 4
Autism: Over 60 Years of Not Knowing .......................................................................................... 5
  History of Autism .......................................................................................................................... 6
  Current Context ............................................................................................................................ 7
  Epidemiology of Autism ............................................................................................................... 10
  Diagnostic Criteria ....................................................................................................................... 11
Communication and Language ....................................................................................................... 13
  Typical Communication ............................................................................................................... 13
  Communication and Autism ........................................................................................................ 15
  Non-Verbal Autism ..................................................................................................................... 17
Symbolic and Non-symbolic Forms of Communication ................................................................. 18
  Non-symbolic Forms .................................................................................................................. 18
  Symbolic Forms ........................................................................................................................ 19
Educational System ........................................................................................................................ 20
  History of Education in Ontario ................................................................................................ 20
  Halton District School Board .................................................................................................... 22
  Non-verbal Communication in the Classroom ............................................................................ 23
Summary ........................................................................................................................................ 25

## Chapter 3: Methods ....................................................................................................................... 26

Locale of the Study .......................................................................................................................... 26
Research Sample ............................................................................................................................ 27
Research Design ............................................................................................................................. 28
  Sociological Theory .................................................................................................................. 28
  Symbolic Interaction Approach ................................................................................................. 29
Data Collection .............................................................................................................................. 31
  Observations ............................................................................................................................ 31
    Benefits and Limitations ........................................................................................................ 33
  Videotaping ................................................................................................................................ 34
Chapter 4: Findings

Individual Findings

Participant 1

Communication with an Educational Assistant

Behaviour Regulation

Dyadic Social Interaction

Joint Attention

Communication with the Classroom Teacher

Behaviour Regulation

Dyadic Social Interaction

Joint Attention

Communication with Classroom Students

Behaviour Regulation

Dyadic Social Interaction

Joint Attention

Communication with Others

Overall Use of Communicative Forms

Summary of P1

Participant 2

Communication with an Educational Assistant

Behaviour Regulation

Dyadic Social Interaction

Joint Attention

Communication with Others

Overall Use of Communicative Forms

Summary of P2

Participant 3

Communication with an Educational Assistant

Behaviour Regulation

Dyadic Social Interaction

Communication with the Classroom Teacher

Behaviour Regulation

Dyadic Social Interaction

Joint Attention

Participant 4

Communication with an Educational Assistant

Behaviour Regulation

Dyadic Social Interaction
Chapter 5: Discussion

Original Objectives: ........................................ 89
Theoretical Implications ........................................ 94
Peer Communication ........................................ 95
Practical Implications ........................................ 96
Communicative Partners ................................................................. 96
Communicative Forms ..................................................................... 98
Initiations versus Response .............................................................. 101
Limitations ..................................................................................... 102
M-COSMIC Tool ............................................................................. 103
Research Setting ............................................................................ 104
Reliability Measurements ................................................................. 105
Recommendations for Future Research and Concluding Remarks .... 105
References ....................................................................................... 107
Appendix A ...................................................................................... 120
Appendix B ...................................................................................... 121
Appendix C ...................................................................................... 122
Appendix D ...................................................................................... 123
Appendix E ...................................................................................... 124
Appendix F ...................................................................................... 128
Appendix G ...................................................................................... 132
Appendix H ...................................................................................... 136
Appendix I ...................................................................................... 139
Appendix J ...................................................................................... 141
List of Tables

Table 1 Description of Participants ................................................................. 42
Table 2 Participant 1’s Communicative Forms .................................................. 52
Table 3 Participant 2’s Communicative Forms .................................................. 57
Table 4 Participant 4’s Communicative Forms .................................................. 63
Table 5 Participant 5’s Communicative Forms .................................................. 68
Table 6 Participant 6’s Communicative Forms .................................................. 72
Table 7 Participants’ Communicative Roles ...................................................... 79
Table 8 Overall Communicative Forms ............................................................. 80
Table 9 Combination of Communicative Forms ................................................. 81
Table 10 Relationship between Category, Role and Form ................................. 101
List of Figures

Figure 1. Participant 1’s Communicative Partners ......................................................... 45
Figure 2. Participant 1 and Educational Assistant Communicative Functions .......... 45
Figure 3. Participant 1 and Classroom Teacher Communicative Functions .......... 48
Figure 4. Participant 1 and Classroom Student Communicative Functions .......... 50
Figure 5. Participant 2 and Educational Assistant Communicative Functions .......... 54
Figure 6. Participant 4’s Communicative Partners ......................................................... 58
Figure 7. Participant 4 and Educational Assistant Communicative Functions .......... 59
Figure 8. Participant 4 and Classroom Teacher Communicative Functions .......... 60
Figure 9. Participant 5’s Communicative Partners ......................................................... 64
Figure 10. Participant 5 and Educational Assistant Communicative Functions .......... 65
Figure 11. Participant 6’s Communicative Partners ......................................................... 69
Figure 12. Participant 6 and Educational Assistant Communicative Functions .......... 70
Figure 13. Total Exchange by Communicative Partner .................................................. 74
Figure 14. Total Amount of Behaviour Regulation Exchanges ................................. 76
Figure 15. Total Amount of Dyadic Social Interaction Exchanges ............................. 77
Figure 16. Total Amount of Joint Attention Exchanges ............................................... 78
Figure 17. Percentage Comparison of Initiated Speech and Non-echoed Language ....
........................................................................................................................................ 84
Figure 18. Percentage Comparison of Eye Contact and Unusual Eye Contact ....... 85
Figure 19. Percentage Comparison of Gesturing/Pointing ......................................... 86
Figure 20. Percentage Comparison of Commenting and Spontaneous Initiated Joint
Attention ............................................................................................................................. 87
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Dedication

This thesis is dedicated to my mother, the individuals and families who are impacted by autism but especially the South family. Throughout my educational and professional practice, I have been granted access to many families with individuals diagnosed with autism, but there hasn’t been a family that has changed the course of my life like the South’s. Val, Tommy, Cameron and Mitchell, you have not only changed the course of my life, but that of my family’s. Val: you are a champion, never underestimate how absolutely amazing you are and all that you’ve accomplished in raising three amazing men. Tommy: you may never fully understand how much you’ve filled my heart; this thesis started because of you.
Chapter 1: Introduction

The Exploding Problem

Autism is a neurological disorder characterized by impairments in language development, social communication and increased restrictive or repetitive behaviours. Leo Kanner first identified autism in 1943 following a study of his clinical patients. One of the most notable symptoms in individuals diagnosed with autism is impairment in language development (Bowler, 2007). Individuals with autism have different communication abilities; some may develop functional speech, while others produce only vocalizations or never develop speech (Clifford, Hudry, Brown, Pasco & Charman, 2010).

Current estimations indicate that there has been a 150% increase in autism diagnoses within the last ten years (Autism Speaks Canada, 2012). During 2011, approximately 200,000 children in Canada were diagnosed with autism, with rates continuing to rise. Autism affects multiple services in Canadian society, including the educational system (Fombonne, 2003). Research has shown that teachers feel ill equipped and have increased stress when students with autism are placed in their classrooms (deBoer, 2009).

Situating Myself in the Research

I am a social worker by education. I graduated from Ryerson University in 2006. During my post-graduation employment, I found that I did not fit the role of a typical social worker. My experiences as a day camp counsellor, placement student in an Ontario Early Years Centre, youth counsellor aboard Disney Cruise Lines and director at a special needs camp allowed me to develop and hone my passion for working with individuals with special needs. My work experience as a youth counsellor aboard Disney Cruise Lines provided me with the opportunity to interact with many of the 3,000 children aboard each week, and to view first-hand the growing
number of children with special needs. This experience allowed me to realize that I wanted to be involved in the practical work with children with special needs, developing and implementing services tailored for their specific needs.

My belief regarding child development is that the educational system is fundamental in shaping children due to the learning and socialization that occurs within and outside the classroom. When looking for a placement for my Master’s practicum, I searched out school boards in the Peel and Halton regions of Ontario. I specifically looked for a school board that had a reputation for providing exceptional services for individuals with special needs. I completed my practicum in a new life skills classroom within the Halton District School Board (HDSB). Life skills programs are self-contained classrooms for students who are chronologically between grades four and eight. They are designed to assist students who present with significant to severe developmental delays (Halton District School Board, 2010).

I worked with seven students within the life skills classroom. Four had a diagnosis of autism, one of whom could not communicate verbally. Because these students were new to the class, knowledge of their skills was based on information from Ontario School Records, interviews with their families and advice from members of the autism team. In addition, there was limited knowledge among classroom staff regarding the communicative techniques used by the student with non-verbal autism. Educational professionals used trial and error when communicating with this student. My practicum experiences were paramount in shaping the focus of my thesis. These experiences brought to my attention the gap in knowledge and resources for educational professionals working with students who had non-verbal autism.
Why This Study?

This study has three goals: first, to attend to the gap in research with respect to communication techniques of individuals with a diagnosis of non-verbal autism; second, to raise awareness and to encourage continuing education for educational professionals with regards to the communication patterns in individuals with non-verbal autism; third, to provide the opportunity for further critical reflection on educational practices in self-contained classrooms.

This research paper is made up of five chapters. Chapter 1 is the current chapter and introduction. Chapter 2 contains the literature review. The literature review outlines characteristics, statistics, definitions and research focusing on individuals with autism, communication in children with and without a diagnosis of autism, the history of special education and current research regarding the inclusion of children with autism in the classroom setting. Chapter 3 outlines the methodological process that produced my data. The research design, location, data sample, recruitment, data collection and analytical tool are explained. The aim of the first three chapters is to provide a framework for the subsequent chapters detailing findings and discussion. Chapter 4 presents my findings by analyzing the observations of my participants using a standardized analytical tool. Chapter 5 will present the discussion, implications, considerations and limitations of the study.
Chapter 2: Literature Review

Introduction

The literature review provides an understanding of the disorder and the impact of communication impairments. There are five sections in this chapter. Part one explores the historical roots and diagnostic criteria of autism. Part two outlines the patterns of communication and language development for both typically developing individuals and individuals diagnosed with autism. Part three summarizes the verbal and non-verbal forms of communication used by individuals diagnosed with autism. Part four examines the historical roots of special education in Ontario. Part five addresses teachers’ reports and perceptions regarding the placement of individuals diagnosed with autism in their classrooms.

Approach

The literature review was conducted by using the University of Victoria’s electronic search engines: PsychINFO, Academic Search Complete, Social Services Abstracts, Social Work Abstracts, Sociological Abstracts, EdResearch Online and Professional Development Collection. Due to the amount of research on the topic of autism, specific journals were also searched: Journal of Autism and Other Developmental Disorders, Research in Autism Spectrum Disorders, American Journal of Sociology, Journal of American Medical Association, Journal of Childhood Communication Disorders, Language and Speech, Language, Speech & Hearing Services in Schools. The following key phrases were used:

“Autism”
“Autism Spectrum Disorders”
“Autism” and “non-verbal”
“Non-verbal autism”
“Autism and Communication”
“History of Autism”
“Autism and school”
“Autism in the classroom”
“Autism” and “Diagnosis”
“Special education”
“Autism” and “Education”
“Communication”
“Alternative and Augmentative Communication”

In conjunction with the online search, a supplementary literature search was conducted at the University of Toronto Ontario Institute for Studies in Education. This search examined literature available in regards to education. The key words used:

“Autism” and “classroom”
“Special education”
“Autism” and “teachers”
“History of special education”

**Autism: Over 60 Years of Not Knowing**

Part one of the literature review consists of four sections: first, a discussion of the history of autism is offered; second, autism’s current context, including prevalence rates and development of the autism spectrum are presented; third, the different epidemiological theories regarding the roots of autism are discussed; and last, the diagnostic criteria for autism is examined.
**History of autism.** In 1943, based on the clinical observations of 11 children (three females and eight males), Leo Kanner identified the disorder known as autism. Kanner noted five themes in the dissemination of his results (Bowler, 2007; Goldstein, Naglieri & Ozonoff, 2009; Timimi, Gardener & McCabe, 2011). First, all 11 children had developed *autistic disturbances of affective contact* (Bowler, 2007; Goldstein, et al., 2011). Affective contact is defined as the “failure to develop the kinds of emotionally charged interpersonal relations that usually become part of a child’s behavioural repertoire” (Bowler, 2007, p.2). Second, the 11 children failed to establish interpersonal relationships with family members. Third, Kanner’s patients developed echolalia (the tendency to repeat back words or phrases heard immediately or in a previous point in time). Fourth, the 11 children lacked spontaneous behaviour or imagination. Fifth, all the patients had an Intelligence Quotient (IQ) of 70 or below (Bowler, 2007; Timimi et al., 2011). Based on his findings, Kanner believed that autism was a disorder developed during infancy and developed the term *infantile autism* (Timimi et al., 2011).

In his original work, Kanner stated that individuals diagnosed with autism “lived in their own world, cut off from normal social intercourse” (Feinstein, 2010; Goldstein et al., 2009, p. 2; Kanner, 1943). Based on Kanner’s statement, the medical community assumed an association between autism and schizophrenia (Feinstein, 2010; Timimi et al., 2011). This association was validated by the medical community claiming that autism was manifested through childhood schizophrenia (Bowler, 2007; Feinstein, 2010). However, research examining the different psychotic behaviours developed by individuals with schizophrenia to those with autism helped professionals to recognize that they were dealing with two distinct disorders (Feinstein, 2010). With a growing understanding of autism, the American Psychiatric Association (APA) and the World Health Organization (WHO) classified autism in its own separate diagnostic category
In the 1970s Lorna Wing observed varying degrees of traits and impairments associated with autism, leading to the development of the autism spectrum (Feinstein, 2010; Timimi et al., 2011). Autism Spectrum Disorders (ASD) are currently used to describe individuals who do not meet Kanner’s (1943) original definition of autism but are classified as having a less severe type of autism (Appendix A; Bowler, 2007; Coplan, 2010; Wing & Gould, 1979).

**Current context.** Autism is a complex neurological disorder that has no preference for age, race, religion or socio-economic status (Geneva Centre, 2009; Timimi, et al., 2011). The autism spectrum consists of Pervasive Developmental Disorders-Not Otherwise Specified (PDD-NOS), Asperger’s Syndrome and Autistic Disorders. Autism Spectrum Disorders are defined by the Autism Canada Foundation (2011) as a set of:

- complex neurobiological disorders that can affect the normal functioning of the gastrointestinal, immune, hepatic, endocrine, and nervous system. Autism Spectrum Disorders impact normal brain development leaving most individuals with communication problems, difficulty with typical social interactions, a tendency to repeat specific patterns of behaviour, and a restricted repertoire of activities and interests.
- Individuals with ASD tend to have varying degrees and combinations of symptoms. (p.1)

Development of an ASD is based on a triad of impairments in social, imaginative and symbolic functioning. Severity of symptoms differs amongst all individuals along the spectrum (Bowler, 2008; Timimi et al., 2011; Wing & Gould, 1979). In current research, the term ASD is most often applied to individuals who function within a cognitively normal range and
communicate via spoken language (Bowler, 2007; Volkmar, State & Klin, 2009). This study recognizes the similarities among all three ASD but focuses on autism.

Current estimations regarding Ontario’s autism rates state that 1 in 88 individuals are diagnosed with autism each year (Autism Speaks, 2012). The Autism Society of Canada states that from 1998 to 2004 there was a 150% increase in reported autism cases (Autism Society of Canada, 2004). Two theories have been attributed to the rise in prevalence rates: changes in diagnostic criteria and heightened awareness of autism (Leonard, Dixon, Whitehouse, Bourke, Aiberti, Nassar, Bower and Glasson, 2010; Prior, 2003). Throughout the past ten years categories of impairment and change in age of assessment may have led to increased autism rates. Prior (2003) believes the widening of diagnostic criteria for autism within the Diagnostic Statistical Manual (DSM) and International Classification of Diseases-10 (ICD-10) allows individuals with eccentricities in social communication to be diagnosed with autism. Williams, Higgins and Brayne (2006) conducted a meta-analysis comparing rates of diagnoses based on earlier DSM criteria to rates based on current DSM criteria. Results found a 2% to 3% increase in diagnostic rates when criteria from the current DSM and ICD were used in diagnosis (Williams, Higgins, & Brayne, 2006).

A second theory regarding increased prevalence rates is heightened awareness for parents and caregivers. A diagnosis of autism is based on a subjective assessment by a licensed professional. An increase in professional awareness may allow a larger number of professionals to arrive at an autism diagnosis (Leonard, 2010). As well, heightened awareness may allow parents to become aware of the characteristics of autism. Parents have reportedly been asking professionals for autism referrals at earlier ages (Prior, 2003; Wing & Potter, 2002).
Studying autism is important, as autism impacts multiple areas: the individual, the family unit, the education system and society as a whole. Individuals with autism report feeling alone, being bullied by peers, having difficulty making friends, expressing their wants and needs in appropriate ways and negotiating life’s complexities (Firestone, 2005; Grandin, 1995). Research has stated that families who have one or more child(ren) with autism report more stress in their lives compared to families who have a child with a different disability (Donovan, 1988; Dumas, Wolf, Fisman & Culligan, 1991). Parents also self-report a higher incidence of familial breakdown, feeling helpless, being restricted in social outings, increased expenses, loss of employment and increased negative psychological outcomes (Baker, Blacher, Kopp & Kraemer, 1997; Hauser-Cram, Warfield, Shonkoff & Krauss, 2001; Jarbrink, Fombonne & Knapp; 2003; Lecavalier, Leone & Wiltz, 2006; Lee, Harrington, Louie & Newschaffer, 2008).

Professional policies and practices of educational systems are impacted by the increase of autism. Teachers report an increase in burn-out and stress due to a lack of autism training, negotiating the roles within their classroom between themselves and paraprofessionals and the constant changes being made to policies and procedures. School boards also face an increased cost in helping to provide specific supports and services for students with autism (Hastings & Brown, 2002; Helps, Newsom-Davis & Callias, 1999; Robertson, Chamberlain & Kasari, 2003; Syriopoulous-Delli, Cassimos, Tripsianis & Polychronopoulou, 2011; Watts-Hull, 2010).

Society is impacted by the increase of autism rates through increased costs to education and social services. With an expanding autism population, pressure has increased regarding the development and funding of programs and the creation of working and living placements for individuals diagnosed with autism (Birenbaum, Guyot & Cohen, 1990; Jarbrink & Knapp, 2001; Jones & Newson, 1992).
Epidemiology of autism. Despite various theories regarding the development of autism, the epidemiological roots remain unknown. Research regarding the development of autism is a contentious issue, with a variety of different theories and no conclusive evidence regarding the root cause (Leonard, Dixon, Whitehouse, Bourke, Aiberti, Nassar, Bower & Glasson, 2010). In the 1950s autism was believed to be the result of parental rearing techniques. Professionals believed that maternal deprivation was the root cause of autism and coined the term refrigerator mother to blame cold and aloof maternal rearing for a child developing autism (Bettelheim, 1959; Feinstein, 2010; Goldfarb, 1956; Kanner, 1943; Timimi et al., 2011). Further research helped shift the investigation of autism away from an abstract view to a more scientific and objective one (Feinstein, 2010).

At the turn of the 21st century parents with children who had developed autism noticed a distinct link between their child receiving the Measles Mumps and Rubella (MMR) vaccine and the onset of autism symptoms. For example:

*At 15 months, when Adam received his MMR vaccine, he was beginning to articulate two word sentences. After 18 months, however, Adam began to show signs which gave my wife and me cause for concern. He became distant, disinterred and inattentive, and he started to flap his arms...* (Goldberg, 2000, p. 389)

A study by Dr. Andrew Wakefield provided supposedly concrete evidence regarding the relationship between autism and the MMR vaccine (Bernier & Gerdts, 2010). This correlation divided the autism community and resulted in a number of families refusing to vaccinate their children. In 2011, The Lancet, the original publication reporting Dr. Wakefield’s study, retracted his paper and published a statement, saying his findings were “incorrect, contrary to the findings of an earlier investigation” (Eggertson, 2011, p. E199). The retraction and investigation into
Wakefield’s research assisted in ending the widespread belief regarding the relationship between autism and vaccines. However, a number of autism groups believe vaccines play a role in the development or onset of autism.

Environmental factors have also been examined for playing a role in autism diagnosis. A number of researchers have conducted studies examining parental age of two cohorts: those with children diagnosed with autism and those without (Liu, Zerubavel & Bearman, 2010; Parner, Baron-Cohen, Lauritsen, Jorgensen, Schieve, Yeargin-Allsopp & Obel, 2012). These studies have reported a correlation between high paternal age and an increased risk of autism (Liu, Zerubavel & Bearman, 2010; Parner et al., 2012). Social and educational factors are also examined for their role in an autism diagnosis. Heightened awareness and access to information regarding characteristics and traits of autism may lead families to have their child tested at an earlier age. Research regarding the different epidemiological theories of autism is important. Knowledge regarding the epidemiological roots of autism is continuously growing and can be biased depending on the researchers’ personal lens.

Despite a lack of conclusive evidence regarding the root cause of autism, what remains static is that males are diagnosed at a higher rate than females. Current male to female ratios are four to one (Carter, Black, Tewani, Connolly, Kadlec & Tager-Flusberg, 2007; Fombonne, 1999; Honda, Shimizu, Imai & Nitto, 2005; Lingam, Simmons, Andrews, Miller, Stowe & Taylor, 2003; Yeargin-Allsopp, Rice, Karapurkar, Doernberg, Boyle & Murphy, 2003).

