UNIVERSITY OF SYDNEY

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Mind and Autism Spectrum Disorders: A Theory-of-Mind Continuum Model and Typology Developed from Theory-of-Mind as Subjectively Experienced and Objectively Understood

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AUTHOR'S DECLARATION

This is to certify that:

I. this thesis comprises only my original work towards the degree of Doctor of Philosophy;

II. due acknowledgement has been made in the text to all other material used;

III. the thesis does not exceed the word length for this degree;

IV. no part of this work has been used for the award of another degree;

V. this thesis meets the *University of Sydney's Human Research Ethics Committee (HREC) requirements for the conduct of research.*

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LIST OF ACRONYMS

ABC	Autism Behaviour Checklist
ADHD	Attention Deficit Hyperactivity Disorder
ADI-R	Autism Diagnostic Interview-Revised
ADOS	Autism Diagnostic Observation Schedule
ASD	Autism Spectrum Disorders
ASQ	Autism Screening Questionnaire
AT	Associational Thinking
BPVT	British Picture Vocabulary Test
CA	Chronological Age
CARS	Childhood Autism Rating Scale
CELF-R	Clinical Evaluation of Language Fundamentals-Revised
CHAT	Checklist for Autism in Toddlers
DAS	Differential Abilities Scales
DSM IV	Diagnostic and Statistical Manual of Mental Disorders IV
DSM IV TR	Diagnostic and Statistical Manual of Mental Disorders IV Text Revision
EO	Empathy of Other
ES	Empathy of Self
FBOC	False Belief of Other with a changed Contents task
FBOL	False Belief of Other with a changed Location task
FBSC	False Belief of Self with a changed Contents task
HBS	Handicaps and Behaviour Schedule
HREC	Human Research Ethics Committee
ICD 10	International Classification of Diseases 10
IEP	Individualised Educational Programs
IQ	Intelligence Quotient
ITP	Individualised Transition Programs
K-WAIS	Korean Wechsler Adult Intelligence Scale
KCARS	Korean Childhood Autism Rating Scale
KEDI-WISC	Korean Education Developmental Institute Wechsler Intelligence Scale for Children-Revised
KVSMS	Korean Vineland Social Maturity Scale

LIPS	Leiter International Performance Scale
NVMA	Non Verbal Mental Age
PDD-NOS	Pervasive Developmental Disorders Not Otherwise Specified
PL-ADOS	Pre-Linguistic Autism Diagnostic Observation Schedule
PPVT	Peabody Picture Vocabulary Test
SA	Social Age
SBRS	Social Behaviour Rating Scale
SPSS	Social Performance Survey Schedule
TROG	Test of Reception of Grammar
VABS	Vineland Adaptive Behaviour Scale
VIQ	Verbal Intelligence Quotient
VMA	Verbal Mental Age
VPOE	Visual Perception of Other with an Elephant task
VPOMK	Visual Perception of Other with a Muffin and Kettle task
VPSER	Visual Perception of Self with an Elephant task, Right side up
VPSEU	Visual Perception of Self with an Elephant task, Upside down
VSMS	Vineland Social Maturity Scale
WAIS	Wechsler Adult Intelligence Scale
WISC-III	Wechsler Intelligence Scale for Children-III
WISC-R	Wechsler Intelligence Scale for Children-Revised

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ABSTRACT

This study defines Theory-of-Mind as the ability to experience one's own mind and understand the minds of others to the extent necessary to make sense of human behaviour and the world. Since the concept of Theory-of-Mind was first applied to people with ASD (Baron-Cohen, Leslie & Frith, 1985), lack of Theory-of-Mind has been used to explain their cognitive difficulties (National Research Council, 2003), along with social, communicative and imaginative impairments (Frith, Happé & Siddons, 1994).

Previous studies have tended to think of Theory-of-Mind in terms of a simple binary of deficit or credit; to exclude the voices of people with ASD; to emphasise the cognitive aspects of Theory-of-Mind over its affective aspects; and to emphasise understanding the minds of others over experiencing one's own mind.

This study aims to address these issues by investigating Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers. It is the first attempt in the study of Theory-of-Mind to include the voices of individuals with ASD along with the professional views of their teachers.

This study takes an interdisciplinary approach, supported by philosophy of mind and special education. A grounded theory approach and a mixed methods research design combine to build and strengthen a theory of Theory-of-Mind.

For Theory-of-Mind as subjectively experienced, 20 senior secondary and post secondary school students with ASD from Republic of Korea were interviewed and student-produced documents were reviewed to draw out their inner experiences. The Korean Wechsler Adult Intelligence Scale and the Korean Vineland Social Maturity Scale were employed to assess IQ and social competence.

For Theory-of-Mind as objectively understood, their teachers' beliefs regarding their students with ASD were sought through in-depth interviews, a review of teacher-produced documents and administration of a newly developed Teacher Questionnaire.

This study reports differences between Theory-of-Mind as subjectively experienced and objectively observed, and variations within the components of Theory-of-Mind. The role of imagination in Theory-of-Mind and the relationships between Theory-of-Mind components, IQ and social competence are discussed. As a result, a Theory-of-Mind continuum model and Theory-of-Mind Typology is proposed.

CHAPTER 1
INTRODUCTION

The term 'Autism Spectrum Disorders' (ASD) refers to a cluster of developmental disorders that present from birth or very early in development, with usually life-long effects on essential human behaviours such as social interaction, communication, imagination, and relationships with others (National Research Council, 2003). ASD has been characterised as a spectrum of difficulties in these areas that vary in combination and severity, between and within individuals (Charman, 2002).

While it is debatable whether the prevalence rates of ASD are actually growing (Baird et al., 2006; Charman, 2002) or, because of factors such as changes in diagnostic criteria and increasing awareness and recognition (Wing & Potter, 2002), merely appear to be growing, significant prevalence rates are reported by a number of studies. For example, the Australian Advisory Board on Autism Spectrum Disorders reported an estimated prevalence rate for ASD across Australia, based on the Commonwealth government's Centrelink data, of 62.5 per 10,000 for 6 to 12-year-old children (MacDermott, Williams, Ridley, Glasson & Wray, 2007).

Similar prevalence rates have been found in other studies. Charman (2002) reviewed three recent prevalence studies and suggested an average prevalence rate of 60 per 10,000 for children under 10 years old. Wing and Potter (2002) reviewed 39 prevalence studies conducted internationally and reported prevalence rates of 60 per 10,000 for autism and higher rates for the broader spectrum. A prevalence rate of 62.5 per 10,000 indicates there is an average of one child with ASD for every 160 children between 6 and 12 years (MacDermott et al., 2007).

More significantly, ASD, like other disabilities, has considerable social impact, especially on family and education. MacDermott et al. (2007) point out that, with a prevalence rate of 62.5 per 10,000, ASD affects families containing half a million Australians. The families of individuals with ASD experience demands in a variety of family life contexts, including the needs of parents, both as individuals and as a couple (National Research Council, 2003), and of siblings. Family issues also affect the education of individuals with ASD. Family participation, especially maternal involvement, is widely accepted to be part of best practice in the education of individuals with ASD (Benson,

Karlof & Siperstein, 2008), but the education of an individual with ASD can be a source of significant stress for families (Harris, 1994).

Education is extremely important for individuals with ASD, and research continues on developing educational goals appropriate for them with the aim of promoting personal independence and social responsibility (National Research Council, 2003). Educational interventions have been characterised by active engagement in intensive instructional programs accompanied by ongoing measurements of progress toward educational objectives (National Research Council, 2003).

These interventions have also been characterised by a lack of interest in investigating the inner worlds of individuals with ASD. However, it is also important to know the way these individuals are thinking and feeling (Jordan, 1999). Investigation of the subjective experiences of individuals with ASD has the potential to make educational interventions more effective by treating them as independent entities. It allows for a more thorough mediation between learners' inner world of personal experience and the public world of social knowledge within which they function (Pring, 2000).

The issue of understanding the inner worlds of individuals with ASD raises questions about how to go about studying this. One approach is through the study of Theory-of-Mind, first defined in the field of psychology as the ability to impute mental states, such as attention, intention, desire, emotion, perception and belief, to the self and others so as to make sense of human behaviour (Premack & Woodruff, 1978).

Internally, Theory-of-Mind concerns a person's capacity to form and use mental representations in order to create and sustain a sense of oneself and one's world. Externally, a person's Theory-of-Mind is indicated by their activities within the world of social connections, and so is intimately connected to everyday social interactions (Hughes & Leekam, 2004).

Actions within the external world arise from both beliefs, the cognitive nature of Theory-of-Mind, and desires, its affective nature (Astington & Barriault, 2001; Wellman, Cross & Watson, 2001). Theory-of-Mind can therefore be seen to be internal and external, cognitive and affective, in its nature. Because of this all-encompassing nature, Theory-of-Mind has been referred to in a variety of ways, for example, as common sense (Astington & Barriault, 2001) and everyday folk psychology (Al-Hilawani, Easterbrooks & Marchant, 2002).