**Diagnostic criteria.** Currently, there are no medical tests that can be used to diagnose autism. A diagnosis is usually obtained by having accredited professionals conduct behavioural assessments, checklists and interviews (Geneva Centre, 2009). A variety of tools have been developed for establishing an autism diagnosis. Fombonne (2003) conducted a review of 32
worldwide autism studies and specifically examined the diagnostic tool(s) used in each study. His review showed that eight studies were published prior to the inclusion of autism in the DSM and ICD (Fombonne, 2003). Three of these studies used Kanner’s criteria (Hoshino, Yashima, Ishige, Tachibana, Watanabe, Kancki, et al., 1982; McCarthy, Fitzgerald & Smith, 1984; Treffert, 1970). Kanner’s criteria are based on the specific behaviours presented in his original clinical observations (Feinstein, 2010; Timimi et al., 2011). Kanner’s criteria focused on two dimensions: a lack of affective contact and an increase in restrictive and repetitive behaviours (Timimi et al., 2011). The remaining five studies used various criteria to establish a diagnosis of autism: a rating scale (Lotter, 1966), clinical observations (Brask, 1972) and Rutter’s criteria (Bohman, Bohman, Bjorck & Sjoholm, 1983; Steinhausen, Gobel, Breinlinger & Wohlloben, 1986). Rutter’s criteria are a refined version of Kanner’s and included the triad of impairments in social relationships, language and communication skills (Timimi et al., 2011).

Professionals currently use the DSM to establish a diagnosis of autism, although there have been many changes throughout the previous DSM editions (American Psychiatric Association, 1980; Fombonne, 2003; Jacobsen, 2010; Timimi et al., 2011). The DSM-III was the first edition to include autism; autism was categorized as a Pervasive Developmental Disorders (Timimi et al., 2011). The DSM-III-R shifted away from the belief that autism was an infantile disorder and renamed it as an autistic disorder, developing PDD-NOS to represent individuals who did not fully fit the diagnosis of autism (American Psychiatric Association, 1980; Goldstein et al., 2009; Timimi et al., 2011). The DSM-IV followed the lead of the ICD and included three additional sub-categories under Pervasive Developmental Disorders: Asperger’s Syndrome, Childhood Disintegrative Disorder and Rett’s Syndrome (Timimi et al., 2011; World Health Organization, 1993). The DSM-V is currently being revised; changes include the removal of
Asperger’s Syndrome from the manual, although the reasoning behind the removal has not been made public (American Psychiatric Association, 2012).

Three core features remain fixed in establishing a diagnosis of autism: impairments in social interaction, impairments in communication and restrictive or repetitive behaviours (Appendix B, American Psychiatric Association, 2000; Timimi et al., 2011). The DSM-IV-R states that there are 12 characteristics that may appear in an individual with autism; only six must be present for a diagnosis to be given (American Psychiatric Association, 1994; Geneva Centre, 2009).

**Communication and Language**

The second part of the literature review focuses on communication and is divided into four sections. The first section examines communication development in typically developing children. The second section discusses communication progression in children with autism. The third section defines non-verbal autism as it is used in this study. The fourth section discusses symbolic and non-symbolic forms of communication used by children with autism.

**Typical communication.** Communication originates from the sharing and distribution of ideas and information (Hinde, 1972). Communication refers to all forms of sending and receiving messages, through spoken language, body language, gestures or signs (Goldstein et al., 2009). Communication is defined in this study as:

any act by which one person gives to or receives from another individual information of that person’s needs, desires, perceptions, knowledge or affective states. Communication may be intentional or unintentional signals, may take linguistic or non-linguistic forms and may occur through spoken or other modes. (National Joint Committee for the Communicative Needs of Persons with
Severe Disabilities, 1992, p.2)

Understanding communication in typically developing children helps to establish impairments in communication of individuals with autism. Communication competence in typically developing children begins at the prelocutionary stage; occurring at 6 months of age (Sigafoos, Woodyatt, Tait, Tucker, Roberts-Pennell & Pittendreigh, 2000). During the prelocutionary stage, children use involuntary idiosyncratic behaviours as forms of communication, such as vocalizations, body movements and eye gaze (Sigafoos et al., 2000). The idiosyncratic stage follows the prelocutionary stage and is based on parental responses to the child’s behaviour. The behaviours and responses are shaped into intentional forms of communication (Sigafoos et al., 2000). The locutionary stage is the final stage of communication and occurs between the first and second years of a child’s life. It is the time when language is developed (Sigafoos et al., 2000).

Four main aspects make up typical communication: form, function, context and content (Bruce, 2002; Bruce, Godbold & Naponelli-Gold, 2004; Miles & Riggio, 1999; Stremel & Schutz, 1995). Form is “the method used to communicate and includes both concrete methods such as verbal language or body language and abstract methods such as sign language or manual gestures” (Bruce et al., 2004, p.81). Function is described “as the communication partner’s interpretation of the sender’s communication purpose” (Bruce et al., 2004, p. 81). Function is based on what the communication partner believes to be the intent of communication. For example, what occurred prior to the conversation may impact the way communication is viewed. The communication context “sets the stage for communication and includes components such as the physical environment, individualistic characteristics, activity, routine and communication partners“(Bruce, 2004, p. 81). Lastly, content “is the message, a simplistic concept when
expression occurs in verbal forms, but is far more complex and subject to interpretation when the content is expressed through body language and vocalizations” (Bruce et al., 2004, p.81).

Communication is not a singular convention occurring on its own; rather individuals influence each other and are influenced by variables in the environment (Sameroff, 1987; Sameroff & Fiese, 1990).

**Communication and autism.** In 1997 Reichle stated that “the study of communication interventions for persons with severe developmental disabilities is in its infancy. . .” (p.110).

Reichle’s (1997) statement is still true today, with the lack of research examining communication in individuals with autism who do not develop speech. Studying communication is important as communication is a fundamental life and social skill. Communication is seen as one of the most important means for individuals to obtain membership in society (Ferguson, 1994; Jordan, 2011). Individuals with autism do not communicate the same way as their typically developing peers. Nearly one third to one half of individuals with autism do not develop natural speech (Bryson, 1996; Light, Roberts, Dimarco & Greiner, 1998; Lord & Paul, 1997; Noens & Berckelaer-Onnes, 2004). Autism research has primarily focused on the early years; therefore, it remains difficult to obtain an exact number of individuals who remain non-verbal. The early years, the years between 2 and 5, are a time when language may still develop and is perceived as a “critical time for examining early development . . . implications for early detection leading to early intervention . . .” (Drew, Baird, Taylor, Milne & Charman, 2007; Lord, Risi & Pickles, 2004; Maljaars, Noens, Jansen, Scholte & Berckelaer, 2011; Shumway & Wetherby, 2009, p. 1140).

Wetherby (1986) and Wetherby, Yonclas and Bryan (1989) recognized that individuals with autism develop communication in a different way compared to typically developing individuals. To better assess these differences, Wetherby and Prutting (1984) created a model of
communication development for children with autism. The key factor in the Wetherby and Prutting model is the recognition that children with autism acquire functions of communication and that these functions are developed one at a time.

The first and most often used type of functions are behaviour regulation functions. Behaviour regulation functions are used “to regulate the behaviour of another person in order to obtain an environmental end” (Wetherby, 1986, p. 305). Communication during this stage is purely intentional and communication may be formed through the use of an individual’s own body (i.e., temper tantrums) or through the use of a partner’s body (i.e., pulling a hand towards a desired object; Wetherby & Prutting, 1984). Social interaction functions follow behaviour regulation functions in the Wetherby and Prutting model. Social interaction functions are used to “communicate for the purpose of attracting or maintaining attention to oneself” (Wetherby, 1986, p. 305). Communication functions during this stage can be formed through actions or vocalizations but the sole purpose is to gain another’s attention, request a social routine or greet others. The final communication functions are joint attention. Joint attention “direct(s) another person’s attention to an object or an event for a social end” (Wetherby, 1986, p.305). Communication using the functions of joint attention may be formed through interactive commenting or requesting information (Wetherby, 1986). A diagnosis of autism has been shown to affect an individual’s ability to develop joint attention (American Psychiatric Association, 1994; Twachtman-Cullen & Twachtman-Reilly, 2010; Wetherby, 2006). Research indicates that individuals with autism do not communicate as a way to seek shared enjoyment, interests, or achievements with others. Rather, communication is used for an environmental end (Twachtman-Cullen & Twachtman-Reilly, 2010; Wetherby, 2006). For example, individuals
with autism use greetings or politeness markers, such as thank you, as part of a ritual with the motivation to complete the ritual, rather than acknowledging the person (Wetherby, 1986).

Two issues arise when studying communication in individuals with autism. First, when studying language impairments it is important to examine the parameters of what constitutes communication impairment (Fay & Schuler, 1980). Second, it is important to recognize that each child is unique and communication development may occur at a different rate (Clifford et al., 2010; Jurgens, Anderson & Moore, 2009).

**Non-verbal autism.** In 2001, the National Research Council reported “that about 50% of children diagnosed with autism will acquire functional speech” (p.172), while a substantial portion will remain non-verbal (Goldstein et al., 2009). Impairments in communication remain a central characteristic in the diagnosis of autism; individuals range from having difficulty developing verbal language to being completely non-verbal (American Psychiatric Association, 2000; Bryson, 1996; Goldstein et al., 2009; Light et al., 1998; Lord & Paul, 1997; Noens & Berckelaer-Onnes, 2004; Preissler, 2008). Studies also revealed a correlation between a child’s language development and his/her IQ; individuals who develop little or no language tend to have a lower IQ (below 70) than their peers (Cohen, Paul & Volkmar, 1987; Duquette, Michaud & Mercier, 2008; Eagle, Romanczyk & Lenzenweeger, 2010; Lord & Venter, 1992; Preissler, 2008).

This study defines children with non-verbal autism as individuals who present with very limited to no language, have similar sensory interests of a typically developing 8 to 9 month old child, have deficits in sharing attention and conventions and use gestures for the purposes of communicating (Duquette et al., 2008). Research examining individuals with non-verbal autism remains small for two reasons. First, forms of communication used by non-verbal individuals
have been classified as *abnormal or non-communicative* and thus are sometimes excluded from studies (Wetherby, 1986). Second, previous autism research has primarily focused on individuals who were diagnosed in the early years and individuals with non-verbal autism who possess a higher IQ. This leaves a gap in research regarding other individuals with non-verbal autism (Tager-Flusberg, Paul, & Lord, 2005).

**Symbolic and Non-symbolic Forms of Communication**

Wetherby and Prutting’s (1984) model of communication specifies the functions of communication used by individuals with autism but does not address the forms of communication used during exchanges. This section examines the use of non-symbolic and symbolic forms of communication by individuals with autism.

**Non-symbolic forms.** Non-symbolic forms of communication are formed through body movement, facial expressions, vocalizations and natural gestures (i.e., pulling on a hand, or guiding an individual toward the object of desire; Downing & Siegel-Causey, 1988; Maljaars, Noens, Jansen, Scholte & Berckalaer-Onnes, 2011; Yoder, McCathren, Warren & Watson, 2001). One of the most utilized forms of non-symbolic communication is behaviours (Bebko, Konstantareas & Springer, 1987; Konstantareas & Homatidis, 1989; Lecavalier, Leone & Wiltz, 2006; Maljaars et al., 2011). Studies have suggested that individuals with autism use both positive and negative behaviours in 75% to 80% of their communication (Derby, Wacker, Sasso, Steege, Northup, Cigrand & Asmus, 1992; Iwata, Pace, Dorsey, Zarcone, Vollmer, Smith, Rogers, et al., 1994). Negative behaviours are noticed more often by others than positive behaviours because they involve challenging behaviours. Challenging behaviours, such as pulling hair, kicking, or tantrums persist because the negative behaviour may have previously
removed unwanted stimuli or gained the attention of a communication partner (Downing & Siegel-Causey, 1988).

A second type of non-symbolic form of communication is echolalia. Echolalia is the inappropriate repetition of words, phrases or sentences spoken by others (Goldfarb, Goldfarb & Scholl, 1966). Individuals with autism may use two types of echolalia: immediate and delayed. Immediate echolalia occurs when individuals repeat back what they have just heard (Bowler, 2007). Delayed echolalia happens when individuals repeat words or phrases heard at a previous point in time with no relation to the current context (Bowler, 2007).

**Symbolic forms.** Symbolic forms of communication include rule-governed systems such as written language and the use of symbols (Bloom, 1970). Individuals with autism who do not develop conventional speech may require assistance (Ganz, Earles-Vollrath, Heath, Parker, Rispoli & Duran, 2011). Alternative and Augmentative Communication (AAC) systems were developed to assist individuals with language delays. Alternative and Augmentative Communication systems are defined as “an integrated group of components, including the symbols, aids, strategies, and techniques used by individuals to enhance their communication. The system serves to supplement any gestural, spoken, or written communication” (American Speech-Language-Hearing Association, 1989, p. 107). There are two types of AAC systems: unaided and aided (Light, et al., 1998; Sigafoos, Didden & O’reilly, 2003). Unaided AAC systems do not require external devices; communication is formed through the use of sign language or manual gestures (Light et al., 1998). Aided AAC systems require the use of external devices such as communication boards, computer based technology and Picture Exchange Communication Systems (Light et al., 1998).
The Picture Exchange Communication Systems (PECS) is one of the most widely known and utilized aided systems for individuals with autism. Picture Exchange Communication Systems (PECS), created in the 1970s, enhances communication through the utilization of an individual’s visual abilities (Howlin, 2006). The system works by teaching individuals that certain pictures correspond with an associated item (Bondy & Frost, 1993). Once a connection is established between a picture and its corresponding meaning, individuals can express their wants and needs by finding and using the PEC (Bondy & Frost, 1993). Autism research examining the use of PECS reported an increased rate of requesting and responding to questions compared to peers not using PECS (Howlin, 2006).

**Educational System**

The final part of the literature review examines the educational system in Ontario and is divided into three sections. I begin with the examination of the historical roots and the system’s treatment of individuals with special needs. The second section discusses the context of this study, the Halton District School Board. The final section presents previous research regarding the placement of non-verbal students with autism into classrooms.

**History of education in Ontario.** In 19th century Canada, children diagnosed as intellectually or developmentally delayed were placed in psychiatric institutions without integration into society or the education system (Simmons, 1982). Towards the end of 1918, a philosophical shift took place regarding how individuals with special needs were viewed, shifting from institutionalization to living in the community with special accommodations (Weber, 1993). Changes in ideological thinking continued throughout the 1960s, from a view of socially responsible custodial care to a view of social integration and universal education (Weber, 1993). This change in ideology allowed parents/guardians to enrol child(ren) with
intellectual and developmental disabilities into the school system (Andrew & Lupart, 1993; Burge, Oueletter-Kuntz, Hutchinson & Box, 2008). Unfortunately, despite access to the school system, mainstream classes were deemed inappropriate for some students because of mental and physical disabilities. Therefore students with special needs were placed in segregated classrooms (Andrew & Lupart, 1993; Burge et al., 2008).

In 1984, the Ontario government passed the Educational Amendment Act, mandating that students with special needs have the right to receive an appropriate education (Hutchinson, 2007; Weber, 1993). The Educational Amendment Act also set the following expectations:

- that each school board establish and update a comprehensive special education plan;
- that each school board develop a Special Education Advisory Committee to create and implement recommendations on policies and procedures; and
- the development of the Identification, Placement, and Review Committee (IPRC) to determine placement and accommodations for students with a variety of needs. (Weber, 1993)

School boards across Ontario implemented the recommendations of the Act but continued to place students with special needs in segregated classrooms (Weber, 1993).

In 2004, the Canadian government created a report: Advancing the Inclusion of Persons with Disabilities, outlining the importance of including children with disabilities in the educational system (Burge et al., 2008). The report recommended that children with special needs should be placed in general education classrooms but also recognized and recommended that some students may benefit from placement in self-contained classrooms (Bunch & Valeo, 2004; Burge et al., 2008; Fein & Dunn, 2007). Self-contained classrooms were created for two purposes: first, to educate students who have one or more significant physical or developmental
delays; and second, to help students develop basic self-help, communication and pre-academic skills (Fein & Dunn, 2007).

**Halton District School Board.** This study took place within self-contained primary classrooms of the Halton District School Board (HDSB). The HDSB encompasses the areas of Burlington, Oakville, Milton and Halton Hills, Ontario (Appendix C). Student enrolment for the HDSB is approximately 58,000 students, 40,000 students are enrolled in the elementary stream (Halton District School Board, 2010). Out of the approximate 40,000 students, around 2% are placed within a variety of self-contained classrooms (Halton District School Board, 2010).

Being a regulated school board in Ontario, the HDSB adheres to the educational guidelines put forth in both the Educational Amendment Act and the *Advancing the Inclusion of Persons with Disabilities* summary report (Burge et al., 2008; Hutchinson, 2007; Weber, 1993). The HDSB special education plan defines self-contained classrooms as a “small group environment where students receive over 50% assistance from a special education teacher and may include integration into a regular classroom setting as appropriate” (Halton District Scholl Board, 2010, p. 6). Self-contained classrooms were developed based on five specific student related goals:

1. accessing intensive intervention programs
2. addressing areas of significant learning needs/strengths
3. developing independent learning strategies
4. becoming a more self-directed learner
5. experiencing success with support from the school, community, and home. (Halton District School Board, 2010)
There are currently ten different types of self-contained classrooms in the HDSB. Classrooms range from Early Language Development Centres to behavioural and functional learning programs (Halton District School Board, 2010). This study focuses on a particular program known as the life skills program. Life skills programs are available for students who are chronologically between Grades 4 and 8, and designed to assist students who present with significant to severe developmental delays (Halton District School Board, 2010). The life skills program:

- uses research supported and differentiated instructional practices,
- encompassing a range of programming, from alternative curriculum based on the student’s development stage to the development of basic literacy and numeracy skills of daily living, including self-regulation, self-advocacy and social skills. (Halton District School Board, 2010, p.57)

Due to the changing number of classroom and continual diagnosis, the exact number of individuals with autism in the life skills program is not known. It is important to have an accurate number of individuals with autism in each school or classroom, as it may lead to more appropriate training, intervention and educational opportunities for professionals working in these programs.

**Non-verbal communication in the classroom.** Over the past 30 years exceptional gains have been made for the inclusion of students with autism into the educational system. Educating students with autism continues to be a complex task. Students with autism possess different strengths and needs, which may impact the delivery of academic services (Noland, Cason & Lincoln, 2010). During the integration phase of educational reform, teachers reported being excited regarding the possibility of students with autism being placed in their classroom (deBoer, 2009). At the same time though teachers also expressed concerns regarding the availability of
adequate training and school support regarding these placements (deBoer, 2009). Teachers have reported increased rates of stress as a result of a lack of training around autism, especially students with non-verbal autism (deBoer, 2009).

Studies examining autism in the classroom found that students with an autism diagnosis received limited communication opportunities compared to their peers (Downing & Siegel-Causey, 1988). Houghton, Bronicki and Guess (1987) studied the communicative attempts of students with multiple disabilities. Results found that teachers responded less to a student’s non-verbal behaviour than verbal responses by their peers. Keen, Sigafoos and Woodyatt (2005) studied communicative attempts of students with autism and found that in “38% of videotaped instances, teachers did not respond to the children’s communicative attempts. . .” (p.30). Rhyne, et al., (1990) observed four students in two primary classrooms; results showed that teachers provided limited or no responses to students with autism. Teachers may not be attending to the communicative techniques of students with autism because they are unaware of the communicative forms and functions being used.

The understanding of communication between individuals who possess severe and multiple disabilities and educational professionals working with them is essential for mutual understanding and effective interactions (Stillman & Siegel-Causey, 1989). There is a question produced from these findings: are educational professionals not responding to or negatively interpreting communication by students with non-verbal autism due to a lack of education regarding the different forms and functions used by these students? This question is the driving force behind this study and will hopefully lead to a better understanding of the communicative techniques used by individuals with non-verbal autism.
Summary

In summary, autism is a neurological disorder affecting 1 in 88 children. Autism affects the individual, the family, society and educational system. There are no definitive answers regarding the epidemiological roots of autism. Three main impairments remain central to establishing an autism diagnosis: impairments in social interaction, impairments in communication and restrictive or repetitive behaviours. Impairments in communication affect between 75% and 80% of individuals diagnosed with autism. Communication impairments range from longer development time, developing only a few words, to not developing language at all. The development of the Educational Amendment Act helped place individuals with autism into general education classrooms, although some individuals benefit from placement into self-contained classrooms. Teachers report a gap in knowledge and education regarding individuals with non-verbal autism and the use of communication techniques.
Chapter 3: Methods

Chapter 3 focuses on the context, methodological underpinnings, participant recruitment and data collection methods of this study. I chose a qualitative inquiry approach for data collection; specifically naturalistic and participatory observations in conjunction with videotaping. The Modified-Classroom Observation Schedule to Measure Intentional Communication, a standardized tool, was used to aid in observations (M-COSMIC; Clifford, Hudry, Brown, Pasco, Charman, & Performance Assessment for California Teachers, 2010). This chapter is divided into five parts. First, a description of the study’s context, sample and recruitment strategies are given; second, a discussion of the research design and theoretical underpinnings is provided; third, data collection methods are reviewed; fourth, ethics, confidentiality, anonymity and researcher credibility are presented; lastly, a detailed description of the M-COSMIC tool is offered.

Locale of the Study

I chose to conduct my research in the HDSB based on the development of its special education plan. The HDSB provides a wide array of programs for students with varying abilities and needs. This study was conducted in five separate life skills classrooms. Life skills programs provide safe and creative spaces for children with special needs and are defined as:

- encompassing a range of programming from alternative curriculum, based on the student’s developmental stage for the improvement of basic literacy and numeracy skills.
- There is a focus on the development of independence in the skills of daily living, including self-regulation, self-advocacy and social skills. (Halton District School Board, 2010, p.57)
Studying students in a life skills program was chosen for two reasons. First, the life skills program provides individualized education tailored to the specific needs of a student. Second, compared to general education classes, the life skills program offers smaller class sizes. I specifically looked for a classroom containing 8 to 12 students. I felt that a smaller class size would benefit the study because general education classrooms may have provided two challenges. First, it may have been difficult to find participants who fit the criteria for this study in general education classrooms. Second, larger classroom sizes may have hindered the amount of communication produced by participants. I felt that the communicative abilities of mainstream students may have overshadowed the communicative abilities of individuals with non-verbal autism.

**Research Sample**

This study utilized non-probability quota sampling, where the researcher identifies the core population and number of participants beneficial to study (Neuman, 2003). The core population of the study was individuals with a diagnosis of non-verbal autism. The criteria for a participant were that they be a student within a life skills classroom and be non-verbal. I aimed to observe between six to eight participants.

I began my recruitment process once I received approval from both the University of Victoria and the Halton District School Board Research Advisory Committee. The first step of the recruitment process involved identifying potential schools with a life skills program. The Principal of Special Education provided me with the names of such schools. After potential schools were identified, I set up meetings with each school principal. These meetings consisted of proposing the details of the research study, outlining how the study would benefit that school
and its students, outlining recruitment procedures and explaining the involvement of the overall classroom, students and professionals. Once the principal of each potential school gave me permission to conduct the research, I set up meetings with the life skills teachers. During these meetings I explained the purpose of the study, the class involvement, confidentiality procedures and time line. Once permission from the classroom teacher was granted, recruitment occurred.

Recruitment letters (Appendix D) were sent home to all classroom students asking that only those fitting the set criteria and willing to participate send the form back. Once a recruitment letter was signed by the parents/guardians of potential participants, consent forms were sent home to the potential participants, other classroom students and educational professionals (Appendix E, F & G). After the consent forms were signed by the parents/guardians of participants and returned, the classroom teacher and I discussed a start date for pre-observational visits.

**Research Design**

The second part of this chapter outlines the design of this study and briefly examines the theory guiding this study.

**Sociological theory.** This study is rooted in sociological theory, offering a strategy for handling research data and providing modes of conceptualization for describing and explaining (Glaser & Strauss, 1967). Glaser and Strauss (1967) believe there are four interrelated objectives of sociological theory:

1. to enable prediction and explanation of behaviour
2. to be usable in practical applications (prediction and explanation should be able to give practitioner understanding and some control)
3. to provide a perspective on behaviour
4. to guide and provide a style for research on a particular area of behaviour. (p.3)

These four objectives are embedded in the design of this study. The purpose of this study is to understand non-verbal communication, help educational professionals predict and examine non-verbal forms of communication, to assist in providing concrete perspectives on communication and to contribute to further professional development.

**Symbolic interaction approach.** The guiding practice of this study is symbolic interactionism. Symbolic interactionism is based on sociological theory and was developed by Mead and re-introduced by Blumer, who was a member of the Chicago School of Sociology (Charmaz, 2006). The Chicago School was made up of a group of sociologists who were interested in studying the social and symbolic interactions of individuals with their settings. A symbolic interaction approach studies social human behaviour and is based “on the belief that humans should be regarded in the context of their environment” (Benzies & Allen, 2001, p. 542; Bodgan & Knopp-Bilken, 1986). The basic tenets of symbolic interaction approach are defined as:

human beings acting towards things on the basis of the meanings they ascribe to those things, the meaning of such things are derived from, or arise out of, the social interaction that one has with one another or society; these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things they encounter. (Blumer, 1969, p.2)

When researchers use a symbolic interaction approach, they are not only concerned with knowing their participants’ point of view, but also the process that allows their point of view to develop (Benzies & Allen, 2001).
The utilization of a symbolic interaction approach in research is based on four tenets. These tenets are reflected in the design of this study. First, a symbolic interaction approach views “people acting on the basis of the meaning that things have for them” (Baugh, 1990, p. 41; Benzies & Allen, 2001). Benzies and Allen (2001) clarify this to mean that “the world is interpreted through the use of symbols (language) in the process of interaction” (p. 544). This tenet is reflected in the design of this study, examining the process of communication used by participants in their context. Second, interaction is fluid and variable. Not every observation is going to arrive at the same ending (Baugh, 1990). Although not set out in the study’s design, this tenet reflects this study’s view of communication, accepting that communication is fluid and the observer should be aware that communication and its context are constantly changing. Third, “meanings are assigned and modified through an interpretive process that is ever changing” (Benzies & Allen, 2001, p.544). This is reflected in the study’s definition of communication. Lastly, “the individual and the context in which the individual exists are inseparable” (Benzies & Allen, 2001, p.544). This tenet is reflected in the choice of setting, the life skills program. The life skills program provides an inclusive classroom where participants and their context work together to create communication opportunities.

Although this study is not driven by theory, but rather the tenets of a symbolic interaction approach make up its theoretical underpinnings. The theoretical underpinnings of a sociological and a symbolic interaction approach aided in the analysis of results, as well as allowed a re-examination of personal perspectives. Specifically, I attempted to go beyond the surface of the communication exchange and examine the meaning and process that may have led the communication exchange to occur in the first place.
Data Collection

The following section outlines the two methods utilized to collect data for this study: observations and videotaping. A discussion of the data collection method, their benefits, limitations and use in the study are offered.

Observations. Observations are defined as the “symbolic description of events, behaviours, and artifacts in the social setting chosen for study” (Marshall & Rossman, 1989, p. 79). Observational methods continue to play an important role in qualitative research because they help frame what is familiar, help acquire a better understanding of the unfamiliar and describe and examine behaviour (Dell-Clark, 2011; Marshall & Rossman, 1995). Observations allow researchers to check for non-verbal expressions, examine interactions and observe communication with others (Schmuck, 1997).

A combination of participant and naturalistic observations were used in this study. Schensul, Schensul and LeCompte (1999) define participant observation as “the process of learning through exposure or involvement in the day-to-day routine of participants in the research setting” (p. 91). Participant observations enable researchers to learn the activities of the participants in their natural setting (Kawulich, 2005). DeWalt and DeWalt (2002) suggest that using participant observation in research can increase the thoroughness of findings because the researcher becomes interested in learning about others, is non-judgemental and is open to the unexpected. Participant observation was demonstrated in this study by observing participants in their natural setting, their classroom.

Naturalistic observations were combined with participant observations to assist in providing the opportunity to document real-life occurrences (Angrosino, 2007). Naturalistic
observations differ from the casual seeing that researchers partake of in everyday life (Angrosino, 2007). Naturalistic observations are systematic. They are conducted with precise notation allowing efficient and orderly retrieval, categorization and analysis of information and focus on what is observable, such as individual behaviours, activities and events (Angrosino, 2007).

Naturalistic observations are derived from four tenets, which are reflected in this study. The first tenet is that investigations take place in the real world, rather than in a setting created for the purpose of the study (Hammersley, 1990). Participants in this study were observed in one of their natural settings in order to capture day–to–day interactions between participants and the educational professionals and peers. Second, naturalistic observations are based on the study of social processes with minimal to no intervention by the researcher (Hammersley, 1990). Every attempt to be as unobtrusive as possible was used for this study. I organized appropriate observation times and tried to place myself out of the flow of the class. Third, naturalistic observations are designed to address actual processes of social interaction (Hammersley, 1990). The final tenet of naturalistic observations involves the construction and re-construction of a process under study, rather than testing a pre-defined hypothesis (Hammersley, 1990). This tenet is reflected in the nature of this study’s research question, which is not a pre-defined hypothesis, but an open-ended question requiring the examination of communication processes.

Since individuals with autism tend to show greater communication impairment during real world social interactions rather than in simulated environments, it is important to study autism and communication in natural settings (Wimpory, Hobson, & Nash, 2007). Shah (2006) utilized observations during her study of educational settings, these observations allowed her to become familiar with both the context and participants. Observations have successfully been
used in a variety of different studies examining the communication patterns of children with and without autism (Clifford et al., 2010; Noens & Van Berckelaer-Onnes, 2004; Pasco, Gordon, Howlin, & Charman, 2008; Shah, 2006). Noens and Van Berckelaer-Onnes (2004) believe that “observations of communicative behaviour in a variety of natural environments are very valuable . . . since the behaviour of people with autism can differ considerably” (p. 207).

**Benefits and limitations of Observations.** DeMunck and Sobo (1998) state three benefits to using participant observation in qualitative research studies. First, participant observation allows researchers to gain access to a *backstage culture*; access that might not be available by using other methods. *Backstage culture* refers to the viewing of events that may not be seen during scheduled times (DeMunck and Sobo, 1998). Second, participant observations highlight detailed descriptions of behaviours, intentions, situations and events, rather than a reliance on verbal methods (DeMunck & Sobo, 1998). Third, participant observation allows researchers to view participants in unscheduled times, which may decrease participant bias (DeMunck & Sobo, 1998).

Researchers using observations as a data collection method should constantly be in a state of self-reflection (Padgett, 2008). Researchers need to not only critically reflect, but also engage in self-reflection of their feelings and how they may impact the study (Padgett, 2008). To offset personal bias other methods, such as interviews, can be used to validate observational findings. Using participant observation alone without other data collection methods is seen as a limitation. For example, interviews provide researchers with the ability to check definitions, observe situations informants may have described and allow the researcher to gather a broader picture of the study (Marshall & Rossman, 1995). For this study, however, observations were conducted without interviews. I felt that interviews would have relied heavily on the educational
professionals’ perspective, with possible preconceived ideas regarding participant communication being made.

**Videotaping.** Videotaping was chosen as a data collection method for two reasons. First, observing and recording behaviour can be a complex task. Videotaping allows the recorder to have access to a permanent account of what occurred. It was important for this study to have a permanent account of the observation, as I believed the classroom setting could become busy and not allow for accurate observations. Second, videotaping was used for congruence. The previous two COSMIC studies used videotaping to capture and observe the communication patterns of their participants (Clifford et al., 2010; Pasco et al., 2008).

The use of film in qualitative research first appeared in the field of anthropology, as visual media helped provide researchers with documentation to aid in their findings (Rosenstein, 2002). Video as a data collection method has been used for more than 50 years (Erickson, 2006; Pink, 2001). Currently, many researchers from the fields of anthropology, sociology, and photographic or media studies use videotaping as a data collection method (Pink, 2001). The combination of literature and advances in technology has allowed visual methods, including videotaping, to be viewed as a reliable data collection method (Erickson, 2006). Collier and Collier (1986) state that “film and video have become essential for the study of human behaviour, investigations of interactions . . . or research in schoolroom culture” (p.159).

**Benefits and limitations of videotaping.** Video methods provide researchers with permanent documentation from the field (Rosenstein, 2002). Using video as a data collection method allows researchers to be selective regarding what is recorded. Allowing for a more concrete representation of the phenomena defined in the study (Lomax & Casey, 1998).
Videotaping examines real life events as they occur and provides the ability to continuously review certain situations (Secrist, de Koeyer, Bell & Fogel, 2002). Videotaping provides an in-depth analysis of the setting or behaviour, because the researcher is able to pause the camera and information can be examined and re-examined rather than relying on field notes that may miss information (Erickson, 2006). Videotaping behaviour is viewed as an objective, scientific data source, where data may be viewed repeatedly, instances may be counted and reliability may be increased because findings can be verified by others (Mackay, 1995).

Videotaping, however, is also viewed as an intrusive method for studying individuals in natural settings. Videotaping uses technology to collect data. Researchers bring two foreign objects into their research setting: the camera and themselves (Secrist et al., 2002). This study recognizes that the camera is a fixed single object and may affect the way people behave. The researcher decides where to put the camera and what situation to focus on (Mackay, 1995; Pink, 2001). Videotaping is also criticized when no other data collection methods are used. The researcher may end up substituting his/her own personal conclusions regarding what was viewed, rather than knowing the exact meaning behind an action or phrase (Blumer, 1971; Schutz, 1967).

As with most qualitative methods, the use of videotaping can be viewed as a subjective tool and the researcher needs to be constantly aware of their own subjectivity and acknowledge the choices they make and how these choices may influence the findings (Mackay, 1995; Pink, 2001). Peer debriefing was employed as a way to help assess subjectivity and better establish credibility. Peer debriefing is defined as “a session held with objective peers to review and explore various aspects of the inquiry” (Loiselle & Profetto-McGrath, 2007, p. 327). For this study, peer debriefing involved discussions with my thesis committee in conjunction with Dr. Greg Pasco and Karen Ray. Dr. Pasco is a professor at the Institute of Education, University of
London, England. His research is focused on children with autism and he helped create the COSMIC tool. Karen Ray is the research manager at Saint Elizabeth Health Care. Through consistent email conversations with Dr. Pasco, I was able to critically review my choices regarding specific ideas or actions I had taken in establishing my research methods. Through discussions with Ms. Ray, I was able to critically evaluate how the research was conducted and the conclusions drawn from the observations.

**Observations and videotaping in the current study.** Observations and videotaping were used both separately and simultaneously in this study. Observations were used to help limit the effect of my physical presence in the classroom and to gather pre-videotaped data. During the observations, the tripod and camera were set-up but not turned on. My physical location remained consistent and data was recorded silently. Field notes were taken during the observations to provide a better understanding of how participants acted and communicated. The field notes offered insight into changes that may have occurred after the videotaped observation began. Pasco et al., (2008) found that although participants were unaffected by the camera’s presence, teachers and other professionals in the classroom changed their behaviour.

Videotaping began when the pre-observational visits were completed. In total participants were videotaped for 90 minutes over three to four visits. During these visits I was in a constant negotiation with myself, torn between being a passive participant, where I originally aimed to just sit silently and observe the classroom environment, to feeling that I needed to engage in conversation with the participant and professionals to help ease anxiety and develop a connection. During my visits I did engage in conversations with the educational professionals and participants. My conversations with classroom professionals consisted of polite greetings as well as inquiring about the participants’ health and behaviour.
Ethics

Prior to commencing this study ethical approval from two organizations was obtained. Approval was granted from the University of Victoria Human Research Ethics Board and the Halton District School Board Research Advisory Committee. Approval from these two research organizations ensured that the school board’s, participating schools and the participant’s rights were respected. This section outlines the confidentiality and anonymity procedures, along with limits to these procedures, the participant’s right to withdraw from study, and research credibility methods.

Confidentiality and anonymity. Confidentiality is the protection of the participants’ identities. The participants’ identities were protected through the access, control and security of personal data during the recruitment, data collection and completion of this study. Confidentiality in this study involved the protection and access to both hard copy and electronic data. All hard copy documents (i.e., research records, consent forms and written data) were kept in a secure lock box. All electronic data was kept on a password-protected computer, with a backup of all electronic files located on a password protected hard drive. Anonymity was upheld by excluding identifying features gained from recruitment, data collection and analysis. Participant names were not used in the analysis or dissemination of results. Instead, participants were coded sequentially using Participant 1, or the short form, P1 up to Participant 6 or P6.

There were limits to both confidentiality and anonymity in the study. Due to the fact that participants were identified by outside sources – the school principal and classroom teacher – others were aware of who may have been involved in the study. Anonymity could not be fully guaranteed because of the cameras presence in the classroom. The camera allowed an outside
individual to know that a research study was taking place in the classroom. This limitation was addressed by placing the camera in an open area of the room to give the impression that the whole class was being observed when in fact the camera was focused on the participant. As well, videotaped observations were conducted when the whole class was present.

Parents/guardians of participants were made aware of the option to withdraw in the consent form. If a parent/guardian or participant wished to withdraw, all personal information and data were omitted in the dissemination of results, but data was kept with all other documents until disposal.

**Researcher credibility.** In this study, the confidentiality provisions set out in the research design stated that I would be the only individual able to view the videotapes. Thus I was limited in my ability to conduct inter-relater reliability. Conducting inter-relater reliability would have allowed me to compare the results of this study with an outside researcher. Inter-relater reliability would have strengthened my conclusions (Loiselle & Profetto-McGrath, 2007). To address this limitation and increase reliability, the methods of dependability and confirmability were employed (Loiselle & Profetto-McGrath, 2007).

**Dependability.** Dependability refers to “data stability over time and over conditions” (Loiselle & Profetto-McGrath, 2007, p. 328). An inquiry audit is one approach to dependability and was utilized in this study. An inquiry audit occurs when an external reviewer reviews and scrutinizes documents and supporting evidence (Loiselle & Profetto-McGrath, 2007). The inquiry audit was conducted by external reviewers within the field of autism, communication and research, providing feedback and guidance regarding observations and conclusions. The external
reviewers included Dr. Greg Pasco, Karen Ray, Dr. Daniel Scott and Dr. Roy Ferguson. These reviews were conducted through personal conversations and emails.

Confirmability. Confirmability is related to the “neutrality of the data . . . the potential for congruence between two or more independent people about the data’s accuracy, relevance and meaning” (Loiselle & Profetto-McGrath, 2007, p. 328). Confirmability in this study was conducted through an audit trail, a “systematic collection of documentation that allows an independent auditor to come to the same conclusions about the data” (Loiselle & Profetto-McGrath, 2007, p.328). The audit trail was comprised of observational notes, analytical findings and a reflective journal produced during the analysis portion of the study. Observational notes consisted of field notes taken during the pre-observational and videotaping visits. I often referred back to these notes during the analysis, as they assisted in solidifying what was occurring behind the scenes or typical/atypical participant behaviour. The analytical portion of the audit trail consisted of emails with Dr. Greg Pasco to assist in the proper utilization of the analytical tool. A reflective journal was used during the interpretation and analysis of the findings. The reflective journal provided me with the ability to capture intrinsic thoughts and observations as they occurred.

Analysis

This section discusses the analytical tool used in the dissemination of participant observations, the analytical steps taken to arrive at the results and the validity and reliability methods used in the COSMIC tool. The Modified-Classroom Observation Schedule to Measure Intentional Communication (M-COSMIC) tool was chosen to analyze the videotapes based on its design, previous uses and validity in studying individuals with autism who presented with
limited verbal skills (Clifford et al., 2010). The M-COSMIC tool is a modified version of the original COSMIC tool developed by Pasco et al., (2008). The COSMIC tool was designed in response to perceived deficits found in other tools examining autism and communication, such as the Autism Diagnostic Observation Schedule-Generic (ADOS-G) and the Social Communication Assessment for Toddlers with Autism (SCATA; Drew, Baird, Taylor, Milne & Charman, 2007; Lord, Risi, Lambrecht, Cook, Leventhal, DiLavore, Pickles, & Rutter, 2010). Pasco et al., (2008) believe that the ADOS-G and SCATA tools created communication opportunities, rather than examine communication occurring in natural settings.

The COSMIC tool consists of an observational form categorizing data grounded in operational definitions, “developed based on the findings of an intervention study and items included on other assessments of early social communication” (Pasco et al., 2008, p. 1809, Appendix H). To validate these operational definitions, 91 children between the ages of 4 and 11 were videotaped for an average of 15 minutes, followed by an analysis of their communicative behaviours (Pasco et al., 2008). The validated results created the communicative forms, functions and roles found in the COSMIC tool. In 2010, Clifford, Hudry, Brown, Pasco, Charman and Pre-School Autism Communication Trial recognized the importance of the original COSMIC tool, but felt that it needed to be modified. Modifications included expanding the defined communicative forms to encompass other forms utilized by individuals with autism. As well, modifications expanded the operational definitions to “increase the utility by providing a coding scheme and structure likely to elicit various types of forms and function of social-communication” (Clifford et al., 2010, p. 3). Based on these modifications, the M-COSMIC tool was chosen to analyze the findings.
**Use of M-COSMIC in current study.** Prior to commencing the analysis a discussion regarding effective utilization of the COSMIC tool with Dr. Greg Pasco occurred. Dr. Pasco suggested that I first become comfortable with the format and process of the COSMIC tool by conducting practice observations (G. Pasco, personal communication, April 27 2010). Four practice sessions were conducted with an individual diagnosed with non-verbal autism and his worker. I was able to assess if I was using the M-COSMIC tool correctly because I have worked with the practice participant and am aware of his communicative functions and forms.

Analysis of the participants began once all six had been observed and recorded. Participant 3 was disqualified from study, as it was felt that he/she exceeded this study’s criteria: being too verbal and possessing an IQ above 70. Therefore, the findings of this study are based on five participants (see Table 1). Based on the recommendations from Dr. Pasco, the analytical process involved multiple steps. First, the videotapes were viewed in random order to decrease any personal bias. Second, when analyzing the videotapes, the video was paused only to record an example. Third, a hard copy version of the M-COSMIC observational form was used to conduct a line-by-line worksheet, noting the communicative partner, function, role, forms and examples (Appendix I). This study, the first to include an examples section in the observational form, therefore uses a mixed method approach, combining frequency counts with specific examples (Appendix I).
Table 1

Description of Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age in years</th>
<th>Gender</th>
<th>Student to professional ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>9</td>
<td>Male</td>
<td>1:1</td>
</tr>
<tr>
<td>P2</td>
<td>13</td>
<td>Male</td>
<td>1:1</td>
</tr>
<tr>
<td>P4</td>
<td>14</td>
<td>Male</td>
<td>1:1</td>
</tr>
<tr>
<td>P5</td>
<td>15</td>
<td>Male</td>
<td>1:1</td>
</tr>
<tr>
<td>P6</td>
<td>8</td>
<td>Male</td>
<td>1:1</td>
</tr>
</tbody>
</table>

The examples section was not used for every communication exchange. Instead, specific examples were chosen to help better explain an interaction. For example, an exchange was noted as it occurred. That is, what the communicative partner said to elicit a response, and what was occurring prior to and post the exchange. The addition of the examples section is important as it may allow outside readers to grasp a concrete understanding of the coded functions and forms. The addition of the examples section should not have an effect on the functionality of the tool.