Theory-of-Mind studies have tended to regard the major factor in Theory-of-Mind difficulties to be impaired abilities in representing mental states (Loth, Gømez & Happé, 2008), in oneself and others. They have relied predominantly on the use of false belief tasks as a means of examining and testing these mental representation capabilities (Liu, Wellman, Tardif & Sabbagh, 2008). One popular false belief task, for example, is the 'Sally and Anne' story (Baron-Cohen, Leslie & Frith, 1985, p. 41).

Sally and Anne are two doll protagonists who together put a marble into a basket which Anne then transfers to a box in Sally's absence, to hide it from her. Individuals with ASD who could tell where Sally would look for the marble were credited with Theory-of-Mind, while those who could not were regarded as demonstrating a Theory-of-Mind 'deficit' (Baron-Cohen, Leslie & Frith, 1985, p. 44). The ability to represent the thought of another, in this case Sally's, thus became the marker of the presence or absence of Theory-of-Mind (Tager-Flusberg, 2001). In these tasks people with ASD have demonstrated severe difficulties in representing the thought of another, and have therefore been regarded as lacking Theory-of-Mind.

This way of understanding Theory-of-Mind in individuals with ASD has come to be called the specific deficit approach (e.g., Baron-Cohen et al., 1985; Perner, Frith, Leslie & Leekam, 1989). Based on this approach, and looking at the relationships between Theory-of-Mind and IQ (e.g., Happé, 1995) on the one hand and Theory-of-Mind and social competence (e.g., Frith, Happé & Siddons, 1994) on the other, Theory-of-Mind has became arguably the most influential theory in explaining the cognitive difficulties, behavioural symptoms (Jarrold, Butler, Cottington & Jimenez, 2000) and social difficulties (Frith & Happé, 1999) of people with ASD.

However, a number of recent studies have criticised the underlying assumptions guiding the specific deficit approach to the study of Theory-of-Mind, and in particular the emphasis on false belief (e.g., Astington, 2001; Tager-Flusberg, 2001), where a single task becomes the marker for a complex mental phenomenon. Recent studies (e.g., Begeer, Rieffe, Terwogt & Stockmann, 2003; Hutchins, Bonazinga, Prelock & Taylor, 2008) have questioned whether the results of false belief tests may be influenced by various factors that might impede the performance of participants with ASD, including their motivation and the administration of false belief tasks by people unfamiliar to them. These factors would cast doubt on the reliability of Theory-of-Mind studies reliant solely on performance

in false belief tasks. The specific deficit approach to Theory-of-Mind has also been challenged by the results of a recent study that has shown that adults *without* ASD also have difficulty performing false belief tasks (Apperly, Back, Samson & France, 2008).

Factors other than false belief also have implications for Theory-of-Mind. Hobson and Meyer (2005) argued that a major problem for individuals with ASD is limited interpersonal relatedness, and this is a problem of affect rather than of cognition. This problem has gone unrecognised in the majority of Theory-of-Mind studies because of the emphasis on the cognitive deficit revealed by false belief tasks. Another suggestion is that a major difficulty experienced by individuals with ASD regarding their Theory-of-Mind lies in their capacity to understand how experience changes between individuals. Reading narratives involving relationships between a number of protagonists, for example, people with ASD can have difficulty in shifting psychological perspectives and understanding how the world appears to different people. This aspect of Theory-of-Mind has also been underestimated because of the focus on cognitive deficit (García-Pérez, Hobson & Lee, 2008).

Another issue in studies of Theory-of-Mind concerns the mutuality of the relationship between an ability to understand one's own mind and the minds of others. Frith and Happé (1999) have pointed to studies which demonstrate a close relationship between the ability to report mental states in others and the ability to report the same mental states in oneself (e.g., Gopnik & Meltzoff, 1994), suggesting that if one ability is lacking, the other may be taken to be lacking.

However, perhaps the most fundamental problem regarding Theory-of-Mind studies in general, and the role of false belief tasks in particular, is that despite being concerned with invisible mental states such as thinking and feeling they do not include the subjective experiences of their participants. The phenomenological study of the minds of people with ASD has been lacking. Indeed, people with ASD have made little contribution to the study of ASD as they have rarely been considered to be capable of offering insights into their own condition (Cesaroni & Garber, 1991). This lack of curiosity about the actual experience of people with ASD and the absence of input from them has been criticised by Bovee (2000), an adult with ASD. He, for example, questioned the common assumption that people without ASD can have insight into the minds of people with ASD, but the converse is not true.

These criticisms of Theory-of-Mind studies raise four fundamental questions: (1) Is false belief equivalent to Theory-of-Mind?; (2) Is Theory-of-Mind limited to a theory of the minds of others?; (3) Do Theory-of-Mind tests reflect the inner experience of participants' Theory-of-Mind?; and (4) Is the specific deficit approach to evaluating Theory-of-Mind sufficient to understand Theory-of-Mind of people with ASD?

Addressing these questions requires a new approach to the study of the Theory-of-Mind of people with ASD. This new approach needs to be open to the role of a variety of mental states other than false belief. It needs to include the voices of people with ASD, rather than simply make assumptions about their inner experiences from outside. Lastly, it needs to investigate the nature of the Theory-of-Mind of people with ASD by focusing on how they experience their own minds and understand those of others rather than on the simple presence or absence of false belief understanding.

This study therefore aims to investigate Theory-of-Mind as subjectively experienced by students with ASD and as objectively understood by their teachers. This investigative journey will be guided by five research questions. The first three questions concern the subjective experiences of students with ASD. They are:

1. How do students with ASD experience their own minds and internal worlds?
2. How do students with ASD understand the minds of others and the external world?
3. How is the experience of one's own mind and internal world connected to the understanding of the minds of others and the external world?

The final two research questions concern the objective understanding held by teachers regarding the Theory-of-Mind of their students with ASD, and the comparison of this understanding with the subjective experience of Theory-of-Mind undergone by their students. They are:

4. How do teachers construe the Theory-of-Mind understanding of their students with ASD?
5. What are the similarities and differences between teachers' understanding of the Theory-of-Mind of their students with ASD and the subjective experiences of Theory-of-Mind held by students with ASD?

As this study is the first attempt to examine both the inner experiences of individuals with ASD and the understanding of them held by special education teachers it requires careful

methodological and philosophical reflection. The educational implications of this study will emerge from the comparison between Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers. All this requires an interdisciplinary approach towards the study of the mind.

This investigation has been divided into two studies. Study 1 concerns the subjective experiences of Theory-of-Mind of 20 senior secondary and post secondary school students with ASD (CA 15:4-19:11) from Republic of Korea. This was sought through in-depth interviews and document review. Study 2 concerns the objective understanding of their students' Theory-of-Mind held by 11 teachers of these 20 students with ASD. This was sought through in-depth interviews, document review and a newly developed teacher questionnaire.

As shown in Figure 1.1, Chapter 1 *Introduction* initiates this thesis by defining ASD and Theory-of-Mind and presenting a brief discussion on the contributions of Theory-of-Mind studies to the field of ASD, along with problems in their assumptions and methods.

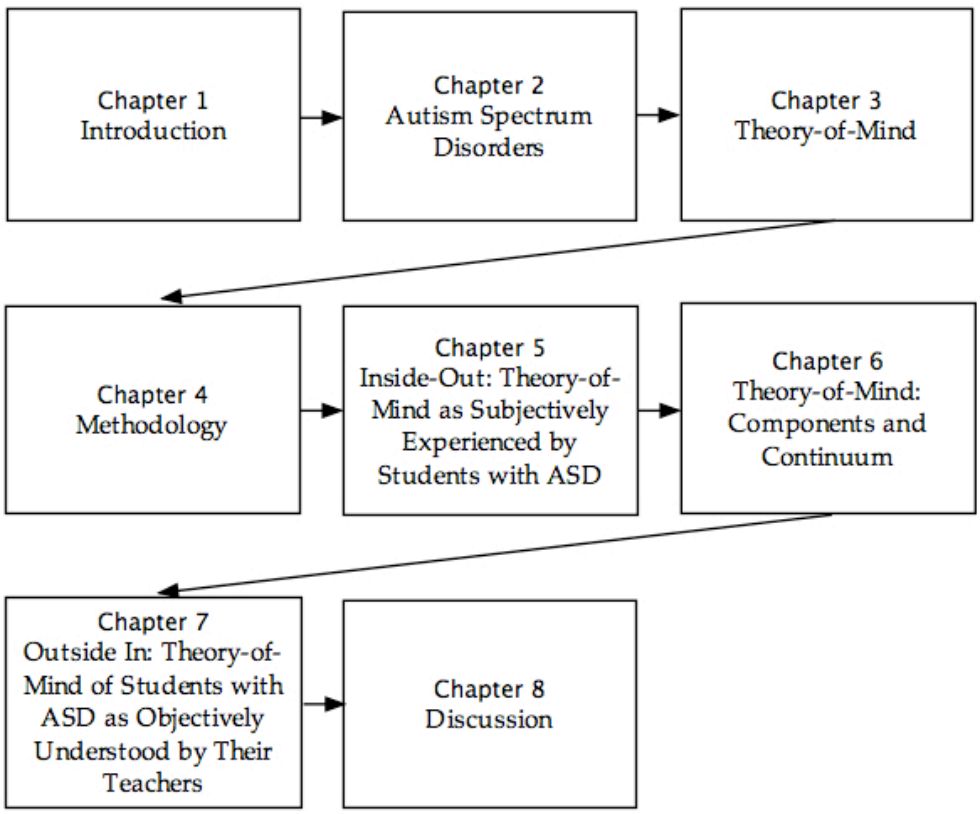


Figure 1.1 **Structure of the thesis**

Chapter 2 *Autism Spectrum Disorders* provides a short review of studies concerning ASD, including issues of diagnosis, assessment instruments, prevalence and gender ratio, biological and cognitive theories, and intervention programs.