After participant videotapes were analyzed, a deconstruction of each individual participant took place by conducting frequency counts based on the M-COSMIC observational form. The communicative partners, communicative functions, role and forms were examined at an individual level. After disseminating individual participant findings, a comparison of the frequency counts of all five participants occurred to achieve an understanding of cross-participant communication. The cross-participant analysis provided an encompassing view of the results and allowed patterns and differences to become apparent.
Validity and reliability of previous COSMIC studies. Having both a valid and reliable study is the hallmark of any reputable research. To aid in the reliability and validity of this study during the analysis phase, the previous pilot observations were revisited with a constant questioning of why an exchange would be considered a certain function or form as opposed to another. This process involved consistently re-reading and immersing myself in the definitions of communicative functions in the M-COSMIC tool.

Concurrent validity is a form of measurement validity referring to “how well the conceptual and operational definitions mesh with each other. The better the fit, the greater the measurement validity” (Neuman, 2003, p. 182). Concurrent validity was demonstrated in the COSMIC and M-COSMC studies by comparing findings with results obtained from an pre-existing source, the ADOS-G tool (Neuman, 2003). In previous COSMIC studies, concurrent validity was established by comparing items from the COSMIC and M-COSMIC tool against similar items taken from the ADOS-G tool (Clifford et al., 2010; Lord et al., 2000; Pasco et al., 2008). Concurrent validity procedures are outlined in Chapter 4.
Chapter 4: Findings

This chapter has three parts and presents the findings of the analyzed data. Analyzed data were compiled based on frequency counts and examples based on the M-COSMIC observational form. The first part presents individual findings. Participants were analyzed based on their communicative exchanges with their communicative partners, communicative functions, role of communication and communicative forms. The second part provides a cross-participant analysis of all the communicative partners, functions, roles and forms. This part aims to provide an overall understanding of how individuals with non-verbal autism communicate. The final part presents this study’s concurrent validity. Concurrent validity was established through the use of percentage analysis. The results from this study were compared against items from a comparable tool.

Individual Findings

Participant 1 (P1). Participant 1 was a 9 – year – old male. During pre-observational visits it was noted that P1 had a tendency to be distracted by the presence of others. Based on my observations, I decided that when recording P1 I would place myself out of his view.

Over the 90 minutes of videotaped observations P1 had 327 communication exchanges. Sixty one exchanges were coded as non-interactive or no response. Non-interactive or no response communication is defined as when “a child responds to an approach by withdrawing . . . when the child does not respond in any way to a request, approach or prompt” (Clifford et al., 2010, p.16). The total number of communication exchanges produced with a communicative partner was 290. Participant 1 communicated with five partners (see Figure 1).
Communication with an educational assistant (EA). Two EAs worked one on one with P1 producing 252 exchanges. Communication with an EA made up 87% of all P1 communication. Six communicative functions were used in P1 and EA exchanges (see Figure 2).

**Figure 1.** Participant 1’s communicative partners.

**Figure 2.** Participant 1 and educational assistant communicative functions.
**Behaviour regulation.** The communicative category of behaviour regulation is made up of the functions of request for an object or action, refusal and compliance (Clifford et al., 2010). Out of the 252 P1/EA exchanges, 14% were categorized as behaviour regulation. In communication with an EA, P1 utilized the functions of request for an object or action and compliance.

Requests for an object or action functions are defined as “where an object, toy, help with a toy is requested, whether initiated or prompted by an adult” (Clifford et al., 2010, p. 14). The function of request for an object or action was utilized eight times. All eight requests were initiated by P1 and formed through the use of pointing/gesturing, looking to the object or a combination of vocalizations and picture/symbol/sign/technology.

The function of compliance was used in 28 P1/EA exchanges. Compliance functions are defined as “acts of co-operation with a communicator, code when the child is following instructions . . . to carry out an action” (Clifford et al., 2010, p. 14). All 28 compliance exchanges were a response to a request or task demand given by the EA to P1 and formed through action, picture/symbol/sign/technology or the combination of pointing/gesturing and gaze switch. The communicative form of gaze switch occurs when “the child alternates gaze between an object and person to establish social attention co-ordination. This must be a 3-point shift (in quick succession): object-person-object or person-object-person” (Clifford et al., 2010, p.14).

**Dyadic social interaction.** The category of dyadic social interaction consists of the functions of showing off, requesting social routine and acknowledging. Dyadic social interaction accounted for 57% of P1/EA communication. The majority of P1/EA exchanges were categorized as showing off. Showing off functions are defined as when an individual “acts to
attract another’s attention to oneself” (Clifford et al., 2010, p. 15). All showing off exchanges were initiated by P1 and formed using 17 different communicative forms.

Two P1/EA exchanges utilized the function of request for social routine. Request for social routine functions are defined as “when a child makes a request for a game or activity that is clearly social in nature” (Clifford et al., 2010, p. 15). The two social routine requests were initiated by P1 and formed through the use of picture/symbol/sign/technology.

Seven dyadic social interaction exchanges employed the function of acknowledging. Acknowledging functions are defined as “acts or verbal acts used to indicate notice of another person’s previous statement or action” (Clifford et al., 2010, p. 15). Two of the seven acknowledging exchanges were a response and occurred during a conversation between the EA and P1. These two exchanges were either formed through action or a combination of action and eye contact. For example:

*When working on his daily journal, P1 is colouring in a page and needed help closing his marker.*

EA: *here do you want me to help you with that*

*P1 hands her the marker, makes eye contact, and continues colouring with a different colour* (non-verbal).

The five remaining acknowledging exchanges were initiated by P1 and formed through two worded speech or vocalizations. For example:

*While working P1 drops a piece of paper, an EA walks by picks the paper up, and puts it back on the table.*

P1: *Thank you, thank you, thank you*
Joint attention. The category of joint attention consists of the functions: commenting and request for information. Joint attention accounted for 29% of P1/EA communication. Commenting was the only function used in P1/EA joint attention exchanges. Commenting is defined as “when a participant refers to an event, object or action in order to share attention with a partner” (Clifford et al., 2010, p. 15). All commenting exchanges were initiated by P1 and formed through 14 different communicative forms. P1 showed a strong preference for two worded speech, eye contact and a combination of eye contact with two worded speech.

Communication with the classroom teacher (CT). Participant 1 and his CT were involved in 15 different communication exchanges making up 5% of all P1 communication. Participant 1 utilized six communicative functions in his exchanges with the CT (see Figure 3).

![Participant 1 and Classroom Teacher Communicative Functions](image)

*Figure 3. Participant 1 and classroom teacher communicative functions.*
**Behaviour regulation.** Out of the 15 P1/CT exchanges, ten were categorized as behaviour regulation. The behaviour regulation functions of request for an object or action and compliance were used in P1/CT communication. Request for an object or action was utilized twice. Both exchanges were initiated by P1 and formed using two worded speech or pointing/gesturing. The remaining eight P1/CT exchanges were categorized as compliance. These exchanges were responses to a task or demand and formed through action, gesture/pointing, gaze switch or picture/symbol/sign/technology. For example:

- **CT:** . . . and P1 got new shoes this weekend. *P1 stand up and show us your new shoes.*
- **P1 stands up, walks over to CT, and looks at him** (non-verbal)
- **CT:** *Where are your new shoes? Point to your new shoes.*
- **P1 points to new shoes** (non-verbal).

**Dyadic social interaction.** Three of the 15 CT/P1 exchanges were categorized as dyadic social interaction. These three exchanges utilized the functions of showing off, acknowledging and request for social routine. All three exchanges were initiated by P1 and formed through gaze switch, single word speech or two worded speech.

**Joint attention.** Two P1/CT exchanges were categorized as joint attention and both used the function of commenting. These commenting exchanges were initiated by P1 and formed through eye contact.

**Communication with classroom students (CS).** Participant 1 communicated 16 times with two different classroom students. These 16 exchanges accounted for 6% of P1 communication. Participant 1 and CS exchanges took place during a group activity, for example morning circle, a time where the class got together to share what they did the night before. Four communicative functions were utilized during CS exchanges (see Figure 4).
Figure 4. Participant 1 and classroom student communicative functions.

*Behaviour regulation.* One P1/CS exchange was categorized as behaviour regulation. This exchange utilized the function of compliance and was a response to a request from the CS to P1. The compliance exchange was formed through action.

*The classroom teacher finishes reading a story. CS2 taps P1 on the shoulder and gestures for P1 to move. Neither of them says anything. P1 stands up and moves (non-verbal)*

*Dyadic social interaction.* The majority of P1/CS exchanges were categorized as dyadic social interaction, with 13 exchanges. Ten of these exchanges utilized the function of showing off. Eight were initiated by P1; the remaining two exchanges were responses to task demands made by a CS. All showing off exchanges were formed through eye contact, gaze switch or a combination of triple word speech and eye contact.

The remaining three dyadic social interaction exchanges utilized the function of acknowledging. These three exchanges were initiated by P1 and formed through a combination of two worded speech and eye contact.
Joint attention. Participant 1 and CS2 had two exchanges categorized as joint attention. Both exchanges utilized the function of commenting. Participant 1 initiated both exchanges; the two exchanges were formed through eye contact or a combination of eye contact and pointing/gesturing.

Communication with others. Participant 1 also engaged in communication exchanges with two other partners: the class as a whole (1%) and the researcher (1%). Participant 1 engaged in two exchanges with the class as a whole. These two exchanges utilized the function of showing off, were initiated by P1 and formed through the use of pointing/gesturing. For example:

An announcement comes on during a group reading activity P1 turns to the speaker and points . . . (non-verbal)

Participant 1 initiated five communication exchanges with the researcher. These exchanges took place as the researcher was turning the camera on or off. The five exchanges utilized the functions of showing off and commenting. All five exchanges were initiated by P1 and formed through one, two or three worded speech.

Overall use of communicative forms. Participant 1 used more than 25 different communicative forms (see Table 2). The majority of P1 communication involved single, two or three worded speech; accounting for 53% of his communicative forms. It should be noted that the majority of P1’s verbal speech consisted of echolalia. After a review of P1’s videotapes, specifically examining his verbal speech, it was found that 95% of his verbal speech was echolalia. P1 also used the communicative forms of action (10%) and eye contact (8%).
### Table 2

*Participant 1’s Communicative Forms*

<table>
<thead>
<tr>
<th>Form</th>
<th>Times Used</th>
<th>Functions Used in (Numbers broken down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triple word speech</td>
<td>42</td>
<td>Showing Off (38); Commenting (4)</td>
</tr>
<tr>
<td>Triple word speech and eye contact</td>
<td>34</td>
<td>Showing Off (30); Commenting (4)</td>
</tr>
<tr>
<td>Triple word speech, eye contact, and gesturing/pointing</td>
<td>16</td>
<td>Showing Off (16)</td>
</tr>
<tr>
<td>Two word speech</td>
<td>38</td>
<td>Showing Off (13); Commenting (20); Acknowledge (5)</td>
</tr>
<tr>
<td>Two word speech and eye contact</td>
<td>26</td>
<td>Commenting (11); Showing off (12); Acknowledge (3)</td>
</tr>
<tr>
<td>Two word speech and action</td>
<td>3</td>
<td>Commenting (1); Compliance (1); Showing Off (1)</td>
</tr>
<tr>
<td>Two word speech and look at object</td>
<td>3</td>
<td>Commenting (3)</td>
</tr>
<tr>
<td>Two word speech and gesturing/pointing</td>
<td>3</td>
<td>Commenting (1); Request (2)</td>
</tr>
<tr>
<td>Two worded speech, eye contact, and gesturing</td>
<td>15</td>
<td>Commenting (1); Showing Off (14)</td>
</tr>
<tr>
<td>Single word speech</td>
<td>9</td>
<td>Showing Off (3); Commenting (5); Request for Social Routine (1)</td>
</tr>
<tr>
<td>Single word speech and eye contact</td>
<td>2</td>
<td>Showing Off (2)</td>
</tr>
<tr>
<td>Single word speech and gesture/pointing</td>
<td>1</td>
<td>Commenting (1)</td>
</tr>
<tr>
<td>Eye contact</td>
<td>22</td>
<td>Showing Off (6); Commenting (16)</td>
</tr>
<tr>
<td>Eye contact and vocalizations</td>
<td>4</td>
<td>Showing Off (2); Commenting (2)</td>
</tr>
<tr>
<td>Eye contact and action</td>
<td>2</td>
<td>Acknowledge (1); Showing Off (1)</td>
</tr>
<tr>
<td>Eye contact and gesture/pointing</td>
<td>2</td>
<td>Showing Off (1); Commenting (1)</td>
</tr>
<tr>
<td>Gaze Switch</td>
<td>9</td>
<td>Showing Off (4); Compliance (4); Commenting (1)</td>
</tr>
<tr>
<td>Picture</td>
<td>3</td>
<td>Compliance (2); Request for Social Routine (1)</td>
</tr>
<tr>
<td>Picture and action</td>
<td>1</td>
<td>Request (1)</td>
</tr>
<tr>
<td>Action</td>
<td>28</td>
<td>Compliance (26); Request for Social Routine (1); Acknowledge (1)</td>
</tr>
<tr>
<td>Action and vocalizations</td>
<td>1</td>
<td>Request (1)</td>
</tr>
<tr>
<td>Gesture/pointing</td>
<td>8</td>
<td>Request (4); Compliance (3); Showing Off (1)</td>
</tr>
<tr>
<td>Vocalizations</td>
<td>9</td>
<td>Showing Off (6); Commenting (2); Acknowledge (1)</td>
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<tr>
<td>Gesture/pointing and Picture/symbol/sign/technology</td>
<td>1</td>
<td>Request (1)</td>
</tr>
<tr>
<td>Gesture/pointing, eye contact, and vocalizations</td>
<td>2</td>
<td>Showing Off (2)</td>
</tr>
</tbody>
</table>

**Summary of P1.** Overall, P1 had 290 different communication exchanges. Participant 1 communicated with five communicative partners. The majority of P1’s communication was with an educational assistant, accounting for 87% of all communication. Participant 1 rated high in the communicative category of dyadic social interaction; 57% of P1’s communication used functions in this category. Participant 1 primarily communicated through verbal speech although largely echolalia, followed by the non-verbal forms of action and eye contact.

**Participant 2 (P2).** Participant 2 was a 13 – year – old male. Although P2 was a member of a life skills classroom, he sometimes caused distractions due to his behaviours and was placed in a separate classroom. Over the 90 minutes of videotaped observations, P2 had 198 communication exchanges. Sixty-one exchanges were categorized as non-interactive or no response, for a total of 137 communication exchanges. Participant 2 communicated with two partners: his educational assistant and the researcher.

**Communication with an educational assistant (EA).** Out of his 137 communication exchanges, P2 communicated 133 times with his EA. Communication with an EA accounted for 97% of P2’s communication. Six communicative functions were used in exchanges with his EA (see Figure 5).
**Figure 5.** Participant 2 and educational assistant communicative functions.

*Behaviour regulation.* The category of behaviour regulation made up 30% of P2/EA communication. Participant 2 utilized all three functions under the behaviour regulation category. Five exchanges utilized the function of request for an object or action. These exchanges were a response to questions posed by the EA and formed through picture/symbol/sign/technology, gesturing/pointing or action.

For example:

EA: *Alright computer time is over, time to work.*

*P2 gets up and walks over to his desk.*

EA: *we have a story, walk, or computer, which do you want*

*P2 takes the picture of the books off his choice board, and hands it to the EA (non-verbal)*

EA: *you chose book, you are working for a story*
Participant 2 used the function of refusal 12 times. The function of refusal is defined as “behaviours from appropriate refusal to inappropriate screaming as a protest/non-compliance . . . to refuse an undesired object or request. . .” (Cliffor et al., 2010, p. 15). Eleven refusal exchanges were initiated by P2 and one exchange was a response. All refusal exchanges were formed through action, single word speech or a combination of single word speech and action.

The remaining 24 exchanges were categorized as compliance. All compliance exchanges were a response to a request posed by the EA and formed through action, picture/symbol/sign/technology or a combination of action and picture/symbol/sign/technology.

Dyadic social interaction. The category of dyadic social interaction made up 14% of P2/EA communication. All dyadic social interaction exchanges were assigned the function of showing off. These exchanges were initiated by P2 and formed through the use of vocalizations, eye contact or a combination of eye contact and action.

Joint attention. The category of joint attention was P2’s most utilized category, accounting for 56% of his communication. Seventy P2/EA exchanges were categorized as commenting. Commenting exchanges were both initiated and responded to. Sixty-four commenting exchanges were initiated by P2, while six commenting exchanges were responses. P2’s commenting exchanges consisted of 15 communicative forms, including eye contact, a combination of vocalizations and eye contact or a combination of vocalization and gesture/pointing.

The function of request for information was used in four P2/EA exchanges. Request for information functions are defined as “acts used to seek information, explanations, or clarifications about an event, or previous utterance. . .” (Cliffor et al., 2010, p. 15). The four request for information exchanges were initiated and formed through a combination of action
and vocalizations or show/give. The communicative form of show/give is defined as “the child deliberately hand an object to a person or orients the object where it can be seen” (Clifford et al., 2010, p. 14). An example of a request for information exchange using show/give is:

\[
\text{Participant 2 seemed to be having trouble with putting crayons in a box, and hands the box to the EA (non-verbal).}
\]

EA: do you need help?

\[
P2 \text{ hands the box of crayons to the EA (non-verbal).}
\]

**Communication with others.** During the videotaped observations P2 engaged in four communication exchanges with the researcher, accounting for 3% of all P2 communication. These four exchanges utilized the function of showing off. All exchanges were initiated by P2 and formed through single word speech, eye contact or a combination of vocalization and eye contact.

**Overall use of communicative forms.** Participant 2 used a total of 21 different communicative forms (see Table 3). Participant 2 used both verbal (47%) and non-verbal (53%) forms of communication in his exchanges. Participant 2’s most utilized forms of communication were action (20%), eye contact (14%) and two worded speech (10%).

**Summary of P2.** Participant 2 engaged in 137 communication exchanges. Because of his classroom placement, 97% of P2’s communication occurred with his EA. The communicative category of joint attention rated highest in P2 communication. The function of commenting was used in 70 exchanges. Participant 2 utilized both verbal and non-verbal forms of communication in his exchanges, but used non-verbal forms at a higher rate.
Table 3

Participant 2’s Communicative Forms

<table>
<thead>
<tr>
<th>Form</th>
<th>Times Used</th>
<th>Functions Used in (Numbers broken down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two worded speech</td>
<td>15</td>
<td>Commenting (13); Showing Off (2)</td>
</tr>
<tr>
<td>Two worded speech and eye contact</td>
<td>3</td>
<td>Commenting (3)</td>
</tr>
<tr>
<td>Single word speech</td>
<td>7</td>
<td>Showing Off (3); Compliance (1); Protest (3)</td>
</tr>
<tr>
<td>Single word speech and action</td>
<td>4</td>
<td>Showing Off (1); Protest (3)</td>
</tr>
<tr>
<td>Single word speech, eye contact and gesture/pointing</td>
<td>1</td>
<td>Commenting (1)</td>
</tr>
<tr>
<td>Vocalizations</td>
<td>6</td>
<td>Commenting (2); Showing Off (4)</td>
</tr>
<tr>
<td>Vocalizations and eye contact</td>
<td>11</td>
<td>Showing Off (2); Commenting (9)</td>
</tr>
<tr>
<td>Vocalizations, looks to target, and action</td>
<td>1</td>
<td>Commenting (1)</td>
</tr>
<tr>
<td>Vocalizations, eye contact, and gesture</td>
<td>3</td>
<td>Commenting (3)</td>
</tr>
<tr>
<td>Vocalization and action</td>
<td>6</td>
<td>Protest (1); Request for Information (1); Commenting (4)</td>
</tr>
<tr>
<td>Vocalization, eye contact, and action</td>
<td>2</td>
<td>Compliance (1); Request for more information (1)</td>
</tr>
<tr>
<td>Vocalization and gesture</td>
<td>9</td>
<td>Commenting (9)</td>
</tr>
<tr>
<td>Eye Contact</td>
<td>19</td>
<td>Commenting (15); Showing Off (4)</td>
</tr>
<tr>
<td>Eye contact and action</td>
<td>5</td>
<td>Commenting (2); Showing Off (3)</td>
</tr>
<tr>
<td>Action</td>
<td>27</td>
<td>Commenting (1); Showing Off (2); Request (1); Compliance (18); Protest (4); Request for Information (1)</td>
</tr>
<tr>
<td>Action and picture/symbol/technology</td>
<td>1</td>
<td>Compliance (1)</td>
</tr>
<tr>
<td>Gesture/pointing</td>
<td>3</td>
<td>Commenting (2); Request (1)</td>
</tr>
<tr>
<td>Gaze Switch</td>
<td>6</td>
<td>Commenting (6)</td>
</tr>
<tr>
<td>Picture/symbol/technology</td>
<td>5</td>
<td>Request (3); Compliance (2)</td>
</tr>
<tr>
<td>Looks to target</td>
<td>3</td>
<td>Commenting (3)</td>
</tr>
</tbody>
</table>
Participant 3. Participant 3 was eliminated from the study.

Participant 4 (P4). Participant 4 was a 14-year-old male who was part of a life skills classroom. In pre-observational visits it was noted that P4 tended to be a quiet student with hardly any vocalizations or verbal speech. Over the 90 minutes of videotaped observations, P4 produced 142 exchanges. Nine exchanges were identified as non-interactive or no response. Therefore, P4 had a total of 133 communication exchanges, with four communicative partners (see Figure 6).

Figure 6. Participant 4’s communicative partners.