Chapter 3 *Theory-of-Mind* reviews Theory-of-Mind studies, examining the origins and development of Theory-of-Mind research. This review focuses in particular on how the Theory-of-Mind of individuals with ASD has been studied and taught. The field of philosophy of mind is examined to provide guidance in theoretical and methodological issues. This results in an interdisciplinary approach to the study of Theory-of-Mind, drawing from education, psychology and philosophy.

Chapter 4 *Methodology* discusses the theoretical and methodological issues that have shaped this study. An introduction to the theoretical influences on the research design is followed by an explanation of the two methodologies adopted in this study, grounded theory analysis and mixed methods research. Study 1, students' subjective experience of Theory-of-Mind, and Study 2, their teachers' objective understanding of their students' Theory-of-Mind, are both guided by these two methodologies, from planning to data analysis.

In Study 1, *Theory-of-Mind as subjectively experienced*, in-depth interviews and document review were used as qualitative data to build a theory regarding students' subjective experience of Theory-of-Mind, and assessments of IQ and social competence were used as quantitative data to strengthen the theory by analysing the relationships between these subjective experiences and objectively measured cognitive and social abilities.

In Study 2, *Theory-of-Mind as objectively understood*, in-depth interviews, document review and open questions in a questionnaire were used as qualitative data, to build a theory regarding teachers' objective understanding of their students' Theory-of-Mind experiences. Closed questions in a questionnaire provided quantitative data to triangulate the results gained from the qualitative analysis.

Chapter 5 *Inside-Out: Theory-of-Mind as Subjectively Experienced by Students with ASD* describes the findings of Study 1, *Theory-of-Mind as subjectively experienced*, using grounded theory analysis. This chapter examines how students with ASD experience their own minds and internal worlds on the one hand, and the minds of others and the external world on the other.

Chapter 6 *Theory-of-Mind: Components and Continuum* discusses the transformation of qualitative data concerning students' subjective experiences of Theory-of-Mind into quantitative data, in order to investigate the relationships between Theory-of-Mind, IQ and social competence.

Chapter 7 *Outside-In: Theory-of-Mind of Students with ASD as Objectively Understood by Their Teachers* discusses the findings of Study 2, *Theory-of-Mind as objectively understood*. This chapter triangulates teachers' views of their students' Theory-of-Mind through qualitative and quantitative studies. It shows similarities and differences between their understanding and the subjective experiences of their students with ASD. This discussion continues in the final chapter.

Chapter 8 *Discussion* introduces maps displaying the relationships between Theory-of-Mind components on the one hand and between Theory-of-Mind components and IQ and social competence on the other. It also introduces a Theory-of-Mind continuum model focused on Theory-of-Mind as subjectively experienced by individuals with ASD. A Theory-of-Mind typology is introduced, providing a broad picture of Theory-of-Mind as subjectively experienced and objectively understood.

CHAPTER 2
AUTISM SPECTRUM DISORDERS

2.1 Introduction

This chapter introduces Autism Spectrum Disorders (ASD) and reviews theories and research about its nature, causes and characteristics. As shown in Figure 2.1, the nature of ASD is examined through the diagnostic criteria used to identify ASD (Section 2.2.1), the assessment instruments employed (Section 2.2.2), and its prevalence and gender ratio (Section 2.2.3). Sections 2.3.1 and 2.3.2 examine the biological and cognitive theories that have sought to explain the origins of ASD. Lastly, Section 2.4 provides a summary of this review and draws conclusion for further study.

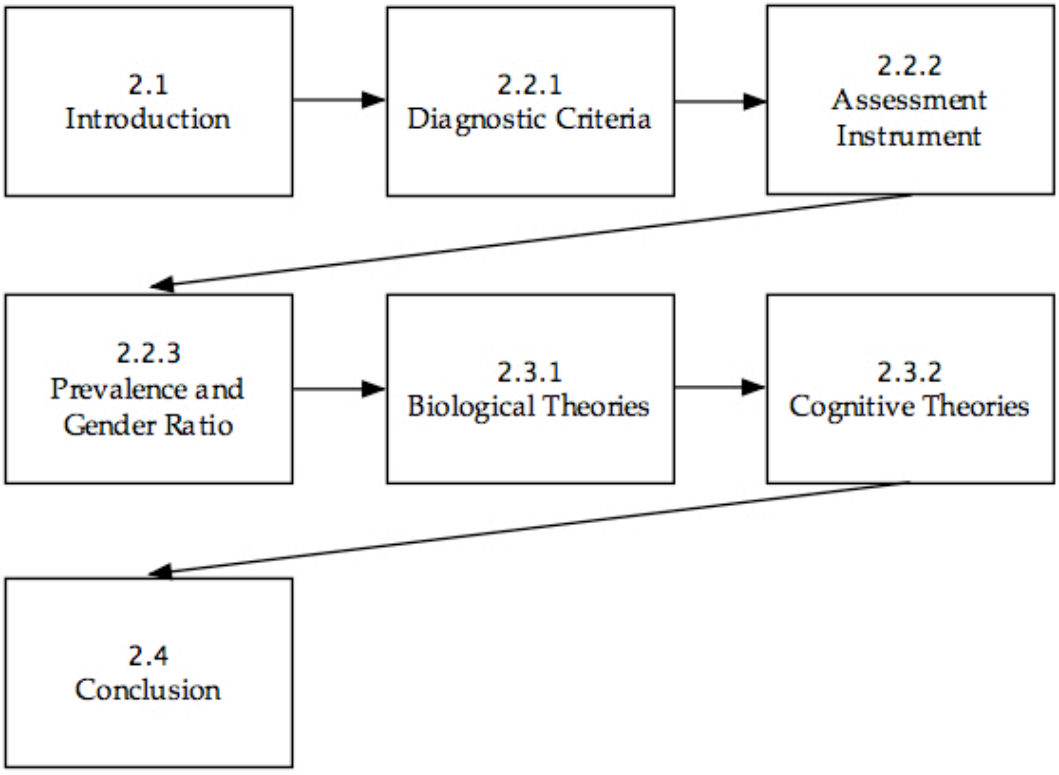


Figure 2.1 **Structure of chapter two**

The term *autism* (from the Greek *autos*, 'self') was used as early as 1910 by the Swiss psychiatrist Eugen Bleuler, who also invented the term *schizophrenia*. For Bleuler, autism referred to a person's withdrawal to a private world of fantasy within which any outside

disturbance becomes intolerable (Kuhn, 2004). In 1911 he introduced the term *autistic thinking*, a mode of thought dominated by free association which he contrasted with logical or realistic thinking (Bleuler, 1951; Harris, 2000).

Bleuler's terminology was borrowed by Leo Kanner (1943) because the withdrawal from the world into the self that he observed among children was similar to the withdrawal that Bleuler associated with autistic thinking (Harris, 2000). At one time considered to be an early form of childhood schizophrenia, autism is now regarded as a developmental disorder (Wolff, 2004). Although at first it was seen as a single entity, it is now seen as a spectrum of related characteristics (Bowler, 2007). As a consequence, it is now called Autism Spectrum Disorders (ASD).

2.2 Diagnosis, Assessment and Prevalence

ASD consists of a range of behavioural characteristics which must be considered in any attempt to define it. While it has been suggested that ASD has a biological base, there is still no biological marker that can explain its characteristics (Jordan, 1999). ASD is instead defined by means of a number of diagnostic criteria through assessment instruments that screen for and/or diagnose ASD for purposes of treatment and education. Examination of both the diagnostic criteria and assessment instruments provides a concrete portrait of the complex characteristics that together make up ASD. The development of the concept of ASD and changes in the diagnostic criteria have, in turn, affected the perceived prevalence of ASD (Wing & Potter, 2002).

2.2.1 Diagnostic Criteria

Kanner and Eisenberg (1956) posited five diagnostic criteria for ASD; a profound lack of affective contact, obsessive desire for sameness, fascination for objects, mutism, and sound intelligence. These criteria need to be apparent from birth, or at least before 30 months. Kanner and Eisenberg (1956) summarised their diagnostic criteria into two fundamental behavioural features, indifference to others and intense resistance to changing repetitive routines (Wing & Potter, 2002).

Wing (1976) criticised the limitations of Kanner's criteria, and argued that diagnostic criteria for ASD should cover more areas of a child's functioning. Reflecting upon this criticism Wing's new diagnostic criteria covered three areas, impairments of

social interaction, impairments of language development including both verbal and nonverbal language, and repetitive stereotyped behaviours (Wing, 1976; Wing & Gould, 1979). Wing also suggested that autistic patterns of behaviour emerge between the ages of two to five years.

Rutter (1978) refined the diagnostic criteria for ASD by focusing on three major characteristics; impaired social development, delayed and deviant language development, and insistence on sameness. He also narrowed the onset period of these characteristics to before the age of 30 months. (For a summary of the above criteria, see Table 2.1.)

Table 2.1 ***ASD Diagnostic Criteria***

Criteria	Kanner & Eisenberg	Wing	Rutter
1	Lack of affective contact	Impairments of social interaction	Impaired social development
2	Obsession with sameness	Impairments of verbal and nonverbal language development	Delayed and deviant language development
3	Fascination for objects	Repetitive stereotyped behaviours	Insistence on sameness
4	Mutism or language lacks inter-personal communication		
5	Sound intelligence		

Wing's (1976) triad and Rutter's (1978) criteria have been further refined in organisational diagnostic systems. The tenth edition of the international classification of diseases (ICD 10, World Health Organisation, 1993) and the DSM family, including IV (1994) and IV TR (2004), define ASD as a triad of restrictions in reciprocal social communication, reciprocal social interaction, and imagination/behaviour (Figure 2.2). DSM IV (1994) and IV TR (2004) classify ASD as a pervasive developmental disorder along with Rett's disorder, childhood disintegrative disorder, Asperger's disorder, and pervasive developmental disorders not otherwise specified (PDD-NOS).

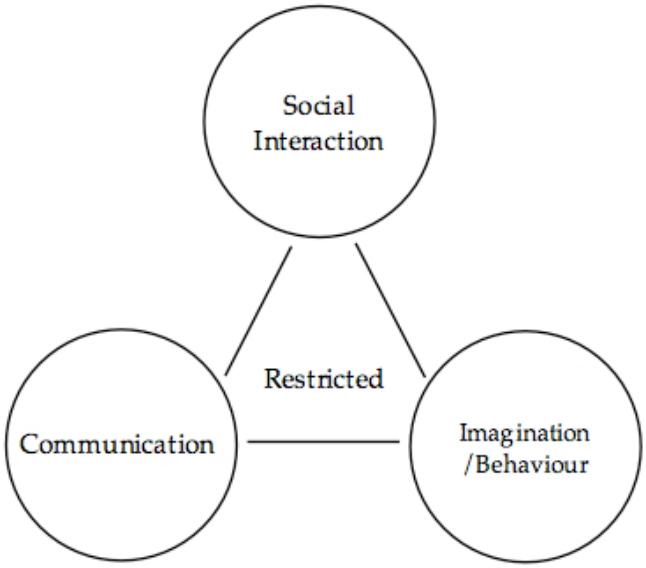


Figure 2.2 **Triad characteristics of ASD**

Table 2.2 shows specific symptoms in the three areas of social interaction, communication and behaviour (adapted from Accardo, 2000). Each area comprises four symptoms. In defining ASD, both diagnostic systems require at least two from the area of social interaction and at least one from that of communication and behaviour, with a total of at least six symptoms from all three areas.

Table 2.2 ***Symptoms of Triad Characteristics of ASD***

Area	**Social Interaction**	**Communication**	**Imagination/Behaviour**
	Qualitative abnormality in the sub-areas		**Demonstrating**
Symptom	Non verbal communication Peer relationships Socio-emotional reciprocity Spontaneous sharing	Spoken language Conversational interchange Use of language Social imaginative play	Stereotyped and restricted behaviour & interest Compulsive adherence to routines Motor mannerisms Preoccupations with play materials

These characteristics of ASD provide the contents of assessment instruments for screening and/or diagnosing individuals with ASD. The assessment instruments are discussed in the following section.

2.2.2 Assessment Instruments

ASD assessment instruments have two purposes, screening and diagnosis. These purposes are generally achieved by using three methods or any combination of them; checklists, interviews, and observation. This section introduces common assessment instruments according to their methods of information gathering, and concludes with a discussion of the nature and limitations of these methods.

The first method is to examine children's behaviour to screen them for the characteristics of ASD. Examples are Checklist for Autism in Toddlers (CHAT) (Baron-Cohen, Allen & Gillberg, 1992; Baron-Cohen et al., 1996) and Autism Behaviour Checklist (ABC) (Krug, Arick & Almond, 1980).

The CHAT is used to screen toddlers from the age of 18 months by assessing pretend play, proto-declarative pointing and gaze monitoring (Baron-Cohen et al., 1992). Tests with over 16,000 children aged 18 months revealed that while CHAT demonstrates very high specificity (98%) to identify the absence of childhood autism, it is not sensitive (sensitivity 38%) to detect its presence (Baird et al., 2000). Moreover, even though the use of CHAT is regarded as a reliable indicator of ASD at 18 months, it needs to be used with the acknowledgement that some children develop normally up to the age of two years, and only then display the characteristics of ASD (Jordan, 1999).

The ABC is a functional screening tool developed for use in the field of education (Krug et al., 1980). It looks at a list of behaviours, including relatedness and body/object use. In addition, weighted scores are used to discriminate between individuals with high levels of autistic behaviour from individuals with other types of disabilities (Krug et al., 1980). The ABC is generally recognised as a sound tool for estimating the degree of autistic symptomatology in an individual (Gillberg, Nordin & Ehlers, 1996).

The second diagnosis method is systematic interview, where questions related to ASD characteristics of the individual subject to diagnosis are directed to principle caregivers, including parents and/or teachers. Examples are Handicaps and Behaviour Schedule (HBS) (Wing & Gould, 1978) and Autism Diagnostic Interview-Revised (ADI-R) (Lord, Rutter & Couteur, 1994). The HBS is a semi-structured interview schedule which provides a detailed investigation of a child's development since infancy until current function (Wing & Gould, 1978). The HBS has been praised for its flexibility, as it can be

used to validly assess a wide range of impairments in both adults and children (Gillberg et al., 1996).

The ADI-R is another ASD diagnostic tool based on systematic interviews. It is a semi-structured, investigator-based interview for caregivers of individuals linked to ICD-10 and DSM IV criteria (Lord et al., 1994). It seeks information on reciprocal social interactions, communication and stereotyped patterns of behaviour and interests (Lord et al., 1994). The ADI-R is increasingly popular and is currently one of the most used instruments in research on ASD (Gillberg et al., 1996; Jordan, 1999). The ADI-R was developed into the Autism Screening Questionnaire (ASQ) (Berument, Rutter, Lord, Rickles & Bailey, 1999). The ASQ comprises 40 items based on the ADI-R looking at the presence or absence of ASD related symptoms. The ASQ was tested on a sample of 200 individuals, 160 with PDD and 40 with non-PDD diagnosis, and yielded sound discriminant validity in differentiating PDD, including ASD, from non-PDD diagnoses through high sensitivity (85%) and specificity (75%) (Berument et al., 1999).

The third method used to diagnose ASD is structured observational assessments. While this method benefits most children with ASD, it may miss the most severe symptoms because they will not be shown in an environment with a high degree of structure (Gillberg et al., 1996). Examples of this method are the Autism Diagnostic Observation Schedule (ADOS) (Lord et al., 1989) and the Pre-linguistic Autism Diagnostic Observation Schedule (PL-ADOS) (DiLavore, Lord & Rutter, 1995).

The ADOS is the first available structured observational schedule to diagnose ASD based on assessment of social and communicative behaviour (Gillberg et al., 1996). It is designed for subjects with a mental age of about three years plus. The ADOS consists of eight tasks (e.g., unstructured presentation of toys and conversation) presented by an examiner and requires around half an hour to administer (Lord et al., 1989). The ADOS operationalised the general guidelines provided by ICD-10 for the diagnosis of ASD. The ADOS was then evolved to be used for younger or non-verbal subjects by making it less linguistically demanding. This is the PL-ADOS.

The PL-ADOS is a semi-structured observational schedule to assess play, interaction and social communication skills. It was designed to diagnose ASD in children less than six years old who are not yet using phrase speech. The PL-ADOS consists of 12 activities (e.g., free play and imitation) with 17 accompanying ratings and 31 overall

ratings. Both the ADOS and the PL-ADOS focus on social interactions between the examiner and subjects rather than identifying behaviours to be observed, and on rating the quality of social and communicative behaviour rather than its absence or occurrence in limited quantities (DiLavore et al., 1995; Lord et al., 1989).

The Childhood Autism Rating Scale (CARS) (Schopler, Reichler, Devellis & Daly, 1980) is based on both behavioural observation and interview. The CARS is a 15 scale rating system covering 14 domains (e.g., human relationships and imitation) related to the symptoms of ASD, and includes general impressions about the degree of ASD observed in a child. It was tested on a sample of 537 children and demonstrated robust reliability and validity (Schopler et al., 1980).

As explained above, a number of assessment instruments were developed and administered to screen and diagnose ASD. Among these instruments the ADI-R and the ADOS are internationally considered as the 'gold standard' diagnostic protocol for ASD (McPartland & Klin, 2006).