Communication with an educational assistant (EA). Participant 4 and EA communication accounted for 53% of P4’s total communication. Participant 4/EA communication utilized four communicative functions (see Figure 7).
Figure 7. Participant 4 and educational assistant communicative functions.

Behaviour regulation. Participant 4 and an EA communicated 66 times within the behaviour regulation categories, accounting for 94% of P4/EA communication. The category of behaviour regulation consists of the functions of request for an object or action, refusal or compliance. All three functions were used during P4/EA communication. Request for an object or action occurred in ten exchanges. All requesting exchanges were initiated by P4 and formed through action or gesture/pointing.

Participant 4 initiated the function of refusal once. This function was formed through action and occurred when P4 was playing a game with his EA:

EA: O 36

Participant 4 removes all the chips from his board and stands up (non-verbal)

EA: The game isn’t over, please sit down.

Participant 4 sits back down (non-verbal)
The function of compliance was the most utilized function in P4/EA communication. Fifty-five P4/EA exchanges were categorized as compliance. All exchanges were a response to a request or task demand made by the EA to P4. Compliance exchanges were formed through the use of action, show/give or a combination of action and vocalizations.

*Dyadic social interaction.* Four P4/EA exchanges were categorized as dyadic social interaction, for 6% of P4/EA communication. These exchanges utilized the function of showing off. All showing off exchanges were initiated by P4 and formed through eye contact, gaze switch or vocalizations.

*Communication with the classroom teacher (CT).* P4 and his CT communicated 47 times. These exchanges accounted for 35% of P4 communication. Four communicative functions were utilized in P4 and CT exchanges (see Figure 8).

*Figure 8.* Participant 4 and classroom teacher communicative functions.
Behaviour regulation. Out of the 47 P4/CT exchanges, 24 were categorized as behaviour regulation. Seven of the 24 exchanges utilized the function of request for object or action. The seven request functions were initiated by P4 and formed through gaze switch, action or a combination of eye contact and gesture/pointing. The function of compliance was used in the remaining 17 exchanges. Compliance exchanges were a response to a request or task demand made by the CT to P4. The 17 compliance exchanges were formed through action, picture/symbol/sign/technology or a combination of action and eye contact. For example:

*Although P4 is doing his work, he becomes distracted by the pieces involved and starts playing with them. The CT walks by*

CT: *keep going*

*Participant 4 goes back to work (non-verbal)*

Dyadic social interaction. Eighteen P4/CT exchanges were categorized as dyadic social interaction. These 18 exchanges were categorized as showing off. All showing off exchanges were initiated by P4 and formed through eye contact, action, a combination of eye contact and action or a combination of eye contact, action and vocalizations.

Joint attention. Participant 4 and his CT produced five exchanges that were categorized as joint attention. All five exchanges utilized the function of commenting. Two of these exchanges were initiated by P4. The remaining three exchanges were a response by P4 to questions posed by his CT. All five commenting exchanges were formed through eye contact, action or a combination of action and eye contact.

Communication with classroom students (CS). Participant 4 communicated nine times with two CS. These nine exchanges made up 7% of P4 communication. Communication with CS took place in facilitated contexts. Participant 4 and CS1 communicated five times during a
facilitated game. These five exchanges were categorized as showing off. They were initiated by P4 and formed through eye contact or a combination of eye contact and action. For example:

*Participant 4 removes all the chips from his game and hands the card back to the EA, and looks over his shoulder and makes eye contact with the classroom student he is playing with, they stare at each other for a few seconds . . .* (non-verbal)

Participant 4 and CS2 communicated four times during a facilitated story. These four exchanges utilized three different communicative functions: commenting, request for an object or action and acknowledging. Although P4 and CS2 utilized four different communicative functions, the communicative exchanges were all initiated by P4 and formed through a combination of eye contact and action. An example of a CS2 commenting exchange:

*CS2 and P4 are sitting at a table together. CS2 is attempting to read a book to P4.*

*Participant 4 looks up at CS2 and makes eye contact; P4 turns the page of the book before CS2 is finished reading.*

**Communication with the class as a whole.** Participant 4 communicated with his whole class seven times. These seven exchanges accounted for 5% of P4 communication. The seven exchanges took place during morning circle. Morning circle is a time when students and professionals discuss what they did the previous night and ask each other questions. All seven exchanges involved the function of commenting. These were responses to questions posed by both educational professionals and other students. Communication with the class was formed through the use of picture/symbol/sign/technology. For example:

*CT: what did you have for dinner last night?*

*P4: chicken fingers and fries* (using technology, specifically his Go-Talk)
Overall use of communicative forms. In total, P4 used 14 communicative forms (see Table 4). Participant 4 communicated primarily using non-verbal forms, mostly action (55%), followed by eye contact (11%) and either a combination of eye contact and action (7%) or picture/symbol/sign/technology (7%).

Summary of P4. In summary, P4 produced 133 communication exchanges. The majority (55%) of his communication occurred with an educational assistant. The category of behaviour regulation accounted for 70% of all P4 communication. Participant 4 primarily communicated using non-verbal forms and rated highest in action (58%) followed by eye contact (11%).

Table 4

Participant 4’s Communicative Forms

<table>
<thead>
<tr>
<th>Form</th>
<th>Times Used</th>
<th>Functions Used (Broken down by function)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>79</td>
<td>Compliance (60); Request (13); Protest (1); Commenting (2); Showing off (2); Acknowledging (1)</td>
</tr>
<tr>
<td>Action and Vocalization</td>
<td>8</td>
<td>Compliance (8);</td>
</tr>
<tr>
<td>Show/give</td>
<td>1</td>
<td>Compliance (1)</td>
</tr>
<tr>
<td>Eye contact and look to object</td>
<td>1</td>
<td>Compliance (1)</td>
</tr>
<tr>
<td>Eye Contact</td>
<td>15</td>
<td>Showing Off (14); Commenting (1)</td>
</tr>
<tr>
<td>Eye Contact and Action</td>
<td>9</td>
<td>Compliance (1); Commenting (2); Showing Off (6)</td>
</tr>
<tr>
<td>Vocalization</td>
<td>1</td>
<td>Showing Off (1)</td>
</tr>
<tr>
<td>Vocalization, eye contact and action</td>
<td>1</td>
<td>Showing Off (1)</td>
</tr>
<tr>
<td>Vocalization and eye contact</td>
<td>2</td>
<td>Showing Off (2)</td>
</tr>
<tr>
<td>Gaze Switch</td>
<td>2</td>
<td>Showing Off (1); Request (1)</td>
</tr>
<tr>
<td>Picture/Symbol/Sign/Technology</td>
<td>9</td>
<td>Compliance (3); Commenting (6)</td>
</tr>
<tr>
<td>Picture/Symbol/Sign/Technology and eye contact</td>
<td>2</td>
<td>Commenting (2)</td>
</tr>
<tr>
<td>Gesture/pointing</td>
<td>1</td>
<td>Request (1)</td>
</tr>
<tr>
<td>Gesture and Eye Contact</td>
<td>2</td>
<td>Request (2)</td>
</tr>
</tbody>
</table>
**Participant 5 (P5).** Participant 5 was a 15 – year – old male within a life skills classroom. Participant 5 had a separate room in his classroom that allowed him to work quietly with the educational assistants. Over the 90 minutes of videotaped observations P5 produced 146 exchanges. Twelve of these exchanges were deemed non-interactive or no response. Participant 5 had a total of 134 communication exchanges with four communicative partners (see Figure 9).

![Participant 5’s Communicative Partners](chart.png)

*Figure 9. Participant 5’s communicative partners.*

**Communication with an educational assistant (EA).** Participant 5 worked with two different EAs for a total of 127 exchanges. Participant 5 and EA communication accounted for 95% of P5 communication. Six communicative functions were used during P5/EA communication (see Figure 10).
Figure 10. Participant 5 and educational assistant communicative functions.

Behaviour regulation. Behaviour regulation was categorized in 92 exchanges, accounting for 72% of P5 communication. Five of these exchanges utilized the function of request for an object or action. Four out of these five exchanges were initiated by P5. The remaining exchange was a response to a question posed by an EA. The five request exchanges were formed through action, picture/symbol/sign/technology or a combination of action and picture/symbol/sign/technology. For example:

- After finishing his work, P5 and the EA go over to check his schedule
- EA: free choice, what would like to do for free choice?
- Participant 5 looks at his choice board, and makes his choice by pointing at the PEC (non-verbal)

Nine P5/EA exchanges utilized the function of refusal. These nine exchanges were initiated by P5 and formed through action, vocalizations or a combination of action and eye contact.
For example:

Participant 5 sits at the computer while the EA gets the computer program ready.

EA: alright, let’s start

Participant 5 takes the mouse and clicks out of program

EA: No, you need to work until the timer goes off

The majority of P5/EA communication was categorized as compliance, with 78 exchanges. All compliance exchanges were in response to a question or task demand made by the EA to P5. Compliance exchanges were formed through action, picture/symbol/sign/technology, a combination of vocalizations and action, a combination of action and picture/symbol/sign/technology or a combination of action and eye contact.

Dyadic social interaction. Eight P5/EA exchanges were categorized as dyadic social interaction, accounting for 6% of P5/EA communication. All eight exchanges were the function of showing off. All showing off exchanges were initiated by P5 in attempts to gain the attention of an EA. Showing off exchanges were formed through action, picture/symbol/sign/technology, vocalizations, a combination of action and vocalizations or a combination of action and eye contact.

Joint attention. Twenty-seven P5/EA exchanges were categorized as joint attention, for 21% of P5/EA communication. Twenty-six of these exchanges utilized the function of commenting, 15 a response and the remaining 11 initiated. All 26 commenting exchanges were formed through action, eye contact, gaze switch or gesture/pointing. For example:

EA: Great job! High five

Participant 5 gives the EA a high-5 (non-verbal)
The one remaining joint attention exchange used the function of request for information. This exchange was initiated by P5 and formed through action. For example:

*Participant 5 is typing up words. He picks up a piece of paper looks at it, and hands it to the EA...*

*EA: you’re done that one, keep going.*

*Participant 5 puts the paper down and grabs the next piece of paper (non-verbal)*

**Communication with classroom students (CS).** Three communication exchanges took place between P5 and three individual classroom students. Communication exchanges with a CS accounted for 2% of P5 communication. All P5/CS communication took place during morning circle; the time when the class got together to talk about their night and ask open-ended questions. The three communication exchanges utilized the function of commenting. All three exchanges were a response to questions posed by the CS to P5 and were formed using picture/symbol/sign/technology.

**Communication with others.** Participant 5 also communicated with the class as a whole and the researcher, these exchanges accounted for 2% and 1% of P5 communication, respectively. Participant 5 communicated three times with the class as a whole. These three exchanges utilized the function of compliance. All three were a response to questions posed by the class and formed through use picture/symbol/sign/technology.

Participant 5 and the researcher communicated once. This communication exchange occurred during the videotaped observations, when the researcher was quietly observing the participant. This exchange utilized the function of showing off, was initiated by P5 and formed through the use of eye contact.
Overall use of communicative forms. P5 used 10 different communication forms (see Table 5). Participant 5 showed a preference for non-verbal forms of communication. Participant 5 utilized the communicative form of action (55%) in the majority of his exchanges. Action was followed by picture/symbol/sign/technology (12%) and eye contact (7%).

Table 5

Participant 5’s Communicative Forms

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>73</td>
<td>Compliance (46); Showing Off (4); Commenting (15); Protest (5); Request (2); Request Information (1);</td>
</tr>
<tr>
<td>Action and Vocalization</td>
<td>10</td>
<td>Compliance (7); Showing Off (1); Refusal (2);</td>
</tr>
<tr>
<td>Action and Picture/Sign/ Symbol/Technology</td>
<td>11</td>
<td>Compliance (9); Request (2)</td>
</tr>
<tr>
<td>Action and Eye Contact</td>
<td>8</td>
<td>Compliance (5); Showing Off (1); Refusal (2)</td>
</tr>
<tr>
<td>Picture/Symbol/Sign/ Technology</td>
<td>16</td>
<td>Compliance (12); Showing Off (1); Request (1); Commenting (1)</td>
</tr>
<tr>
<td>Picture/Symbol/Sign/ Technology and Eye Contact</td>
<td>3</td>
<td>Compliance (3)</td>
</tr>
<tr>
<td>Vocalizations</td>
<td>1</td>
<td>Showing Off (1)</td>
</tr>
<tr>
<td>Eye Contact</td>
<td>10</td>
<td>Commenting (9); Showing Off (1)</td>
</tr>
<tr>
<td>Gaze Switch</td>
<td>1</td>
<td>Commenting (1)</td>
</tr>
<tr>
<td>Gesture/pointing</td>
<td>1</td>
<td>Commenting (1)</td>
</tr>
</tbody>
</table>

Summary of P5. Participant 5 produced 134 communication exchanges with four communicative partners. The majority of P5 communication took place with an EA. Participant 5 and an EA communication accounted for 95% of P5 communication. Participant 5 utilized the category of behaviour regulation in the majority (71%) of his communication. Participant 5’s highest rated communicative form was action (54%), with no exchanges involving speech.
**Participant 6 (P6).** Participant 6 was an 8–year–old male. In pre-observational visits there was no indication that P6 possessed the ability to produce verbal speech, although he did display vocalizations such as screaming. Over the 90 minutes of videotaped observations P6 produced 127 exchanges. Eight of these exchanges were deemed non-interactive or no response therefore the total number of P6 communication was 119 exchanges. Participant 6 communicated with three partners (see Figure 11).

![Participant 6's Communicative Partners](image)

*Figure 11. Participant 6’s communicative partners.*

**Communication with an educational assistant (EA).** The majority of P6’s communication occurred with an EA. Participant 6 and EA communication made up 93% of his communication. Five communicative functions were used during P6/EA exchanges (see Figure 12).
Figure 12. Participant 6 and educational assistant communicative functions.

**Behaviour regulation.** Out of the 111 P6/EA exchanges, 82 were categorized as behaviour regulation, accounting for 74% of P6/EA communication. Three behaviour regulation exchanges were a request for an object or action. All three exchanges were initiated by P6 and formed through action. The function of refusal was initiated by P6 three times. These three exchanges were initiated by P6 and formed through action.

Compliance was the most utilized communicative function in P6/EA communication, with 76 exchanges. All compliance exchanges were a response to a question or task demand posed by an EA to P6. All compliance exchanges were formed either through action or the combination of action and eye contact. For example:

*Participant 6 is finishing up his work of putting a puzzle together*

EA: *good job*

*Participant 6 is shown his free choice options. He chooses a toy. Participant 6 stands up, and starts to jump up and down . . .*
EA: sitting please

Participant 6 grabs his chair and sits down (non-verbal)

Dyadic social interaction. Twenty-two P6/EA exchanges were categorized as dyadic social interaction accounting for 20% of P6/EA communication. The function of showing off was used in 14 exchanges. All showing off exchanges were initiated by P6 and formed through eye contact, vocalizations or action. The remaining eight dyadic social interaction exchanges utilized the function of request for social routine. These eight exchanges were initiated by P6 and formed through action, a combination of action and eye contact or a combination of action, eye contact and vocalizations.

Joint attention. Seven P6/EA exchanges were categorized as joint attention, for 6% of P6/EA communication. All 7 exchanges were categorized as commenting. Four of the seven exchanges were initiated by P6, and three were a response to the EA’s action (i.e., singing or talking to P6). All seven commenting exchanges were formed through eye contact. For example:

Participant 6 is sitting in his chair playing with a toy. The EA is sitting across from him saying his name and singing softly to him. Participant 6 looks up and stares into the EA’s eyes for 10 seconds.

Communication with classroom students (CS). Participant 6 and a CS were involved in three exchanges, accounting for 3% of P6 communication. Communication with a CS took place during a group teaching activity. All three P6/CS exchanges involved the function of showing off, were initiated by P6 and formed through eye contact. For example:

Participant 6 and the CS are sitting beside each other. The CS is playing with a toy.

Music comes on the screen. Both P6 and the CS look up, and then look at each other.
Communication with the class as a whole. Participant 6 communicated with the class as a whole five times, for 4% of P6 communication. These five exchanges were categorized as showing off. All exchanges were initiated by P6 and formed through vocalizations.

Overall use of communicative forms. Throughout his 119 exchange, P6 produced seven different communicative forms (see Table 6). Participant 6 showed a strong preference for the non-verbal form of action, which alone accounted for 72% of all exchanges. Action was followed by eye contact (15%) and vocalizations (7%).

Table 6

<table>
<thead>
<tr>
<th>Participant 6’s Communicative Forms</th>
<th>Form</th>
<th>Times Used</th>
<th>Functions Used (Broken down by function)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>86</td>
<td>Compliance (74); Showing Off (2); Request (3); Request for Social Routine (6); Protest (1);</td>
<td></td>
</tr>
<tr>
<td>Action and Eye Contact</td>
<td>4</td>
<td>Compliance (2); Showing Off (1); Request for Social Routine (1)</td>
<td></td>
</tr>
<tr>
<td>Action, Eye Contact, and Vocalizations</td>
<td>1</td>
<td>Request for Social Routine (1)</td>
<td></td>
</tr>
<tr>
<td>Eye Contact</td>
<td>18</td>
<td>Commenting (7); Showing Off (11);</td>
<td></td>
</tr>
<tr>
<td>Vocalization</td>
<td>8</td>
<td>Protest (1); Showing Off (7)</td>
<td></td>
</tr>
<tr>
<td>Vocalization and Eye Contact</td>
<td>1</td>
<td>Showing Off (1)</td>
<td></td>
</tr>
<tr>
<td>Vocalization and Action</td>
<td>1</td>
<td>Protest (1)</td>
<td></td>
</tr>
</tbody>
</table>

Summary of P6. Over the 90 minutes of videotaped observations, P6 produced a total of 119 communication exchanges. Participant 6 communicated with three different communicative partners, the majority of exchanges occurred with an EA. The majority of P6’s communication utilized the category of behaviour regulation, accounting for 80% of his communication.

Participant 6 showed a preference for non-verbal forms of communication, especially action, eye contact and vocalizations.
Comparison of Communication Functions, Role, and Forms

The second part of the findings chapter provides a cross-participant analysis. This analysis consists of examining the communicative partners, communicative categories, roles and communicative forms utilized by all participants. The cross-participant analysis was conducted to present the parallels and variances occurring in communication exchanges of individuals with non-verbal autism. This part of the chapter is divided into four sections. The first section examines the communicative partners and contexts where exchanges took place. The second section analyses the communicative categories and functions utilized in all exchanges. The third section presents the role communication played during exchanges. The fourth section presents the utilization of verbal and non-verbal forms of communication by the participants. Overall, there were 813 communicative exchanges made by the participants of this study. These exchanges involved five communicative partners, the utilization of all the communicative categories and functions and produced 33 different communicative forms.

Communicative partners and context. The M-COSMIC observational form accounts for four different communicative partners (Clifford et al., 2010). This study separated the educational assistants from the classroom teachers to create five communication partners. The majority of participant communication occurred with an educational assistant (see Figure 13). There was the assumption prior to commencing the observations, that the educational assistants would be the main communicative partner, as all participants’ required one to one assistance. Overall, 85% of participant communication occurred with an educational assistant.
The majority of communication involving an educational assistant occurred during teaching time, a time when either the participant worked with the educational assistant or the educational assistant supported the participant in working independently. The majority of videotaped observations occurred during these teaching periods.

Only two participants communicated with their classroom teacher: P1 and P4. Communication with a classroom teacher accounted for 8% of all participant communication. Classroom teacher communication occurred during teaching time and group activities. For example, both P1 and P4’s classroom teachers engaged in communication with them while they were working independently.

Four participants communicated with other classroom students or the class as a whole. Participant 2 did not communicate with others, as he was in a separate classroom. Four percent of participant communication occurred with other classroom students; 2% of communication occurred with the class as a whole. Communication with classroom students or the class as a whole.
whole took place during group activities. Although, participant 4 did communicate with his peers outside of a group context, the context was facilitated by an educational professional. A conclusion drawn from the relationship between communication partners and communicative context is the realization that none of the participants independently socialized or communicated with their classroom peers.

The remaining 1% of communication occurred with the researcher. These were unexpected exchanges and took place while the researcher was setting up the camera or during observations.

**Communicative categories.** The following section examines the overall use of the communicative categories and communicative functions in each category.

**Behaviour regulation.** The category of behaviour regulation is made up of three communicative functions: request for an object or action, refusal and compliance. Out of the 813 exchanges, 357 were categorized as behaviour regulation. These exchanges accounted for 44% of participant communication (see Figure 14). An examination of the behaviour regulation category found that P4, P5 and P6 utilized the category of behaviour regulation more frequently than P1 and P2 (see Figure 14). All participants, except for P1, utilized all three functions of behaviour regulation. Participant 1 did not produce the function of refusal/protest during observations. The function of request for an object or action occurred in 43 exchanges. The function of refusal was utilized in 25 exchanges. The function of compliance appeared in 290 exchanges. Compliance was the highest rated function, not only within the behaviour regulation category but compared to the functions in other categories.
Figure 14. Total number of behaviour regulation exchanges.

Dyadic social interaction. The category of dyadic social interaction is made up of the functions of showing off, request for social routine, and acknowledging. The category of dyadic social interaction was used in 254 exchanges, and accounted for 31% of participant communication (see Figure 15). Participants utilized all dyadic social interaction functions but, functions were used at a much lower rate than in the behaviour regulation category. The function of showing off occurred 230 times, request for social routine was used 11 times and acknowledging appeared 13 times.
Figure 15. Total number of dyadic social interaction exchanges.