Assessment instruments focus on the observed behaviours characteristic of ASD. To understand the *meaning* of these behaviours, however, it is important to know the way the person with ASD is thinking and feeling, because it cannot be simply assumed their behaviours have the same meaning as similar behaviours seen in typical development (Jordan, 1999). This means that the diagnosis of ASD requires both qualitative and quantitative information (Sparrow et al., 1997).

This section discussed assessment instruments for ASD. The following section concerns the prevalence of ASD and the gender ratio characterising it.

2.2.3 Prevalence and Gender Ratio

Attempts to shed light on the prevalence of ASD have been ongoing. It is widely accepted that the prevalence rates are increasing (Baird et al., 2006; Charman, 2002). Evidence for this is demonstrated by two studies, Wing (1993) and Wing and Potter (2002), which reviewed a number of studies of the prevalence of childhood ASD in Europe, USA and Japan from the 1960s to the 2000s and reported a marked increase in the reported rates of ASD.

Other prevalence studies conducted in the 2000s also show consistently higher rates than those reported in Wing's 1993 study. Baird and his colleagues (2006) conducted a

prevalence study with a total population cohort of 56,946 children aged 9-10 years, and found the prevalence of ASD to be 116.1 per 10,000 (38.9 for childhood autism and 77.2 for other ASDs). Charman (2002) reviewed three prevalence studies conducted in the 2000s and reported prevalence rates of 60 per 10,000. These results were in marked contrast to Wing's (1993) initial finding of 3.3 to 16 per 10,000.

While these later studies reported a prevalence of ASD that was considerably greater than previously recognised, there are questions about whether or not this growth is genuine. Wing and Potter (2002) and Charman (2002) suggest that the higher prevalence rates currently being found can be explained by changes in diagnostic criteria (e.g., broadening from Kanner's criteria to the current triad of impairments) along with increased recognition and awareness of ASD.

Regarding gender differences, while the reports on the gender ratio of ASD vary to some degree, the predominance of ASD among boys remains clear. The National Autistic Society (2008) and a prevalence study conducted by Chakrabarti and Formbonne (2001) report that more boys show ASD than girls, with a ratio of 4:1. In a study by Baird and his colleagues (2000) the gender ratio increases to a ratio of 7:1 (boys: girls).

Section 2.2 discussed the nature of ASD in relation to diagnostic criteria, assessment instruments, prevalence and gender ratio. The next section discusses related theories regarding the causes and nature of ASD.

2.3 Theories of ASD

Researchers have examined ASD from biological and psychological perspectives in their search for causes of the condition and their attempts to understand its nature. A number of biological factors have been associated with ASD, and three major psychological theories have attempted to explain its nature.

2.3.1 Biological Factors

No single biological factor has been found to account for the aetiology of ASD, although a number of factors, including genetic and environmental, have been identified as being associated with it. While researchers have agreed that genetic factors, such as the fragile X chromosome, have an influence on the aetiology of ASD, no consensus has emerged that

would allow any specific gene or combination of genes to be identified as a single cause (Howline, 1998; Jordan, 1999). Rutter (2000) concludes that it may be decades before any clinical benefits can be expected from genetic research.

The heritability of ASD and the apparent increase in its incidence have suggested the possibility of environmental causes. Suggested factors have included the preservatives used in some vaccines, diet, and pollutants in the general environment (Wing & Potter, 2002). However, no clear evidence has been found which would enable any of these, or other factors, to be identified as specific causes of ASD (Lawler, Croen, Grether & Water, 2004; Taylor et al., 1999). There is even no consensus as yet that the incidence of ASD is rising. As with genetic factors, more research is needed before any firm conclusions can be reached.

One biological factor that has stimulated interest among researchers is the possibility of a link between ASD and neurological abnormalities. However, no consistent patterns have been found in studies of abnormalities in the brains of individuals with ASD, and the difficulties of tying down precise causal pathways between specific brain abnormalities and ASD are considerable (Jordan, 1999). Again, no consensus has been reached, and any contribution to the treatment of ASD that research on neurological abnormalities might make lies in the future.

2.3.2 Psychological Theories

Psychological research has focused on the cognitive dysfunction associated with ASD. There are three major psychological theories that have attempted to explain these cognitive difficulties, Theory-of-Mind, executive function and central coherence theory (Jarrold, Butler, Cottington & Jimenez, 2000; National Research Council, 2003).

Theory-of-Mind provides arguably the most influential theory in explaining the cognitive difficulties and behavioural symptoms of ASD (Jarrold et al., 2000). As the central theme of this study, Theory-of-Mind will be examined in detail in Chapter 3 *Theory-of-Mind*.

The second major cognitive theory that seeks to explain ASD is executive function. Executive function refers to the cognitive operations related to planning, inhibition, flexibility and working memory, all of them associated with operations of the frontal

cortex (Hughes, 2002). This theory sees executive dysfunction as the primary deficit of ASD (Pennington & Ozonoff, 1996).

Studies have revealed significant executive dysfunction in individuals with ASD (e.g., Bennetto, Penning & Rogers, 1996; Geurts, Sylvie, Oosterlaan, Roeyers & Sergeant, 2004; Ozonoff & McEvoy, 1994). However, while it has been claimed that executive dysfunction is universal within the ASD population (Ozonoff, Pennington & Rogers, 1991), it is not specific to ASD but is also associated with ADHD (Geurts et al., 2004) and Tourett's syndrome (Channon, Pratt & Robertson, 2003). Furthermore, in a study by Griffith, Pennington, Wehner and Rogers (1999) two groups, autistic preschoolers and a verbally and nonverbally matched control group, were tested on their performance on eight executive function tasks, and no difference was found between the two.

Central coherence theory is the third major theory that attempts to account for the cognitive difficulties associated with ASD. Central coherence is a perceptual tendency to focus on the whole rather than the parts of visual or auditory stimuli (Shah & Frith, 1993). Weak central coherence, or a strong tendency to see parts rather than wholes, is a characteristic of information processing in the ASD population (Shah & Frith, 1983), who tend to process 'unconnected stimuli, outside a meaningful context, with remarkable efficiency' (Shah & Frith, 1993, p. 1352).

Recently a number of researchers have suggested a mutual interdependency between these theories, and have attempted to find reciprocal relationships between them. Relationships between Theory-of-Mind and executive function were the subjects of studies by Carlson, Moses and Breton (2002) and Zelazo, Jacques, Burack and Frye (2002). Relationships between Theory-of-Mind and central coherence theory were studied by Happé (1997) and Jarrold et al. (2000). A link between performance on Theory-of-Mind and central coherence tests was found from both groups.

2.4 Conclusion

ASD is a developmental disorder which demonstrates a triad of impairments (Figure 2.2). The complexity of ASD makes its diagnosis and assessment difficult. A number of diagnostic criteria and assessment instruments have been developed to capture this complexity, based mainly on the observation of behaviour.

The characteristics that make up ASD are found in approximately 60 per 10,000 individuals, predominantly in males rather than females (between 4 and 7 males per 1 female). Its fundamental cause or causes remain unknown. While genetic, environmental and biological factors have been suggested, there remains no straight answer to the question regarding what causes ASD (Zimmerman & Gordon, 2000).

Psychological theories were developed to account for the cognitive dysfunctions of ASD, either individually or together. While these theories have contributed to our understanding of ASD, because of the complexity of the disorder they have not produced answers that are universally applicable.

A common feature of the methods of diagnosis and assessment of ASD outlined above has been that the actual experiences of individuals with ASD have not played any role in them. This has also characterised the psychological theories that have sought to explain ASD, despite their concern with the workings of the mind. Instead, the main focus has been on the external behaviour of the ASD population, in both assessment and intervention.

However, including the voices of individuals with ASD may open up new areas of understanding. This study aims to address these issues by shifting the focus of Theory-of-Mind study away from externally observed behaviours to internal experience. Bringing the inner experiences of individuals with ASD to the foreground of attention, this would represent a shift from an outside-in to an inside-out approach to the cognitive and affective difficulties of the ASD population. This issue will be discussed further in Chapter 3 *Theory-of-Mind*.

CHAPTER 3
THEORY-OF-MIND

3.1 Introduction

The previous chapter reviewed Autism Spectrum Disorders (ASD), its nature, causes and characteristics. Theory-of-Mind was introduced as one of the major theories explaining the cognitive difficulties of individuals with ASD. This chapter provides a broad review of Theory-of-Mind, a concept that emerged from a tradition of cognitive and meta-cognitive studies in child development beginning with Piaget (Flavell, 1999; 2004).

Premack and Woodruff (1978) in their seminal study spoke of the capacity of an adult chimpanzee to infer mental states, thus demonstrating a 'theory of mind' (p. 515). Baron-Cohen, Leslie and Frith (1985) subsequently linked the term Theory-of-Mind with ASD. Defining Theory-of-Mind as the capacity to 'conceive of mental states; that is, knowing that other people know, want, feel, or believe things' (p. 38), they said that children with ASD have a specific 'deficit' in Theory-of-Mind, evidenced by performance in false belief tasks (Section 3.2.2). Since then, other studies, following similar lines of research, have developed and elaborated these conclusions (e.g., Baron-Cohen, 1989; Perner, Frith, Leslie & Leekam, 1989).

This approach has been criticised for its focus on false belief as the sole indicator of the presence or absence of Theory-of-Mind (Hale & Tager-Flusberg, 2005), and for its focus on the ASD population. Yirmiya, Erel, Shaked, and Solomonica-Levi (1998) pointed out that other populations, such as those with intellectual disabilities, demonstrate limitations in Theory-of-Mind, while Bauminger and Kasari (1999) have argued that some members of the ASD population do in fact demonstrate Theory-of-Mind. These criticisms raise fundamental questions concerning the nature of mind and its study, and they mark the beginnings of this study.

As shown in Figure 3.1, this chapter begins with a review of the study of Theory-of-Mind and its relationship with philosophy of mind and special education (Section 3.2). It then reviews studies of Theory-of-Mind within the ASD population and studies concerning subjective experiences of individuals with ASD (Section 3.3). This study then suggests a new approach to the study of the subjective experiences of Theory-of-Mind in

students with ASD, suggesting that Theory-of-Mind be studied within an interdisciplinary context provided by philosophy, psychology and special education (Section 3.4).

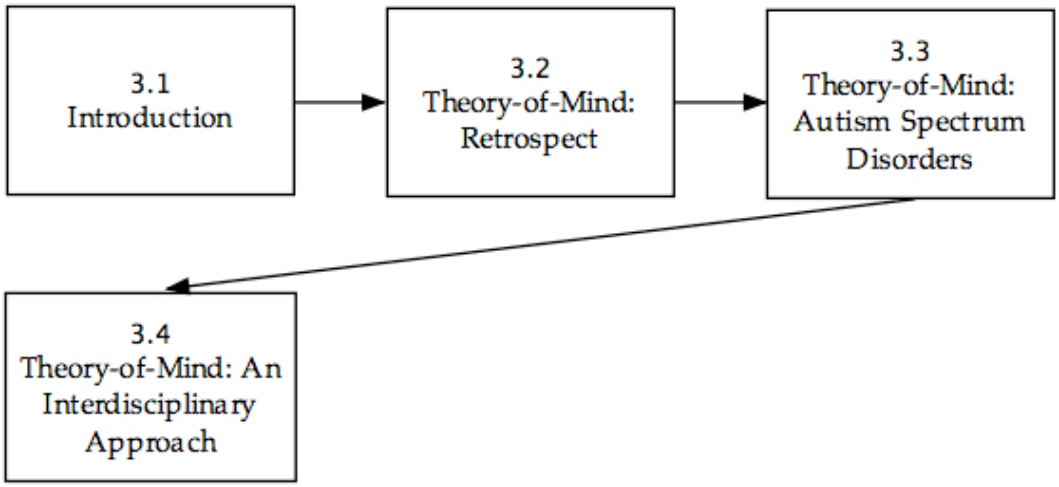


Figure 3.1 **Structure of chapter three**

3.2 Theory-of-Mind: Retrospect

This section addresses the origins and development of the study of Theory-of-Mind. Beginning with the nature (3.2.1) and core concepts of Theory-of-Mind (3.2.2), it discusses the history of Theory-of-Mind studies focusing on its relationship with philosophy of mind (3.2.3). This is followed by discussion on the skills connected with Theory-of-Mind, such as language and social competence (3.2.4). Lastly, the influence of Theory-of-Mind on special education (3.2.5) is examined.

3.2.1 Nature of Theory-of-Mind

Theory-of-Mind has been defined as the ability to impute mental states, such as attention, intention, desire, emotion, perception and belief, to the self and others (Astington & Barriault, 2001). It has both internal (i.e., subjective) and external (i.e., objective) aspects. Internally, Theory-of-Mind concerns a person's capacity to form and use mental representations in order to create and sustain a sense of the self and his or her world. Externally, Theory-of-Mind is indicated by actions within the world of social relationships, and so is intimately connected to everyday social interactions (Hughes & Leekam, 2004).

Actions within the external world arise from internally held beliefs, which indicate the cognitive nature of Theory-of-Mind, and desires, which indicate its affective nature

(Astington & Barriault, 2001; Wellman, Cross & Watson, 2001). Theory-of-Mind can therefore be seen to be internal and external, cognitive and affective, in its nature. Because of this all-encompassing nature, Theory-of-Mind has been referred to in a variety of ways, as common sense (Astington & Barriault, 2001), everyday folk psychology (Al-Hilawani, Easterbrooks & Marchant, 2002), desire-belief psychology and belief-desire naïve psychology (Wellman et al., 2001). The nature of Theory-of-Mind can be explained further through its core components.

3.2.2 Core Components of Theory-of-Mind

The core components making up Theory-of-Mind have been seen as attention, visual perception, desire, intention, emotion, pretence and false belief. While researchers debate about the nature and developmental sequences of any one of these core components, it is generally agreed that together they constitute Theory-of-Mind (e.g., Premack & Woodruff, 1978).

Joint visual attention, a prerequisite for Theory-of-Mind, has been studied in infants to discover the time when children first join with the intentions of others (Morissette, Ricard & Décarie, 1995). Joint attention implies the emergence of an understanding of visual perception, which is a precursor to belief (Gopnik, Slaughter & Meltzoff, 1994). Flavell (1985) explains two levels of visual perception: first, knowing another person need not see the same object that she herself currently sees; and second, knowing that an array of objects presents different appearances when viewed from different spatial locations. Flavell (1999; 2004) suggests that level one can be achieved by early preschool period children and level two by preschool period children.

Desire is a central component of Theory-of-Mind. Bartsch and Wellman (1995) suggest that around two years of age children understand that different people have different desires. Perner (1991a) says that in controlled situations of equal complexity children understand the role of desire much earlier than that of belief.

Intention is a Theory-of-Mind component which motivates bodily movements (Meltzoff, Gopnik & Repacholi, 1999). The capacity to recognise that others have intention has come to be considered as an indication of Theory-of-Mind (Frye, 1991). While Frye (1991) claims that two-year-olds understand intention, Astington (1994) argues

that even though two-year-olds talk about intentions, it is hard to see that they actually understand them.

Regarding *emotion*, babies can recognise different facial expressions of emotion, and two-year-olds can talk about their own feelings and those of others (Astington, 1994). Dunn (1991) says that early in their second year children start to construe the feelings of others, through an affective tuning to their distress or amusement.

Leslie (1988) sees *pretence*, for example a two-year-old pretending that a banana is a telephone, as an early form of mental representation. He also claims the abilities to understand pretence and false belief are mediated by the same mechanism, an innate Theory-of-Mind module.

There is some debate over the age at which true pretence emerges. While Harris and Kavanaugh (1993) share Leslie's (1988) opinion of pretence being observable in two-year-olds, Perner (1991b, p. 53) sees activities such as treating a banana as a telephone as 'acting as if', which he sees as a hypothetical rather than a representational situation. Agreeing with Perner (1991), Lillard (1996) argues that true pretence requires intention and mental representation, and appears around the sixth year of life.

False belief concerns the capacity to objectify one's mental states. This capacity has been tested through the use of standard false belief tasks (Section 3.2.3 for details). While it is known that typically developed children begin to successfully perform in standard false belief tasks around the age of four (Flavell, 1999; Wimmer & Perner, 1983), other researchers suggest even three-year-olds are able to attribute false belief when given a less linguistically demanding task (Lewis & Osborne, 1990), and they learn to make false belief attribution after two weeks training (Slaughter & Gopnik, 1996).

In summary, considering the individual developmental differences and complexities involved in each mental state, the nature and developmental sequence of the components of Theory-of-Mind remain obscure. However, the second year of life appears to be important for developing and understanding desire, intention, emotion and pretence, and the fourth year of life seems to be crucial for understanding visual perception and false belief.

3.2.3 History of Theory-of-Mind Study

The study of Theory-of-Mind is part of a tradition of cognitive and meta-cognitive studies beginning with Piaget. Premack and Woodruff's (1978) study into the capacity of an adult chimpanzee to infer mental states in others sparked a wave of interest into what they called 'theory of mind' (p. 515). Responding to this study, Pylyshyn (1978) and Dennett (1978) argued that demonstration of a Theory-of-Mind required evidence of second order mental representation capacities, or meta-representation – in other words, the capacity to objectify one's mental states. This would be demonstrated if it could be shown that a subject both believes *x* (a representation) and understands the belief about *x* (a representation of a representation).

Second order mental representation capacities can be seen in the understanding that a belief is false. Dennett (1978) gave the example of children who laugh during a Punch and Judy show when Punch prepares to throw the box he thinks contains Judy over a cliff, because they know Judy is not in the box. The children's laughter demonstrates they have both a concept of Punch's belief (Judy is in the box), and a concept of that concept – that Punch's belief is wrong. They have objectified Punch's mental states, and so have demonstrated Theory-of-Mind.