Joint attention. The category of joint attention consists of the functions of commenting and request for information. The category of joint attention made up 25% of participant communication with 202 exchanges (see Figure 16). All participants utilized the function of commenting. Commenting occurred in 197 exchanges. Participant 2 and P5 were the only individuals who utilized request for information. Request for information was used in five exchanges.
Overall findings of communicative categories. Overall, the highest rated communicative category was behaviour regulation, with 44% of participant communication using functions of this communicative category. The categories of dyadic social interaction and joint attention were also utilized by all participants but at a lower rate. The highest rated function was compliance, occurring in 36% of exchanges. The function of showing off was the second highest communicative function with 31% and the function of commenting was third with 25%.

In conclusion, all communicative categories and functions were used by individuals with non-verbal autism. Yet, individuals with non-verbal autism tend to progress through communicative categories at their own speed and utilize communicative functions at different frequencies.

Communication Role

The role of communication was not the primary focus of this study. The role of communication was examined because of its application in the M-COSMIC observational form (Clifford et al., 2010). Examining the role of communication allowed for a larger perspective of

Figure 16. Total number of joint attention exchanges.
how communication was formed. The M-COSMIC tool accounts for three communicative roles: initiation, response and non-interactive (see Table 7). Non-interactive and no response exchanges were not included in the analysis of each participant. This study did not include non-interactive or no response exchanges, because the M-COSMIC tool does not classify them as communication. Comparing the rates of initiated to response communication, results showed that P1 and P2 rated higher in initiated communication and lower in response communication (see Table 7). Meanwhile, P4, P5 and P6 displayed the opposite and rated higher in response rates and produced fewer initiated interactions in their communication.

Table 7

Participant Communicative Roles

<table>
<thead>
<tr>
<th>Participant</th>
<th>Initiation</th>
<th>Response</th>
<th>Non-interactive/no response</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>76% (249)</td>
<td>13% (41)</td>
<td>37</td>
</tr>
<tr>
<td>P2</td>
<td>51% (101)</td>
<td>18% (36)</td>
<td>61</td>
</tr>
<tr>
<td>P4</td>
<td>39% (56)</td>
<td>54% (77)</td>
<td>9</td>
</tr>
<tr>
<td>P5</td>
<td>23% (34)</td>
<td>69% (100)</td>
<td>11</td>
</tr>
<tr>
<td>P6</td>
<td>31% (39)</td>
<td>63% (80)</td>
<td>8</td>
</tr>
</tbody>
</table>

The role of communication may be related to the communicative categories used by each participant. Participant 1 and P2 rated higher in the categories of dyadic social interaction and joint communication. These categories require more social communication and tend to be initiated. In contrast, the remaining three participants rated higher in the category of behaviour regulation. The behaviour regulation category consists of functions that are based on tasks or demands, such as compliance. Therefore, participants would most likely be responding to
communication from their partner. The relationship between role and communicative category raises the question of whether or not non-verbal initiation can be increased in children who do not progress past the behaviour regulation stage of communication.

**Communicative Forms**

The M-COSMIC tool consists of eleven verbal and non-verbal communicative forms (see Table 8). It should be noted, however, that participants tended to communicate using a combination of forms, rather than just one form being utilized during an exchange.

Table 8

*Communicative Forms*

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Verbal Form</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocalization</td>
<td>3%</td>
<td>4%</td>
<td>0.8%</td>
<td>0.7%</td>
<td>7%</td>
</tr>
<tr>
<td>Single Word Speech</td>
<td>3%</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two Worded Speech</td>
<td>13%</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three Worded Speech</td>
<td>14%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-verbal Form</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Picture/Symbol/Sign/Technology</td>
<td>1%</td>
<td>4%</td>
<td>7%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Gesture/Pointing</td>
<td>3%</td>
<td>2%</td>
<td>0.8%</td>
<td>0.7%</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>10%</td>
<td>20%</td>
<td>58%</td>
<td>55%</td>
<td>72%</td>
</tr>
<tr>
<td>Eye Contact</td>
<td>8%</td>
<td>14%</td>
<td>11%</td>
<td>7%</td>
<td>15%</td>
</tr>
<tr>
<td>Gaze Switch</td>
<td>3%</td>
<td>4%</td>
<td>2%</td>
<td>0.7%</td>
<td></td>
</tr>
<tr>
<td>Looks to Target</td>
<td></td>
<td>2%</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Show/Give</td>
<td>0.7%</td>
<td>0.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Verbal forms.** All participants displayed the communicative form of vocalizations. Participant 1 and P2 used the verbal form of vocalizations at a higher rate than P4, P5 and P6. Participant 1 and P2 were the only participants who used single, two or three worded speech. Overall, P1 rated high in verbal forms of communication. It should be noted that P1’s verbal speech consisted of delayed echolalia and involved less than 5% of natural speech. A relationship becomes apparent when examining the use of P1’s and P2’s verbal forms of
communication compared to their non-verbal forms. Participant 1 and P2 utilized verbal forms of communication at a much higher rate than non-verbal forms. Hence the question needs to be asked do non-verbal forms of communication decrease once verbal speech is acquired?

**Non-verbal forms.** Action and eye contact were the only two non-verbal forms of communication used by all participants. Action rated the highest among all five participants occurring on average in 43% of communication exchanges, followed by eye contact with 11%. These results show that individuals with non-verbal autism may share similarities in their communicative forms. As previously stated, the majority of communicative forms were not produced alone but in conjunction with other forms. Unfortunately, the M-COSMIC observational form does not account for two or more communicative forms to be noted. These complex forms were recorded in the modified examples section with 21 different communicative forms involving the combination of two or three verbal and non-verbal communicative forms (see Table 9 and Appendix J). The complexity of communication will be expanded in Chapter 5.

Table 9

<table>
<thead>
<tr>
<th>Participant</th>
<th>Use of two communication forms</th>
<th>Use of three communication forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1</td>
<td>89 (31%)</td>
<td>34 (12%)</td>
</tr>
<tr>
<td>Participant 2</td>
<td>39 (29%)</td>
<td>7 (5%)</td>
</tr>
<tr>
<td>Participant 4</td>
<td>24 (18%)</td>
<td>1 (0.8%)</td>
</tr>
<tr>
<td>Participant 5</td>
<td>32 (24%)</td>
<td>0</td>
</tr>
<tr>
<td>Participant 6</td>
<td>7 (6%)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>191 (24%)</strong></td>
<td><strong>42 (5%)</strong></td>
</tr>
</tbody>
</table>

**Overall relationships.** Participant 1 and P2 shared similarities in their communicative categories, roles of communication and communicative forms. A relationship may be drawn from the patterns shown in their results. Individuals with non-verbal autism who develop speech
may progress to more social categories of communication and initiate their communication at a higher rate. Meanwhile, P4, P5 and P6 also shared similar patterns. They showed a preference for non-verbal forms of communication, tended to communicate via behaviour regulation and responded to the majority of their communications. These two sets of participant patterns indicate that individuals with non-verbal autism do share similarities in communication.

**Association between M-COSMIC and ADOS-G**

As mentioned in Chapter 3, concurrent validity was established in the previous COSMIC studies by conducting Pearson product correlations through comparing items from the COSMIC and M-COSMIC tool to items from the ADOS-G tool (Clifford et al., 2010). Unfortunately, due to the small sample size of this study, concurrent validity could not be established using similar measures. Instead, percentage analyses were used to compare similarities and differences between items from the COSMIC and M-COSMIC studies and items from the standardized ADOS-G tool. The selected items were *Initiated Speech* from the COSMIC study compared to *Overall level of non-echoed language* from the ADOS-G tool, *eye contact* from the M-COSMIC study compared to *unusual eye contact* from the ADOS-G tool, *Gesture/Pointing* from the M-COSMIC study compared to *Pointing* and *A8 Gesturing* from the ADOS-G tool, *Commenting* from the COSMIC study compared to *Spontaneous Initiation of Joint Attention* from the ADOS-G tool.

Prior to conducting the percentage analysis, modifications were made to both scoring systems. Modifications to the COSMIC and M-COSMIC items involved converting the frequency counts into three point ordinal scales. This conversion involved re-watching each videotape and producing a score at six minute intervals (G.Pasco, Personal Communication, May 25, 2012). The COSMIC ordinal scale ranged from zero to two. A score of zero represented no
displays of the item. A score of one represented one to six displays of the item. A score of two represented seven or more displays of the item (G. Pasco, Personal Communication, May 25th 2012). The six minute scores were then averaged and represented the final score for each comparable item. Modifications to the ADOS-G tool involved simplifying or expanding the item scales from either a five or two point scale to a three point scale. The ADOS-G items needed to be reverse coded. Higher scores in the ADOS-G tool were reversed to represent lower scores in this study (Clifford et al., 2010). These modifications allowed for parallel coding to occur (Clifford et al., 2010). To assess proper scoring, practice analyses were conducted using the original practice participant’s videotapes.

**Initiated speech and non-echoed language.** The first comparable item was *initiated speech* from the COSMIC study and *non-echoed language* from the ADOS-G tool. *Initiated speech* is defined as “single words, short phrases, and whole sentences” (Pasco et al., 2008, p. 1816). *Non-echoed language* is a three point scale consisting of “no words or approximations” and “at least one word or word approximation but fewer than five words used during session“ to “regular use of utterances with two or more words” (Lord et al., 2000, Module 2, p. 5). There was a strong association between these two items for all participants (see Figure 17). Although, P2 showed minor differences in association (see Figure 17). When re-examining the mean score for the comparable items, there was only a .15 difference between them.
**Figure 17.** Percentage comparison of initiated speech and non-echoed language.

**Eye contact and unusual eye contact.** The second comparable item was *eye contact* from M-COSMIC and *unusual eye contact* from ADOS-G. *Eye contact* is defined as “when a child makes eye contact with another” (Clifford et al., 2010, p. 14). The three point scale for the ADOS-G item of *eye contact* ranged from “no use of eye contact” and “. . . poorly modulated eye contact to initiate, terminate or regulate social interaction” to “appropriate gaze with subtle changes. . .” (Lord et al., 2000, Module 2, p. 7). A strong association appeared in all participants except P6 (see Figure 18). A possible reason for the difference in association for P6 could be due to the scoring differences between the M-COSMIC tool and the ADOS-G tool. Originally, eye contact was a two point ordinal scale but was expanded to a 3 point scale by adding a score of zero to represent no eye contact.
Figure 18. Percentage comparison of eye contact and unusual eye contact.

The M-COSMIC item of *eye contact* was based on how many times eye contact occurred between a participant and communicative partner. Participant 6 rated high for both items during the first two videotapes but rated lower for the ADOS-G item in the third videotape. This rating may have led to the discrepancy in associations.

**Gesture/Pointing.** The third comparable item was gesture/pointing from both the M-COSMIC and ADOG-G tools. The M-COSMIC tool refers to *gesture/pointing* as “head nodding and shaking, pointing, descriptive, demonstrative or instrumental gestures” (Clifford et al., 2010, p. 1817). The ADOS-G tool separates the items of *gesture* and *pointing*. *Pointing* ranges from “does not point to objects in any way” and “uses pointing to reference objects, but without sufficient flexibility” to “points with index finger” (Lord et al., 2000, Module 2, p.6). *Gesturing* ranges from “no spontaneous use of descriptive, conventional, instrumental, or emotional gestures. . .” and “spontaneous use of at least two different gestures. . .” to “spontaneous use of
descriptive, conventional, instrumental, or emotional gestures” (Lord et al., 2000, Module 2, p.6). To arrive at one mean score for the two ADOS-G items, items were examined separately, averaged, and then the two averages were combined to arrive a total score representing both items. There was a moderate to strong association between these two items (see Figure 19). Participants 1, P2 and P5 had less than 5% difference between items while P4 and P6 had a 10% difference.

![Figure 19. Percentage comparison of Gesturing/Pointing.](image)

**Commenting and spontaneous initiated joint attention.** The final comparative item was *commenting* from the COSMIC tool and *spontaneous initiated joint attention* from the ADOS-G tool. *Commenting* is defined as “when a child verbally or non-verbally refers to an event, object or action in order to share attention with a partner” (Clifford et al., 2010, p. 15). *Spontaneous initiated joint attention* ranges from “no approximation of spontaneous or joint attention. . .” and “partially references an object that is clearly out of reach” to “uses clearly
integrated eye contact to reference an object... by looking at the object, then at the examiner... and then back to the object...” (Lord et al., 2000, Module 2, p. 9). There was a weak association between these two items for all participants (see Figure 20). The large variance in association between these two items may be due to the definitions used by each tool.

![Commenting vs. Spontaneous Initiated Joint Attention](chart)

*Figure 20.* Percentage comparison of commenting and spontaneous initiated joint attention.

**Overall interpretations.** Overall, there were mixed associations between the comparable items. Strong to moderate associations appeared in the *initiated speech* and *non-echoed language* items, *eye contact* and *unusual eye contact* items and *gesture*/*pointing* items. A weak association appeared between the *commenting* and *spontaneous initiated joint attention* items. Clifford et al. (2010) also noted similar associations in their study, perceiving stronger relationships in non-verbal items, compared to weaker associations in verbal items.

Some of the disparities among associations could be attributed to the modifications made in scoring. Originally, none of the ADOS-G items were three point ordinal scales. Therefore, all ordinal scales needed to be expanded or decreased to create comparable scoring between the two
tools. As well, the COSMIC and M-COSMIC items were based on specific time interval scores rather than mean scores representing the entire videotaped observations. Scoring via time intervals allow for the capture of instances of items as they occurred. While the ADOS-G items were based on personal judgement of the entire videotape, there may have been a mix of high and low item utilization. These two issues could have led to some of the perceived differences between comparable items. Future recommendations include using the ADOS-G tool in a similar fashion as the COSMIC tool, with time interval scoring.
Chapter 5: Discussion

This study examined the communication patterns of individuals diagnosed with non-verbal autism within self-contained classrooms. Non-verbal autism is defined in this study as individuals who present with very limited or no language, have similar sensory interests of a typically developing 8 to 9 month old, have deficits in sharing attention and conventions and use gestures for the purpose of communicating (Duqette et al., 2008). Little research has been conducted regarding how individuals with non-verbal autism communicate or examining their communication patterns in natural settings (Pasco et al., 2008). Initial findings of the study indicate that individuals with non-verbal autism tend to progress through similar communication categories and use comparable functions; although, each individual favours the use of different forms to express his/her communication.

This chapter consists of five parts. Part one discusses the original objective of the study and the factors that may affect communication competence. Part two presents the theoretical implications of the study. Part three offers the practical implications of the study, impacting the communicative partners, forms and roles. Part four presents the perceived limitations of the M-COSMIC tool and the study as a whole. Lastly, part five provides future recommendations for research and the concluding remarks.

Original Objectives

The purpose of my research study was to observe and examine communication of individuals with non-verbal autism in self-contained classrooms, with a secondary focus on communication between peers and professionals. The most significant finding of my research was the realization and understanding that communication is a complex task with ever changing
patterns, although individuals with non-verbal autism share similarities regarding communicative functions and forms.

Based on the results of the study, it appears that participants developed their own form of communication competence. Communication competence “assumes an ability to choose communication behavior that is appropriate for a given situation. . . communication competence can be defined as being able to communicate effectively with others in various contexts” (Jackson & Hogg, 2010). The development of a personal communication competence, the utilization of communicative functions and the shift from non-verbal to verbal forms of communication can be based on and impacted by many different factors.

The first factor is individual brain pathways and their development. The autism community and its researchers have not arrived at an understanding of how autism develops nor why certain aspects of communication are affected. Many parents report that prior to an autism diagnosis, their child developed language but a regression occurred around 3 years of age (Goldberg, 2000). Further questioning also entails why some individuals with autism are able to develop language while others only develop certain basic words or phrases. Understanding these initial differences and the impact the disorder has on the brain may assist in helping to understand communication impairment. Currently, a worldwide project is underway mapping the genomes of 10,000 individuals with autism. The hope is to understand how certain genes are impacted by autism. Unfortunately, the mapping process takes time, and results are not expected until 2015 (Talaga, 2012).

The second factor affecting communication is the personality of the individual. Individuals with non-verbal autism, just like typical individuals, have different personalities.
Some may display the characteristics of an extrovert – seeking and wanting to make connections – while others display the characteristics of an introvert, staying within their own world.

Personality traits and their effect on communication were reflected in the study. For example, P1 displayed the characteristics of being an extrovert; he was constantly initiating communication with others and seeking out connections. Participant 1’s personality type may have impacted his communication and led to an increase in initiation. Initiated communication accounted for 76% of P1’s exchanges. Conversely, P5 displayed the characteristics of an introvert; he remained quiet, hardly communicating with others. Participant 5’s introverted personality may have impacted his initiated communication. Only 23% of P5’s communication was initiated. The personalities of individuals may affect their eagerness to communicate with others as well as their communication competence. The research reviewed for this study did not show a consideration for participant personality traits. Going forward, an examination of personality may be worth considering, as personality may provide a basic understanding of communication or social behaviours.

The third factor influencing communication is the relationship with the communicative partner. The main communicative partner for participants within this study was the educational assistant. The educational assistant is a familiar individual who has usually worked with a participant for a long period of time. This study provided me an opportunity to grasp an understanding of communication with familiar individuals. The question then becomes: what does communication look like with unfamiliar individuals, both within and outside the classroom context? Due to the design of the study I was not able to capture communication with individuals not regularly appearing in the classroom. Based on the works of Bloom and Lahey (1978), there would be differences in communication with familiar individuals, compared to unfamiliar
individuals. Bloom and Lahey believe that for an effective communicative relationship to occur, individuals need to have some knowledge regarding the way their partner perceives objects and events of communication.

The fourth factor affecting communication is the size of the communication group. My study found that the majority of participants communicated at an individual level compared to group contexts. Findings also indicate that the type of communication changed when interacting with an individual level compared to groups. For example, the majority of communication at an individual level was categorized as behaviour regulation. Comparatively, communication with the class as a whole was categorized as dyadic social interaction or joint attention. To better assess the reliability of findings in non-verbal individuals being able to provide an understanding of typical communication allows for a more accurate assessment of communicative differences. Research has shown that typical individuals use the same categories of communication as those with an autism diagnosis but differences appear when examining the progression or utilization of communicative approaches. Bruner (1975) studied child communication and found that children used language to communicate for the purpose of commenting jointly with their partner. Bruner’s beliefs suggest that compared to individuals with non-verbal autism, typical individuals tend to communicate for social means despite the context or group size.

The fifth factor influencing the amount and type of communication is environmental considerations. Environmental considerations are related to a multitude of levels. First, the noise level in the space. Can individuals hear themselves or be heard? Does an increase in noise level negatively or positively affect the individual? As an example, during one of my observational periods, a music class started playing while the participant’s classroom door was open. This increased noise level in the room. During these times it was noted that the participant engaged in
more negative behaviours, such as screaming or kicking. These behaviours may have been a response to the increased noise level. Research has shown that individuals with autism do have auditory sensitivity, although each individual with autism is impacted by different noise levels and pitches (Aarons & Gittens, 1992; Geneva, 2009). Workers in educational placements should be aware of these sensitivities and the affect they may have on students and their communication.

Another environmental factor is the number of people in the classroom, especially if it includes people unfamiliar with the individual. More people in the classroom may result in more conversations occurring at once, increasing the noise level or visual stimulation. As previously stated, an increased noise level can be disruptive to the individual and the learning environment. As well, if an unfamiliar professional starts working with an individual with non-verbal autism the professional may not be aware of the individual’s communicative techniques or routine. Individuals with autism are anxious most of the time; any change in noise level, routine or classroom structure may impact their communication (Geneva Centre for Autism, 2009). Environmental considerations may not seem as significant to typical individuals but they may impact an individual with autism.

The final factor affecting communication patterns of individuals with non-verbal autism may be the type and amount of medication currently being taken. Some medications are prescribed to individuals with autism to decrease anxiety, control seizures, reduce negative behaviours and alleviate depressive symptoms. Medications may impact an individual’s personality and communicative abilities. During the study the effects of medication on individuals with autism were observed. Part way through the observations, one participant had a medication modification. The field notes recorded an apparent change in the participant; he became much quieter and more docile in overall behaviour after the medication modification.
The M-COSMIC tool does not account for any of these factors. Future studies may consider longer observational periods or an ethnographic study to permit immersion in the classroom allowing for a fuller understanding of the effects of such factors on individuals. As well, conducting interviews in conjunction with the use of a standardized tool may also help to understand the impact of these factors. An impact or change to one of these factors may affect the communication competence of an individual with non-verbal autism.

A second objective of the study was the examination of communication between individuals with non-verbal autism, and with their peers. The results of the analysis determined that when the opportunity to interact with peers was facilitated by either an educational professional or activity, participants did communicate with their peers. Participants did not actively search out peer communication. Does continually segregating students into self-contained classrooms and within self-contained areas of those classrooms allow them to develop communication skills with peers? Based on the results of the study, I believe it does not. I feel that there should be explicit times within classroom schedules that allow students to engage in social communication opportunities. Sigafoos et al., (2006) believe that not being able to communicate with peers can negatively affect an individual’s life as he/she would not be able to participate in meaningful social interaction or have a sense of belonging with others.

**Theoretical Implications**

This section examines the relationship between the study’s findings and the model of communication for individuals with autism developed by Wetherby and Prutting (1984).

Wetherby and Prutting conducted a study investigating the prelinguistic and early stages of language development in children diagnosed with autism. They theorize that individuals with autism progress through three communicative categories: (a) behaviour regulation, (b) showing
off and (c) joint attention (Bruner, 1975; Wetherby & Prutting, 1984). Wetherby and Prutting believe that individuals with autism primarily communicate using the category of behaviour regulation with little progression to the categories of showing off or joint attention. This study and the original COSMIC study share similar results with the Wetherby and Prutting model. The majority of the participants remained in the behaviour regulation category, with little utilization of communicative functions within the showing off or joint attention categories.