Taking up Pylyshyn and Dennett's suggestion, Wimmer and Perner (1983) investigated Theory-of-Mind in a population of typically developing children using *Maxi's task* to test understanding of false belief. In this task the subject is aware that s/he and another person observe a particular state of affairs *x*, which is then changed, in the absence of the other person, to *y*. If the subject knows that *y* is now the case, *and* knows the other person believes *x* is still the case, then the subject has demonstrated Theory-of-Mind (Wimmer & Perner, 1983). Since then, standard false belief tasks, such as Maxi's task, have become the litmus test for Theory-of-Mind (Frith & Happé, 1999).

Another line of research has studied the core components of Theory-of-Mind and their developmental sequences in typically developing children (e.g., Bartsch & Wellman, 1995; Leslie, 1988) (Section 3.2.2). Studies have also focused on the skills and experiences that affect Theory-of-Mind understanding, such as language and social competence (e.g., Bosacki & Astington, 1999; Frith, Happé & Siddons, 1994) (Section 3.2.5).

Baron-Cohen et al. (1985) applied Maxi's task to children with ASD and Down Syndrome. They reported that unlike children with Down Syndrome, children with ASD

had major difficulties in imputing false belief to others. This study inspired a range of follow-up research in Theory-of-Mind abilities in individuals with ASD with similar results (e.g., Perner et al., 1989) (Section 3.3.1). In addition, intervention studies have examined related issues of teaching Theory-of-Mind to atypically developing children (e.g., Bauminger, 2002; Chin & Bernard-Opitz, 2000) (Section 3.3.2).

Theory-of-Mind has also been studied in terms of the skills associated with it, such as language and social competence. These skills are discussed in the following section.

3.2.4 Interconnected Skills of Theory-of-Mind

3.2.4.1 Language

Language provides an essential tool for gauging whether children have developed Theory-of-Mind (Repacholi & Slaughter, 2003). Language development is tied to a child's development of Theory-of-Mind (Moore & Furrow, 1991) and language ability has a strong impact on the performance of children in false belief tasks (Prior, Dahlstrom & Squires, 1990; Yirmiya et al., 1998) because of the linguistic demands of these tasks (Lewis & Osborne, 1990).

The role of verbal ability in false belief tasks has been examined in a number of studies (e.g., Happé, 1995; Sparrvohn & Howie, 1995). For example, Happé (1995) concluded that 'children with ASD required a far higher verbal mental age to pass false belief tasks than did other subjects' (p. 843), including those with intellectual disabilities. Other studies have also pointed to a strong relation between verbal ability and false belief tasks in ASD (e.g., Dahlgren & Trillingsgaard, 1996; Jarrold, Butler, Cottington & Jimenez, 2000). However, the evidence is not all one way, with some studies reporting no relation between these two variables (e.g., Baron-Cohen et al., 1985; Perner et al., 1989).

A related issue concerns the nature of the relationship between Theory-of-Mind and language, whether, for example, language allows children to discover mental states (i.e., language determinism), or whether the experience of mental states allows them to learn mental state terms (i.e., cognition determinism). Some studies have supported language determinism. Astington and Jenkins (1999), for example, found that earlier language abilities predicted later Theory-of-Mind performance while the converse did not hold. In another study, de Villiers and Pyers (2002) concluded that development of language skills is a prerequisite for false belief understanding.

Cognition deterministists, on the other hand, think conceptual knowledge about mental states is a prerequisite for linguistic expression about mental states (Tager-Flusberg & Joseph, 2005). Bretherton and Beeghly (1982), for example, found a basic capacity to impute mental states to self and other emerges along with the onset of communicative intentions, and concluded that Theory-of-Mind is a prerequisite for intentional communication. Shatz, Wellman and Silber (1983) examined the early use of mental terms. Finding that mental verbs were used in conversation before being used for mental reference they concluded that language use precedes awareness of mental states.

However, the precise nature of the relationship between language and Theory-of-Mind remains unclear and requires further study. Tager-Flusberg (2000) comments:

> What can we say about the direction of the relationships, and the causal connections between language and Theory-of-Mind? The answer to this question is likely to be complex, depending on which components of language and which components of Theory-of-Mind we are concerned with at different developmental stages. At this point, we can only begin to sketch out a model of how these two domains may be interrelated over the course of development (p. 144).

3.2.4.2 Social Competence

Another skill connected to Theory-of-Mind is social competence, which refers broadly to how people solve fundamental problems in human relationships in terms of competition, cooperation and goal attainment (Guralnick & Neville, 1997). A number of studies have examined the relationship between Theory-of-Mind and social competence (Dawson & Fernald, 1987; Hughes, Soares-Boucaud, Hochmann & Frith, 1997). This section focuses on this relationship within the ASD population.

In a classic study influenced by Hobson (1984), Dawson and Fernald (1987) attempted to establish the relationship between the ability to take visual, conceptual and affective perspectives on the one hand and social competence on the other. Social competence was measured by the Vineland Social Maturity Scale (VSMS) and the Social Behaviour Rating Scale (SBRS). They found a significant relationship between perspective taking ability and social competence with both measures.

Oswald and Ollendick (1989) investigated the relationship between false belief and social competence. Theory-of-Mind was measured with false belief tasks. Social competence was measured with the Social Performance Survey Schedule (SPSS) and the Vineland Adaptive Behaviour Scale (VABS). Results were mixed. A significant

relationship with false belief in the changed location task was found with the SPSS, but not with the VABS.

After these two studies the SBRS and VABS were relied upon as measures of social competence in the ASD population. In a study of the relationship between Theory-of-Mind, using emotion tasks and false belief tasks, and social competence, using the SBRS, Prior et al. (1990) found a weak relationship between the SBRS and emotion tasks and no relationship with false belief tasks. Sparrevohn and Howie (1995) also examined the relationship between the SBRS and false belief tasks in individuals with ASD, but found no significant relationship.

The VABS became a frequently used measure of social competence in the ASD population. For example, three studies (Fombonne, Siddons, Achard, Frith & Happé, 1994; Frith et al., 1994; Hughes et al., 1997) investigated the relationship between the VABS and false belief tasks, but found no results in common.

As with language, studies examining the relationship between Theory-of-Mind and social competence have not yielded consistent results. One factor here may be the way Theory-of-Mind is measured. Take, for example, two studies (Dawson & Fernald, 1987; Prior et al., 1990) that found a significant relationship between Theory-of-Mind and social competence. Dawson and Fernald (1987) found this relationship between perspective taking abilities and both the VSMS and the SBRS, while Prior et al. (1990), using both false belief tasks and emotion tasks, found it only between emotion tasks and the SBRS. Other studies using false belief tasks as the measure of Theory-of-Mind have yielded inconsistent results even though the same measurement, the VABS, was used. This indicates that false belief may be less sensitively related to social competence than other mental states associated with Theory-of-Mind.

This section has discussed language and social competence, the interconnected skills of Theory-of-Mind. While it is generally thought there exists a close relationship between Theory-of-Mind and its interconnected skills, the actual relationships remain obscure. Given the mixed results of previous studies, the present study will attempt to clarify this issue.

The next section discusses the relationship between the study of Theory-of-Mind and the field of special education, focusing in particular on the specific deficit approach to Theory-of-Mind study.

3.2.5 Theory-of-Mind and Special Education

The specific deficit approach to Theory-of-Mind study in the ASD population has influenced how ASD is viewed in the field of special education. It has provided an explanation for the social, cognitive (Jarrold et al., 2000; National Research Council, 2003) and communication difficulties experienced by the ASD population (Baron-Cohen, 1995), and has encouraged further studies in the field of ASD including intervention studies seeking to improve Theory-of-Mind in individuals with ASD (e.g., Hadwin, Baron-Cohen, Howline & Hill, 1997).

However, because of its emphasis on the relationship between false belief and ASD, the specific deficit approach to understanding ASD has created problems in special education. First, too much emphasis has been placed on performance in false belief and related tasks to measure Theory-of-Mind (Hale & Tager-Flusberg, 2005). False belief tasks have become the litmus test to credit Theory-of-Mind (Frith & Happé, 1999). People with ASD who 'pass' false belief tasks have been classified as having Theory-of-Mind while those who 'fail' these tasks have been classified as not having Theory-of-Mind (Baron-Cohen et al., 1985; Baron-Cohen, 1989). Seeing Theory-of-Mind in terms of 'pass' or 'fail' and 'have' or 'do not have' assumes the existence of two separate and distinct realms of Theory-of-Mind understanding, an assumption as yet unproven.

The notion that people with ASD can be assigned to one of two Theory-of-Mind realms on the basis of performance in false belief tasks rests on at least two theoretical assumptions. The first assumption is that false belief is representative of all mental states involved in crediting Theory-of-Mind. This, however, excludes individuals with ASD who understand desire or emotion but not false belief. A complex development has been reduced to a single marker (Astington, 2001) on the basis of an unexamined assumption that false belief is more representative of Theory-of-Mind than other mental states.