**Peer communication.** Theoretical differences were noted between this study and the Wetherby and Prutting model in peer communication. I found that participant and peer communication did not follow the same communicative patterns set out in the Wetherby and Prutting model. Communication with peers or the class as a whole bypassed the behaviour regulation category and utilized functions in the social interaction and/or joint attention categories. Participants in this study seemed to modify their communication from being environmental to social. The differences in communicative functions between peers and professionals may be impacted by three factors. First, classroom peers may not be aware of the communicative forms utilized by individuals with non-verbal autism or may be non-verbal as well. Therefore, peer communication may be via more subtle forms of communication, types of communication that professionals may not actively attend to. Second, compared to professionals, peers may not put the same demands on individuals with non-verbal autism. Therefore, they may create social relationships with peers rather than relationships based on task demands. Third, individuals with non-verbal autism may in fact be seeking to be included in social interactions with peers. Therefore, they may use facilitated communication opportunities and social communication to increase their social interaction.
Practical Implications

The following section discusses the practical implications of this study. Practical implications impact the educational professionals, the class as a whole and the individuals with non-verbal autism. Practical implications arose from the findings based on the communicative partners, communicative forms and communicative roles noted in my data.

Communicative partners. The study’s results indicate that the main communicative partner in the classroom setting was the educational assistant. Communication with an educational assistant made up 85% of participant communication. This finding is not surprising as all participants were assessed as needing 1:1 supervision; consistently working with an educational assistant. The previous COSMIC studies coded classroom teachers and teaching assistants under the same category. Placing these two communicative partners together may have resulted in an increased perception of communication occurring with a classroom teacher, when in fact the communication may have taken place with an educational assistant. To fully understand the communication processes and gaps, future studies should attend to the primary and secondary partners, as well as communicative partners with limited exchange opportunities. Future studies may also want to investigate the relationship between length of time spent with the individual with non-verbal autism and communication development. This study observed professionals who had an already established relationship with the student; a communication relationship had been developed over time. Observing communication in a newly developed relationship may have produced different results and patterns.

The literature review provided details regarding the placement of individuals with autism in general and self-contained classrooms. Research showed the effects placing students with autism in a classroom had on the classroom teacher. Practical teaching guides have been created
for teachers because, based on the school structure, teachers create individual education plans, plan curriculum for students and meet with parents to discuss progress. Yet, as demonstrated by the results, the educational assistants are in fact the primary communicative partner for individuals with non-verbal autism. In this study, two out of five participants interacted with their classroom teacher. Two questions arise out of these findings: are there practical/educational guides for educational assistants and how accessible are they? As well, does the school structure enable effective communication between teachers and educational assistants?

Through research and my own personal experiences working in a school board it is apparent that better collaboration between teachers and educational assistants is needed. Educational assistants are aware of individual communicative techniques, behaviours and preferences of individuals with non-verbal autism. Meanwhile, teachers have the theoretical underpinnings provided by their education, access to outside professionals and communication with parents. Yet, educational assistants should be involved at all levels of collaboration, thereby allowing the combination of experience and expertise to help inform learning plans and assessment processes. Collaboration needs to occur at both a practical and policy level. At the practical level, the creation of shared understanding should occur to avoid the mismatching of expectations regarding students (Giangreco, 2011). Research has shown that the strongest working relationships are when schools value and recognize all contributions, when other educational professionals are involved in as much planning and review as possible and when school teams meet regularly (Groom, 2006). As well, student success has been shown to be dependent on the quality of partnership formed between classroom teachers and other educational professionals (Groom, 2006).
At a policy level, collaboration needs to occur by changing educational policies from reactive to a proactive approach (Giagreco, 2011). A proactive approach consists of the examination of a student’s needs, educational awareness for all professionals and the creation of professional teams to ensure that there are clear and accurate understandings of the issues and engagement in solution making (Giagreco, 2011, p. 364). Groom (2006) also suggests that continuous professional development and effective training must occur to create a collaborative school culture.

**Communicative forms.** All of the study’s participants rated high in non-verbal forms of communication. Two participants also used phrase speech. These results are similar to those found in the previous COMSIC studies. In the original COSMIC study, action was the most used form of communication. In the M-COSMIC study, action was the second most and eye contact the fourth most used forms of communication. I believe that the differences in communicative forms between this study and the two COSMIC studies relate to the amount of verbal language possessed by the study’s participants. When examining the results of this study, I found that participant communication shifted from non-verbal to verbal, if the participant possessed speech. For example, P1 utilized verbal forms of communication at a higher rate than his non-verbal forms. A conclusion drawn from this finding is that once verbal language is acquired, the use of non-verbal forms of communication may decrease.

Providing an awareness of the communicative forms utilized by individuals with non-verbal autism may allow educational professionals to develop an understanding of the primary communicative forms used in day to day interactions. Through research, professionals can be provided with the knowledge of what communicative forms are typically used by individuals with non-verbal autism. Further education may allow professionals to become aware of what
communicative forms to look for and attend to when initiating or responding to communication attempts. It has been reported that professionals are more likely to respond to more disruptive behaviours compared to non-disruptive behaviours, not recognizing that disruptive behaviours may be an attempt at communication (Nungesser & Watkins, 2005). Understanding that negative behaviours are forms of communication may allow professionals to become aware of the content of the communication exchange. For example, if an individual with non-verbal autism pulls an educational assistant’s hair, is this a malicious act or a form of communication? Trying to understand the factors that led to the hair pulling may allow for a better idea of where aggression comes from, how to de-escalate it and allow professionals to see earlier, more subtle attempts at communication. Professional knowledge and understanding could be passed on to others at an educational level (i.e., through post-secondary programs) and through professional development (i.e., practical manuals and further professional development opportunities).

Another important practical implication related to communicative forms is the amount and use of eye contact used by all five participants. The DSM-IV-R diagnostic criteria for autism notes the following characteristic in establishing an autism diagnosis: “marked impairment in the use of multiple nonverbal behaviours such as eye-to-eye gaze, facial expression, body postures and gestures to regulate social interaction” (American Medical Association 2000). The inclusion of impaired eye contact in the diagnosis of autism may be overstated. In this study and the M-COSMIC study, eye contact was one of the highest rated forms of communication and utilized with a variety of communicative functions (Clifford et al., 2010). I believe that based on the results of this study and the Clifford et al., (2010) study; eye contact is an adaptive communicative technique for those with limited verbal skills. The use of eye contact by participants within various communicative functions should allow for a reframing of how eye
contact is viewed in autism diagnoses. A re-questioning of the inclusion of eye contact in the diagnostic criteria for all individuals with autism may be needed. It may be necessary to educate professionals regarding the fact that eye contact may be used as a form of communication for a variety of different situations. In this study, eye contact was used in different communicative categories and functions. In the behavioural regulation category, eye contact was used with the functions of compliance and refusal and in the joint attention category eye contact was used with the function of commenting. This finding may impact the way educational professionals view the purpose of eye contact, moving away from viewing it as a form of passive communication to viewing eye contact as a way individuals with non-verbal autism make connections with others and help fill the void in their conversations.

A third implication related to communicative forms is the increased complexity in how the forms are used, such as the combination of two or more forms at once. Through 16 structured assessments, Stone and Caro-Martinez (1990), examined the level of complexity in communication between children with a developmental disability and children diagnosed with autism. Their results found that compared to individuals with developmental disabilities, individuals diagnosed with autism did not utilize forms involving the combination of gestures, vocalizations and eye gaze (Stone & Caro-Martinez, 1990). Yet, in this study participants showed a preference for using more than one communicative form at a time and created 22 different communication combinations (Appendix J). The implication of this finding is that professionals should be aware of and attend to the many different forms occurring during communication exchanges. By attending to only one form of communication, educational professionals may be ignoring other communicative attempts leading to a decrease in social communication. The differences in findings between the Stone and Caro-Martinez (1990) study
and the results of this one may be related to the setting and instruments used during assessment in both studies. Stone and Caro-Martinez observed 36 children during unstructured activities, such as lunch time or play group; whereas, this study only observed five students and observations included structured and unstructured settings. Specifically examining communication during unstructured setting in this study may have led to a decrease in communication complexity.

**Initiation versus response.** The M-COSMIC observational form attended to the role of communication during exchanges. The findings of this study found that there was a relationship between the communicative roles, categories and forms used by participants (see Table 10).

Table 10

<table>
<thead>
<tr>
<th>Participant</th>
<th>Category</th>
<th>Form</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Dyadic Social Interaction</td>
<td>Verbal Forms</td>
<td>Initiation</td>
</tr>
<tr>
<td>P2</td>
<td>Joint Attention</td>
<td>Verbal Forms</td>
<td>Initiation</td>
</tr>
<tr>
<td>P4</td>
<td>Behaviour Regulation</td>
<td>Non-verbal Forms</td>
<td>Response</td>
</tr>
<tr>
<td>P5</td>
<td>Behaviour Regulation</td>
<td>Non-verbal Forms</td>
<td>Response</td>
</tr>
<tr>
<td>P6</td>
<td>Behaviour Regulation</td>
<td>Non-verbal Forms</td>
<td>Response</td>
</tr>
</tbody>
</table>

As evident in Table 10, P4, P5 and P6’s main communicative category was behaviour regulation. These three participants rated higher using non-verbal forms of communication, and had higher rates of response. In contrast, P1 and P2 utilized higher rates of communication within the dyadic social interaction and joint attention categories, rated high in verbal forms of communication and initiated the majority of their communication exchanges. These results are
consistent with the findings from literature regarding the relationship between language
development and the increase in social interaction skills (Loveland & Landry, 1986; Mundy,
Sigman, & Kasari, 1994; Mundy, Sigman, Ungerer, & Sherman, 1987).

Through my personal experience, as well as findings from the literature review, it appears
as if professionals in the field of autism have created a response–based learning environment
for individuals with autism. Currently, there is no questioning regarding how educational
professionals can attempt to increase communication initiation for individuals who do not
progress past the behaviour regulation category. Classroom work for individuals with non-verbal
autism is based primarily on practical implications taken from therapies, such as Intensive
Behaviour Intervention (IBI) or Applied Behaviour Analysis (ABA). During these therapies
students are passive participants being taught socially appropriate behaviour and communication
skills. Students are rewarded based on their positive gains (Coplan, 2010). My personal
experience working with an ABA therapist, allowed me to experience the creation of a response–
based learning environment. I was directly told that I needed to re-frame my approach, from one
of asking my client to perform a task to making task demands towards my client. This caused an
internal shift, from focusing on the clients’ communication and giving choices to focusing on
appropriate social behaviour. These therapies are designed explicitly for social behavioural goals
where individuals with non-verbal autism are positioned in response roles. Response roles are
when individuals wait to be told what to do by a professional, rather than making their own
choices. Social behaviours can be learned and unlearned but what if social behaviours are the
way individuals communicate (i.e., hair pulling or screaming)? Does the goal of social
behaviours override the communication? How are goals prioritized? Is it appropriate social
behaviour or functional communication? Further research examining the ability to connect social behavioural goals with communication goals is needed.

**Limitations**

Although this study has important implications for research and practice, there are three limitations worth noting. Acknowledged limitations include (a) aspects of the M-COSMIC tool, (b) research design and (c) reliability measures.

**M-COSMIC tool.** The COSMIC and M-COSMIC tools are relatively new in the field of autism and communication. There were limitations to using the M-COMSIC tool in this study. First, the two original studies consisted of larger sample sizes. The COSMIC study observed 91 children; the M-COSMIC study observed 41 children; this study observed five students. The reduction in sample size affected the ability to conduct similar concurrent validity, such as a Pearson co-efficient. To attend to this limitation Dr. Gordon Barnes, a quantitative research professor at the University of Victoria was approached and offered assistance. It was suggested by Dr. Barnes that there could be a comparison of items used by Pasco et al., (2008) and Clifford et al., (2010), but these items would need to be represented through a percentage analysis (G. Barnes, Personal Communication, June 15 2012). The percentage analysis showed similar associations as those found in the previous COSMIC studies, although the scoring system may have had an adverse effect on certain items. The scoring design of the COSMIC and M-COSMIC items was based on frequency counts at six minute intervals for each videotape. The ADOS-G tool is scored on ordinal scales and based on the entire videotape. With a larger sample size and shorter videos these procedures may have yielded appropriate results but for this study these procedures created discrepancies. For example, in this study the comparable item of *eye contact* and *unusual eye contact* showed P6 having a 19% difference between the two items, leading to
the perception of a weak association, in reality there was only a 0.4 difference between the two item scores. Perhaps using the same procedures for both the COSMIC and ADOS-G tool may alleviate misinterpretations. In the future, research using the COSMIC tool and a small sample size should code using ordinal scales based on time intervals. Time intervals may allow a better representation of the communication intricacies. In future studies, the ADOS-G ordinal scales would need to be reverse coded allowing for parallel coding to the COSMIC study, than based on a set time interval, the researcher would watch the videotaped observations noting the frequency of each item.

Second, the COSMIC tool was designed based on the operational definitions and communicative forms of 91 children, creating a specific model of communication, with little allowance for new communicative functions or forms. These operational definitions close off the tool from recognizing that anything can be communication as long as the communicative partner responds to it. To address this limitation the examples section was developed. The hope was that this section would help clarify certain communicative forms, as well as explain any forms that were not previously accounted for by the COSMIC tool. The examples section did not note any new communicative functions or forms but was used to account for exchanges that involved two or more established forms of communication, for example, a combination of eye contact and vocalizations.

**Research setting.** The creation of the original COSMIC tool was based on the need for examining communication in natural settings, rather than examining communication in structured settings. A limitation of this study occurred due to the differences among classroom activities. While communication in a natural setting was observed, the variances in classroom structures or activities were ignored. After analyzing the videotapes, it was noted that the amount
of communication produced was dependent on the classroom activity the participant was involved in. For example, if a participant was involved in music class, which required him/her to be a passive participant, less communication was captured than a participant who was working individually with an educational professional. Further communication research may want to organize observations based on classroom activity, rather than just book sessions based on the teacher or classroom schedule.

**Reliability measurements.** Throughout the research process, the anonymity and confidentiality of participants was of the utmost importance and reflected in its design. I was the only individual who had access and ability to view the videotapes. Unfortunately, because of this design, there were limitations in reliability. The previous COSMIC studies conducted inter-relater reliability to measure their findings. Two separate researchers examine the participant observations and compared frequency counts to determine reliability (Padgett, 2008). As inter-rater reliability could not be conducted in this study, this limitation was attended to by utilizing other researcher credibility measures, such as dependability and conformability. Dependability was achieved through an inquiry audit with external reviewers scrutinizing the documents and supporting evidence. Conformability was achieved through an audit trail where pre - and post - observational notes were developed, in-depth discussions with Dr. Pasco occurred regarding the utilization of the COSMIC tool in this study and a reflective journal was created and utilized. Future studies may want to allow other researchers to view the videotapes, although this may lead to hesitation on the part of participants or parents/guardians to participate in the study.

**Recommendations for Future Research and Concluding Remarks**

Recent autism rates have increased to 1 in 88 children being diagnosed with autism (Autism Speaks Canada, 2012). With rates continuing to increase, it is my belief that research on
individuals with non-verbal autism will aid in assisting both professional and personal education, awareness and development. The autism community is continually growing. There are constantly new theories regarding the epidemiology of autism and societal awareness about treating the disorder. Autism impacts many facets in society including individual lives and the educational system. This study brought about awareness, as well as rich discussions regarding the complexity of communication of individuals with non-verbal autism, their effect on our lives and how we continue to impact theirs.

This study allowed me to learn about the implementation of an already established tool. Specifically, I learned how to address deviations occurring from changing the tool by decreasing the sample size while increasing the length of observation. Utilizing a small sample size and gathering powerful observations allowed for the recognition of some of the missing components of the COSMIC tool, such as the lack of awareness regarding the context and accountability regarding individual factors. Future studies may want to attend to these missing components by developing interviews for communicative partners both in and outside of the classroom setting. Interviews may allow researchers to better understand what factors impact individual communication. Autism research should continue to use a combination of observations and videotapes. Being able to rely on the videotapes increased my confidence regarding my results.

The aim of this research is to bring awareness of communication to a holistic level. Communication progress needs to be a collaborative process, including family members, teachers, educational assistants and support team members (Morrier, 2011). Sigafous, Arthur-Kelly, and Butterfield (2006) believe that creating collaborative teaming, consisting of regular team meetings, defined goals and equity in participation should occur to help increase and shape communication. The hope is that this study and future research will provide educational
professionals with an in-depth look at the realities occurring in the classroom. In future, educational researchers may want examine student goals and whether they are based on increasing communication techniques or developing appropriate social behaviour.
References


Appendix A
Autism Spectrum Disorders
Appendix B

*Diagnostic Criteria for Autistic Disorders (APA, 2000)*

A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3)

(1) Qualitative impairment in social interaction, as manifested by at least two of the following:

(a) marked impairment in the use of multiple nonverbal behaviours such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
(b) failure to develop peer relationships appropriate to developmental level
(c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)
(d) lack of social or emotional reciprocity

(2) Qualitative impairments in communication as manifested by at least one of the following:

(a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
(b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
(c) stereotyped and repetitive use of language or idiosyncratic language
(d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level

(3) restricted repetitive and stereotyped patterns of behaviour, interests and activities, as manifested by at least two of the following:

(a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
(b) apparently inflexible adherence to specific, non-functional routines or rituals
(c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
(d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.
Appendix C

Geographical Area of Halton, ON, Canada
Dear Parents/Guardians,

My name is Melissa Ray and I am a Master’s student in Child and Youth Care at the University of Victoria. Through my experience as an Educational Assistant, I have developed an interest in children with autism who communicate non-verbally. If your child has been diagnosed with non-verbal autism, please consider participating in this research study. If your child has not been diagnosed with non-verbal autism, please disregard this letter.

This study has two goals: understanding the different ways children diagnosed with non-verbal autism communicate in the classroom, and how communication changes when students communicate with friends compared to professionals.

This study involves videotaping the student in their classroom 3 to 4 times. Each visit will be 20-30 minutes long. During this time the student’s routine will not be disrupted and the study will not get in the way of the classroom schedule. Your child’s teacher and I will be the only individuals aware that your child is participating in this study. Your child’s anonymity and confidentiality will always be protected.

I will be using the data and findings from this study for my Master’s thesis. This study has been approved by the University of Victoria, Human Research Ethics Board and the Halton District School Board Research Advisory Committee.

If you would like to volunteer your child to participate in the study, you can fill out the form below and return it to a school in a sealed envelope with your child from the school. A consent form will then be forwarded to you. If you’d like additional information about the research study, feel free to contact me or my research advisor Dr. Daniel Scott.

Thank you for considering being part of this research.
Sincerely,

Melissa Ray, BSW
Master’s Candidate
University of Victoria
Department of Child and Youth Care

I would like to receive a consent form for my child

My child’s name is ___________
Appendix E

Participant Consent Form

Communication Exchanges

Your child is invited to participate in a study entitled Communication Exchanges that is being conducted by Melissa Ray.

Melissa Ray is a graduate student with the University of Victoria in the Department of Child and Youth Care and you may me by email.

As a graduate student, I am required to conduct research as part of the requirements for a master’s degree in arts. It is being conducted under the supervision of Daniel Scott.

Purpose and Objectives

The purpose of this research project is to observe children with the diagnosis of autism who communicate non-verbally in self-contained classrooms, and examine their different communicative forms and functions. Also, I want to examine how the communicative forms and functions differ when communicating with peers and professionals.

Importance of this Research

Research of this type is important because it focuses on the communicative strengths of children who communicate in other forms other than verbally.

Participants Selection

Your child/guardian is being asked to participate in this study because of their diagnosis of autism, as well as their communication resources. The selection process involved working with an employee with the Halton District School Board, and identifying schools where potential participants were members. Melissa Ray met with your school principal, and together agreed to have the research project take place at school.

What is involved

If you agree to let your child/guardian participate in this research, their participation will include Melissa Ray (myself) videotaping your child/guardian during a series of periods agreed upon by me and your child’s/guardian classroom teacher. Your child/guardian’s routine will not be disrupted in any way and your child will remain in the classroom during these videotaping periods. There will be 3-4 different periods of time where I will come in to the classroom and record your child for 20-30 minutes. After I have finished videotaping all the periods, I will
spend one afternoon if your child’s/guardian’s classroom observing their communication techniques without recording them.

Video tapes will be taken of your child/guardian with your permission.

Inconvenience

Participation in this study may cause some inconvenience to your child/guardian in the form of me and the camera being present in the room. Before I start observing your child/guardian I will come into their classroom to introduce myself and spend some time with the class so that I become familiar. I also plan to leave the camera in your child’s/guardian’s classroom for a week (it will be left off and will not record any information) to allow the classroom to become more familiar with it being there.

Risks

There are no known or anticipated risks to your child/guardian by participating in this research.

Benefits

The potential benefits of your child’s/guardian’s participation in this research include identifying their communicative strengths, and sharing these strengths with a variety of professionals including special education teachers. This will allow for a better understanding of the different communication patterns, forms and, functions of children diagnosed with autism and who are non-verbal. This may lead to more appropriate educational lessons being conducted in a format which the student may be able to respond accordingly.

Benefits to the state of knowledge include leading to more appropriate educational lessons being conducted in a format in which individuals with autism may understand and respond to more effectively. Also, this research study aims to fill a gap in the research of children with autism who also communicate non-verbally.

Voluntary Participation

Your child’s/guardian’s participation in this research must be completely voluntary. If you do decide to let your child/guardian participate, they may withdraw at any time without any consequences or any explanation. If they do withdraw from the study their data will not be used for further analysis and will be destroyed immediately.

Researcher’s Relationship with Participants

The researcher may have a relationship to potential participants as an educational assistant. To help prevent this relationship from influencing your decision to allow your child/guardian to participate, the following steps to prevent coercion have been taken I will not be observing your child if there is a previous relationship. Instead, Karen Ray, a research manager at St. Elizabeth
Health Care, will be tape recording your child/guardian for those sessions. While, I will continue to observe the classroom after videotaping has finished.

**On-going Consent**

To make sure that you agree that your child/guardian continues to consent to participate in this research, a letter with the upcoming dates for observation will be sent home. Your signature is required on these forms to ensure that you still consent to your child’s/guardians participation.

**Anonymity**

In terms of protecting your child’s anonymity when examining and writing the results for the study, the participants will be coded using numbers (P1, P2, P3, etc.). As well, any identifying characteristics or features that would identify your child/guardian will be omitted.

**Confidentiality**

The confidentiality of your child/guardian will be protected by the researcher (Melissa Ray) being the only individual who will be able to view the videotapes.

The confidentiality of the data will be protected by the videotapes and all hard copy data (consent forms and notes) being kept in a locked file cabinet within the home of the researcher. All electronic data will be kept on the researchers password protected home computer, in password protected files. The principle investigator will be the only individual who has access to the files. All data related to this study, including the videotapes will be kept for 3 years after the completion of the study.

**Dissemination of Results**

It is anticipated that the results of this study will be shared with others in the following ways by being part of Melissa Ray’s thesis defense. During the defense no images or any information regarding the identity of your child/guardian will be shared.

**Disposal of Data**

Data from this study will be disposed of by using a combination of using the *Blue Pencil: Mobile Shredding Service*. This is a secure shredding company located in Ontario, Canada to destroy videotapes and all hard data, such as records, results and consent forms. All electronic files will be permanently deleted from the researcher’s computer. The computer’s hard drive will also be re-formatted to ensure that all data is wiped from the computer.
Contacts

Individuals that may be contacted regarding this study include:

Melissa Ray – Researcher
Dr. Daniel Scott - Supervisor

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria.

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

Participant or parent/guardian to provide initials:

- Videos may be taken of me [my child] for: Analysis _______

Name of Participant____________________________ Signature____________________________ Date____________________________

A copy of this consent will be left with you, and a copy will be taken by the researcher.
Appendix F
Classroom Student Consent Form

Communication Exchanges

A student in your child’s classroom has been invited to participate in a study entitled communication exchanges that is being conducted by Melissa Ray.

Melissa Ray is a graduate student with the University of Victoria in the Department of Child and Youth Care and you may contact me if you have further questions by email. Please feel free to contact Melissa if you need further clarification regarding this study.

As a graduate student, I am required to conduct research as part of the requirements for a master’s degree in arts. It is being conducted under the supervision of Daniel Scott.

Purpose and Objectives

The purpose of this research project is to observe children with a diagnosis of autism and their communication in self-contained classrooms. Also, I want to examine how the communicative forms and functions differ when communicating with peers and professionals.

Importance of this Research

Research of this type is important because it focuses on the communicative strengths of children who communicate in other forms other than verbally.

What is involved?

Your child is not the focus of this study. Your child may or may not be present in the observations. The video camera will be focused on the participant in your child’s classroom. If you agree to let your child/guardian be recorded, their communications with the participant will be recorded and analyzed for this study.

The classroom routine will not be disrupted in any way and your child will remain in the classroom during these videotaping periods. There will be 3-4 different periods of time where I will come in to the classroom for 20-30 minutes. After I have finished videotaping all the periods, I will spend one afternoon if your child’s/guardian’s classroom observing the participants behaviour.

Video tapes will be taken of your child/guardian with your permission.
Inconvenience

Participation in this study may cause some inconvenience to your child/guardian in the form of me and the camera being present in the room. Before I start the observations in your child/guardians classroom, I will come to introduce myself and spend some time with the class so that I become familiar. I also plan to leave the camera in your child’s/guardian’s classroom for a week (it will be left off and will not record any information) to allow the classroom to become more familiar with it being there.

Risks

There are no known or anticipated risks to your child/guardian by participating in this research.

Benefits

The potential benefits of your child’s/guardian’s participation in this research study is helping to identify the different ways children with autism communicate. This will allow for a better understanding of the different communication patterns, forms and, functions of children diagnosed with autism and who are non-verbal. This may lead to more appropriate educational lessons being conducted in a format which the student may be able to respond accordingly, and social skills and cues for interacting with peers.

Benefits to the state of knowledge include leading to more appropriate educational lessons being conducted in a format in which individuals with autism may understand and respond to more effectively. Also, this research study aims to fill a gap in the research of children with autism who communicate non-verbally.

Voluntary Participation

Your child’s/guardian’s participation in this research must be completely voluntary. If you do decide not to let your child/guardian participate, the video camera will be stopped when they enter the cameras view. You may withdraw your consent at any time without any consequences or any explanation. If you do withdraw from the study any scenes in which your child appears will not be used for analysis.

On-going Consent

To make sure that you agree that your child/guardian continues to consent to participate in this research, a letter with the upcoming dates for observation will be sent home. Your signature is required on these forms to ensure that you still consent to your child’s/guardians participation.
Anonymity

In terms of protecting your child’s anonymity when examining and writing the results for the study, the classroom students will be coded using numbers (S1, S2, S3, etc.). As well, any identifying characteristics or features that would identify your child/guardian will be omitted.

Confidentiality

The confidentiality of your child/guardian will be protected by the researcher (Melissa Ray) being the only individual who will be able to view the videotapes.

The confidentiality of the data will be protected by the videotapes and all hard copy data (consent forms and notes) being kept in a locked file cabinet within the home of the researcher. All electronic data will be kept on the researchers password protected home computer, in password protected files. The principle investigator will be the only individual who has access to the files. All data related to this study, including the videotapes will be kept for 3 years after the completion of the study.

Dissemination of Results

It is anticipated that the results of this study will be shared with others in the following ways by being part of Melissa Ray’s thesis defense. During the defense no images or any information regarding the identity of your child/guardian will be shared.

Disposal of Data

Data from this study will be disposed of by using a combination of using the Blue Pencil: Mobile Shredding Service. This is a secure shredding company located in Ontario, Canada to destroy videotapes and all hard data, such as records, results and consent forms. All electronic files will be permanently deleted from the researcher’s computer. The computer’s hard drive will also be re-formatted to ensure that all data is wiped from the computer.

Contacts

Individuals that may be contacted regarding this study include:

Melissa Ray – Researcher Daniel Scott - Supervisor

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria.

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

Participant or parent/guardian to provide initials:
• Videos may be taken of my child for: Analysis ______

____________________  ____________________  ____________
Name of Participant    Signature          Date

A copy of this consent will be left with you, and a copy will be taken by the researcher.
Appendix G

Classroom Professional Consent Form

Communication Exchanges

You are invited to participate in a study entitled Communication Exchanges that is being conducted by Melissa Ray.

Melissa Ray is a graduate student with the University of Victoria in the Department of Child and Youth Care and you may me if you have further questions by email.

As a graduate student, I am required to conduct research as part of the requirements for a master’s degree in arts. It is being conducted under the supervision of Dr. Daniel Scott.

Purpose and Objectives

The purpose of this research project is to observe children with the diagnosis of autism who communicate non-verbally in self-contained classrooms, and examine their different communicative forms and functions. Also, I want to examine how the communicative forms and functions differ when communicating with peers and professionals.

Importance of this Research

Research of this type is important because it focuses on the communicative strengths of children who communicate in other forms other than verbally.

Participants Selection

A child in your class is being asked to participate in this study because of their diagnosis of autism, as well as their communication resources. The selection process involved working with an employee with the Halton District School Board, and identifying schools where potential participants were members. Melissa Ray met with your school principal, and together agreed to have the research project take place at school.

What is involved

If you agree to let your image be recorded for this research, your participation will include Melissa Ray (myself) videotaping the participant in your classroom during a series of periods agreed upon by me and the homeroom teacher. The classroom routine will not be in any way and the participant will remain in the classroom during these videotaping periods. There will be 3-4 different periods of time where I will come in to the classroom and record the participant for 20-30 minutes. After I have finished videotaping all the periods, I will spend one afternoon observing the participant communication techniques without recording them.
Video tapes will be taken of you with your permission

**Inconvenience**

Participation in this study may cause some inconvenience to you by having the camera present in the room. Before I start observations I will come into their classroom to introduce myself and spend some time with the class to become more familiar. I also plan to leave the camera in the classroom for a week (it will be left off and will not record any information) to allow the class to become more familiar with the camera being there.

**Risks**

There are no known or anticipated risks to you by participating in this research.

**Benefits**

The potential benefits of your participation in this research include identifying their communicative strengths, and sharing these strengths with a variety of professionals including special education teachers. This will allow for a better understanding of the different communication patterns, forms and, functions of children diagnosed with autism and who are non-verbal. This may lead to more appropriate educational lessons being conducted in a format which the student may be able to respond accordingly.

Benefits to the state of knowledge include leading to more appropriate educational lessons being conducted in a format in which individuals with autism may understand and respond to more effectively. Also, this research study aims to fill a gap in the research of children with autism who also communicate non-verbally.

**Voluntary Participation**

Your participation in this research must be completely voluntary. If you do decide to participate, you may withdraw at any time without any consequences or any explanation. If you do withdraw from the study your data will not be used for further analysis and will be destroyed immediately.

**On-going Consent**

To make sure that you agree that you continue to consent to participate in this research, a letter with the upcoming dates for observation given to you or placed in your mailbox. Your signature is required on these forms to ensure that you still consent to your child’s/guardians participation.

**Anonymity**

In terms of protecting your anonymity when examining and writing the results for the study, if to be identified it will be through a code using numbers (T1, T2, T3, etc.). As well, any identifying characteristics or features that would identify your child/guardian will be omitted.
Confidentiality

The confidentiality of you will be protected by the researcher (Melissa Ray) being the only individual who will be able to view the videotapes.

The confidentiality of the data will be protected by the videotapes and all hard copy data (consent forms and notes) being kept in a locked file cabinet within the home of the researcher. All electronic data will be kept on the researchers password protected home computer, in password protected files. The principle investigator will be the only individual who has access to the files. All data related to this study, including the videotapes will be kept for 3 years after the completion of the study.

Dissemination of Results

It is anticipated that the results of this study will be shared with others in the following ways by being part of Melissa Ray’s thesis defense. During the defense no images or any information regarding the identity of your child/guardian will be shared.

Disposal of Data

Data from this study will be disposed of by using a combination of using the Blue Pencil: Mobile Shredding Service. This is a secure shredding company located in Ontario, Canada to destroy videotapes and all hard data, such as records, results and consent forms. All electronic files will be permanently deleted from the researcher’s computer. The computer’s hard drive will also be re-formatted to ensure that all data is wiped from the computer.

Contacts

Individuals that may be contacted regarding this study include:

Melissa Ray – Researcher Daniel Scott - Supervisor

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria.

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

Participant or parent/guardian to provide initials:

- Videos may be taken of me for: Analysis _______
<table>
<thead>
<tr>
<th>Name of Participant</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>

*A copy of this consent will be left with you, and a copy will be taken by the researcher.*
Appendix H

Operational Definition of the M-COSMIC tool (Clifford et al., 2010)

Definitions of M-COSMIC codes

<table>
<thead>
<tr>
<th>Form</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture/Symbol/Sign/Makaton</td>
<td>The form of an interaction should be coded as picture/symbol if it involves the child giving or pointing to a symbol, picture, photograph, object of reference or other symbolic representation of an object, food item or activity</td>
</tr>
</tbody>
</table>
| Speech                | - Single words, short phrases and whole sentences should be coded as a single bout of speech. Ascribe relevant codes for single words; two-word phrases; and three word + phrases.  
                      | - Repetition of a sentence in short succession (for emphasis) should be coded as ONE bout of speech. E.g., ‘It’s a big red caterpillar, a big caterpillar’.  
                      | - Speech must be used with some apparent communicative intent  
                      | - Speech may include word approximations and speech of poor intelligibility as long as there is sufficient contextual information to identify what the child is saying (e.g. ‘ba’ while holding a ball) |
| Vocalisation          | Sounds that do not appear to have a speech-like quality, but that are being produced for apparently communicative purposes, should be coded as vocalisation. This may include crying, moaning or wailing, or laughing, if used with some apparent communicative intent |
| Gesture/Pointing      | This code includes head nodding and shaking, pointing, descriptive, demonstrative or instrumental gestures |
| Action                | This code covers a range of behaviours, including sitting down, reaching, walking, putting a toy in a box, etc  
                      | - Only code an action if it is part of communication (must always involve a partner).  
                      | - Actions can involve a response to a partner also (e.g., walking away, hitting out).  
                      | - Any manipulation of symbols, pictures or photographs should be coded as picture/symbol |
| Eye contact           | - Child makes eye contact with another  
                      | - May be in response to another saying/doing something |
| Gaze switch           | Child alternates gaze between object and person to establish social attention coordination. This must be a 3-point shift (in quick succession): object-person-object; or person-object-person. |
| Looks to target (follows point or gaze by shifting attention) | - The child looks to where another is pointing/looking.  
                      | - This form is always coded as a response behaviour |
| Show or Give          | The child deliberately hands an object to a person or orients the object where it can be seen (for the purposes of sharing interest OR getting help, coded as a function) |

Function

Behaviour regulation

| Request for object/action/help | Use this code for any communicative act where an object, toy, help with a toy etc., is requested, whether this is spontaneously initiated by the child or prompted by an adult  
<pre><code>                            | In cases where a request has been made, and the communication partner asks for a repeat or rehearsal of the request, do not assign this code for subsequent |
</code></pre>
<table>
<thead>
<tr>
<th>Social interaction (dyadic)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Request for social routine</strong></td>
<td>This code is used when the child makes a request for a game or activity that is clearly social or interpersonal in nature – such as tickling, hugging or other informal social routines. Also use this code when the child is attempting to have the interaction continue (e.g., requests to be tickled a second and third time). This code may be used when the request is for a formal game or activity, for example, but not where the child is simply requesting that the adult facilitates an activity that will not involve them, such as switching the computer on, or reaching a toy that is on a high shelf.</td>
</tr>
<tr>
<td><strong>Showing off/ Directing attention to self</strong></td>
<td>Acts used to attract another's attention to oneself. Seeking attention or calling someone for play, love attention (Dore, 1977) e.g., &quot;Hey; 'watch' to direct adult's attention; 'can I___?'”</td>
</tr>
<tr>
<td><strong>Acknowledgement</strong></td>
<td>Acts/verbal acts used to indicate notice of another person's previous statement or action; involves the child's focusing attention on or shifting attention to the interactant. Yes/ Yep/ No/OK/mmhhmm/ thanks responses to questions or utterances (e.g., 'Is this yours; Do you want to?') ‘Done it’; ‘Excuse me’; (if trying to get attention drawn to self and not object); sing song for attention to self</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Joint attention (triadic)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comment</strong></td>
<td>Comment is coded when a child verbally or nonverbally refers to an event, object or action in order to share attention with a partner. This may include pointing out, or a verbal description of, a picture, object or event in order to direct another's attention to that object, event or topic.</td>
</tr>
<tr>
<td><strong>Request information</strong></td>
<td>Acts used to seek information, explanations or clarifications about an entity, event or previous utterance; includes wh-questions and other utterances with a rising intonation contour. It may also include requesting information or clarification. However, if a child is clearly making a request for the object in question, albeit indirectly, code as a request for object.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role</th>
<th></th>
</tr>
</thead>
</table>
| **Initiation** | Code initiation when the child spontaneously initiates an interaction. Initiation should not be coded when the communication partner clearly prompts the interaction verbally, physically, or otherwise. Also code initiation when the child’s response is a clear elaboration, contradiction or correction to the communication partner – e.g. The adult says, “There’s your coat” and the child responds, “That’s not my coat; this is my
| Response                      | Code response when a child responds to an instruction, prompt, question, suggestion, or action (e.g. the child sits after being told to “sit down”) of another.  
|                              | This code should be used even if the content of the child’s response is incorrect (e.g., during a puzzle the teacher instructs the child to find the blue piece, but the child picks the red piece); or non-complaint (e.g., child says ‘No’ and slumps in chair) |
| Non-interactive/ No response | Non-interactive is used when the child responds to an approach by withdrawing, avoiding further interaction, or responding in a non-meaningful or stereotyped manner  
|                              | This code may also be used to classify an approach by the child that is clearly not interpersonal, where for example they are attempting to take something from another person without looking at them or otherwise interacting with them; or where the child uses another’s body as a tool to request something (code: Q,N,A)  
|                              | Non-interactive speech/vocalization is also used to classify examples of immediate echolalia, and should be paired with a code of speech.  
|                              | No response. This is used when the child does not respond in any way to a request, approach or prompt |
Appendix I

*M-COSMIC Observational Form* (Clifford et al., 2010)

Classroom Observation Record Form

Child Study Number: ____  Observation/visit: _________
Observer: ____________ Date: ______________

<table>
<thead>
<tr>
<th>Communicative Function</th>
<th>Role</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behaviour Regulation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q – Request object, action</td>
<td>I – initiation</td>
<td>Speech</td>
</tr>
<tr>
<td>T – refusal/protest</td>
<td>R – response</td>
<td>V – vocalisation</td>
</tr>
<tr>
<td>C – compliance</td>
<td>N – non-interactive, no</td>
<td>S – single words</td>
</tr>
<tr>
<td></td>
<td>response</td>
<td>SS – two word phrase</td>
</tr>
<tr>
<td><strong>Dyadic Social Interaction</strong></td>
<td></td>
<td>SSS – three word + phrase</td>
</tr>
<tr>
<td>RS – request social routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO – showing off/attention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AK – acknowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Joint Attention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J – comment/shared attention</td>
<td>I – initiation</td>
<td></td>
</tr>
<tr>
<td>RI – request information,</td>
<td>R – response</td>
<td></td>
</tr>
<tr>
<td>clarification</td>
<td>N – non-interactive, no</td>
<td></td>
</tr>
<tr>
<td></td>
<td>response</td>
<td></td>
</tr>
</tbody>
</table>

Context (N.B. record onset/offset times)  Communication Partner

| T – group teaching/table activity | 1 – teacher |
| F – free play/unstructured       | 2 – Educational assistant |
| B – one to one teaching          | 3 – researcher |
|                                  | 4 – other child |
|                                  | 5 - group |

<p>| Communication Partner | P – picture/symbol/sign/makaton |
|                       | X – gesture/pointing            |
|                       | A – Action                      |
|                       | E – eye gaze                    |
|                       | G – gaze switch                 |
|                       | L – looks to target             |
|                       | SG – show/give                  |</p>
<table>
<thead>
<tr>
<th>Context</th>
<th>Partner</th>
<th>Function</th>
<th>Role</th>
<th>Form (I)</th>
<th>Form (II)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
## Appendix J

### Combination of Communicative Forms

#### Combination of two forms – Vocalization

<table>
<thead>
<tr>
<th>Form</th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocalization and gesture/pointing</td>
<td>2%</td>
<td>7%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vocalization and action</td>
<td>0</td>
<td>4%</td>
<td>6%</td>
<td>7%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Vocalization and eye contact</td>
<td>1%</td>
<td>8%</td>
<td>2%</td>
<td>0</td>
<td>0.8%</td>
</tr>
<tr>
<td>Vocalizations, eye contact and gesture</td>
<td>0.7%</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>0.8%</td>
</tr>
<tr>
<td>Vocalizations, eye contact and action</td>
<td>0</td>
<td>2%</td>
<td>0.8%</td>
<td>0</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

#### Combination of two forms – Single Word Speech

<table>
<thead>
<tr>
<th>Form</th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single word speech and gesture/pointing</td>
<td>0.3%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Single word speech and action</td>
<td>0</td>
<td>3%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Single word speech and eye contact</td>
<td>0.7%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Single word speech, eye contact and gesture</td>
<td>0</td>
<td>0.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Combination of two forms – Two Worded Speech

<table>
<thead>
<tr>
<th>Form</th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two worded speech and gesture</td>
<td>1%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Two worded speech and action</td>
<td>1%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Two worded speech and eye contact</td>
<td>9%</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Two worded speech and look at target</td>
<td>1%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Two worded speech, gesture, and eye contact</td>
<td>5%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Combination of two forms – Three Worded Speech

<table>
<thead>
<tr>
<th>Form</th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triple word speech and eye contact</td>
<td>12%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Combination two forms – PECS

<table>
<thead>
<tr>
<th>Form</th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture/Symbol/Sign/Technology and gesture/pointing</td>
<td>0.4%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Picture/Symbol/Sign/Technology and action</td>
<td>0.4%</td>
<td>0.7%</td>
<td>0</td>
<td>8%</td>
<td>0</td>
</tr>
<tr>
<td>Picture/Symbol/Sign/Technology and eye contact</td>
<td>0</td>
<td>0</td>
<td>2%</td>
<td>2%</td>
<td>0</td>
</tr>
</tbody>
</table>
**Combination of two forms – Gesture/Pointing**

<table>
<thead>
<tr>
<th>Form</th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gesture/Pointing and eye contact</td>
<td>0.7%</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gesture/Pointing and gaze switch</td>
<td>0.7%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Combination of two forms – Action**

<table>
<thead>
<tr>
<th>Form</th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action and eye contact</td>
<td>0.7%</td>
<td>4%</td>
<td>7%</td>
<td>6%</td>
<td>3%</td>
</tr>
</tbody>
</table>

**Combination of two forms – Eye Contact**

<table>
<thead>
<tr>
<th>Form</th>
<th>P1</th>
<th>P2</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Contact and look to target</td>
<td>0</td>
<td>0</td>
<td>0.8%</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>