The second assumption is that performance in false belief tasks parallels Theory-of-Mind ability in real life situations. If this is not the case, there appears to be no justification in assigning individuals with ASD into one of two fixed categories solely on the basis of their performance in laboratory tasks, using terms such as 'passers' and 'failers' (e.g., Happé, 1995, p. 845) or even 'mindblindness' (e.g., Baron-Cohen, 1995, p. 5; Steiner-Bell & Kirby, 1998, p. 2). This approach has been criticised by people with ASD (e.g., Bovee,

2000), as it disregards their own perspectives and imposes the perspectives of people without ASD.

There is a broader issue to consider here in terms of the application of Theory-of-Mind study to special education. The study of Theory-of-Mind has been largely confined to the ASD population, encouraging a tendency to equate Theory-of-Mind difficulties with ASD (Smukler, 2005). This, however, leaves out individuals with other types of disabilities, for example intellectual disabilities, who also fall within the province of special education.

Theory-of-Mind difficulties are not confined to the ASD population. Research has shown that even typically developing individuals can have difficulties in second-order false belief tasks (Apperly, Back, Samson & France, 2008). People with intellectual disabilities also demonstrate delayed Theory-of-Mind development compared to typically developing populations (Yirmiya et al., 1998), as do individuals with hearing impairments or deafness (Peterson & Siegal, 1998), as well as those who are severely visually impaired or blind (McAlpine & Moore, 1995; Peterson, Peterson & Webb, 2000). These results cast doubt on the tendency to confine Theory-of-Mind research to the ASD population.

While it is true that people with ASD tend to have more severe difficulties in understanding Theory-of-Mind than other populations (Yirmiya et al., 1998), too much focus on this population could detract from the contribution that Theory-of-Mind understanding could make to the wider populations that make up the field of special education.

3.3 Theory-of-Mind and Autism Spectrum Disorders

This section provides a broad picture of Theory-of-Mind research in individuals with ASD. It is divided into three parts. The first (Section 3.3.1) investigates how Theory-of-Mind has been evaluated and measured in the ASD population, reviewing 15 quantitative studies. The second (Section 3.3.2) focuses on whether Theory-of-Mind understanding of individuals with ASD can be enhanced, reviewing 23 intervention studies according to their general research design, methodology and findings. The third (Section 3.3.3) explores the subjective experiences of Theory-of-Mind found in individuals with ASD and examines the differences between the subjective feel and the objective measurement of Theory-of-Mind.

3.3.1 Evaluating and Measuring Theory-of-Mind

This section investigates ways used to evaluate Theory-of-Mind abilities in the ASD population. A total 15 studies are included here (Table 3.1), based on two criteria: studies that evaluated Theory-of-Mind understanding among the ASD population; and studies that claimed to measure Theory-of-Mind understanding. This section examines participants, target tasks, measured mental states, measurement methods, materials and findings.

3.3.1.1 Participants in Evaluation Studies

A total of 300 participants with ASD were reviewed in the 15 studies. Their chronological mean age was 12.93 (range 3:11 – 45:1). Most participants were young children and teenagers with ASD, with 12 studies including participants from these age groups. Of the remaining three studies, two (Blackshaw et al., 2001; Happé, 1994) included participants ranging from pre-teens to mature adults in their forties, and one (Kerr & Durkin, 2004) included only participants younger than their teens.

Verbal abilities were reported through verbal mental age or verbal IQ (VIQ). The mean verbal mental age was 6:41 (range 2:8 – 16:1), and the mean VIQ was 93:45 (range 63:2 – 211:9). One study only reported chronological age (Blackshaw et al., 2001).

3.3.1.2 Target Mental States and Tasks of Evaluation Study

The mental state most frequently used as a measure for Theory-of-Mind was false belief, used by 13 studies, of which nine took false belief as being sufficient to credit Theory-of-Mind understanding while four measured it along with other mental states.

A total of six studies took into account more than one mental state to evaluate Theory-of-Mind (Blackshaw et al., 2001; Brent et al., 2004; Brown & Whiten, 2000; Happé, 1994; Steel et al., 2003; Swettenham et al., 1996). These other mental states included pretence, jokes, lies, appearance-reality, joint attention, empathy, thoughts, desire, perception, knowledge, moral judgement and traits, and emotions.

Table 3.1 ***Review of Theory-of-Mind Evaluation Studies***

No.	Author	Participants	Settings	Mental states	Target Tasks	Measurement Methods	Materials	Findings
1	Baron-Cohen et al. (1985)	20 (N/S[1] gender) CA-11:11 (6:1-16:6), BPVT[2] VMA-5:5 (2:8-7:5) LIPS[3] NVMA-9:3 (5:4-15:9)	N/R[4]	First order FB	Sally & Anne FB	Open-ended verbal responses about FB based on changed location	Two doll protagonists-Sally & Anne, marble, basket	20% correct answers
2	Bauminger & Kasari (1999)	22 (1 F, 21 M) CA-10:74 (7:11 –14:8) WISC-R[5] VIQ-107.22 (78-132)	Laboratory	Second order FB	Village FB	Open-ended verbal responses about FB based on changed location	A toy village, houses, a park, two doll characters	68% correct answers
3	Blackshaw, Kinderman, Hare & Hatton (2001)	25 Asperger (5F, 20M) CA – 23 (15-40)	Home, day centre, residential home	Thoughts & emotions of others	Projective Imagination Test	Open-ended verbal responses about participants' conceptions, feelings & thoughts	Four simple black & white line drawings of social situations	Mean 4.32 correct answers
4	Brent, Rios, Happé & Charman (2004)	20 (2F, 18M) CA-9:4 (6-12) CELF-R[6] VMA-8:3	N/R	FB, intention, humour, thoughts, emotions,	1. Sally & Anne FB 2. Smarties FB 3. Picture sequencing 4. Strange stories 5. Cartoons 6. Eyes	Open-ended verbal responses to demonstrate understanding of causality (task 4), humour (task 5) & eye expressions in photos (task 6)	A series of 27 photographs	1. 80% 2. 95% 3. 4.8/6.0 4. 5.95/10 & 4.05/10 5. 16.55/30 & 15.85/30 6.14.30/27 correct answers

No.	Author	Participants	Settings	Mental states	Target Tasks	Measurement Methods	Materials	Findings
5	Brown & Whiten (2000)	12 (4F, 8M children) CA- 12:6 (7:2-15:10) BPVS VMA-4:8 (2:2-8:3) 12 (3F, 9M Adults) CA-24:11 (17:5-33:11) BPVS VMA-6:9 (4:10-10:2)	School, training centre	Joint attention, empathy, manipulation of others' mental states	1. Joint attention(JA) 2. Mental state language 3. Understanding mental states	Direct observations of spontaneous behaviours & if prompted continued more than 1 minute	N/A[7]	2 mins spent in total ToM for children & adults respectively 1 min in JA for adults only
6	Charman & Baron-Cohen (1995)	19 (3 F, 16 M) CA-11:8 (6:5-18) TROG[8], BPVS VMA – 4:8 (4:0-8:0)	School	First order own FB	1.Toothpaste FB 2. Smarties FB	Open-ended verbal responses about FB based on changed content	Photos of four real items of clothing, coin	26.3% correct answers
7	Frith et al. (1994)	24 (7F, 17M) CA- 15 (7:10-19) BPVS MVA-6:7 (4:1-10:1)	N/R	First order FB	1. Smarties FB 2. Three Boxes FB (a version of the Sally & Anne)	Open-ended verbal responses about FB based on changed content & location	Smarties box, pencil, experimenters instead of dolls	30% correct answers
8	Happé (1994)	18 (3F,15M) CA-20:6 (8:9-45:1) WISC-R/WAIS[9] VIQ-87.3 (64-101)	School, home	Pretend, joke, lie, double bluff, A-R, third order FB etc.	Strange stories	Open-ended verbal responses to demonstrate understanding of causality	24 short vignettes related to mental/physical states, pictures	15.7/24 are correct Justification questions 11.1/24 are correct
9	Kerr & Durkin (2004)	11 (4F, 7M) CA-4:59 (3:11-6:05) PPVT[10] VMA- 3:68 (3:00-5:03)	N/R	First order FB	1. Sally & Anne FB 2. Thought bubble FB	Open-ended verbal responses about FB based on changed location & unexpected contents FB with a thought bubble	Props, thought bubble cards	1. 9% 2. 54% correct answers

No.	Author	Participants	Settings	Mental states	Target Tasks	Measurement Methods	Materials	Findings
10	Ozonoff & McEvoy (1994)	17 (N/S gender) CA-15:5 WISC-R VIQ – 83.0	N/R	First, second & third order FB	1. M&M FB 2. Second order FB 3. Overcoat story FB 4. Prisoner story FB	Open-ended verbal responses about FB based on changed content & location. More complex second & third order FB	Four vignettes (N/S material)	1. 75% 2. 23% 3. 76% 4. 17% correct answers
11	Sally & Hill (2006)	18 (2F, 16M) CA-10:6 (6.0-15.0) (N/S) VIQ-96.29 (63.2-211.9)	N/R	First & second order FB	1. Sally & Anne FB 2. Birthday Puppy story FB	Open-ended responses about FB based on changed location & second order FB	Two vignettes (N/S material)	1. 66.67% 2. 55.56 % correct answers
12	Sicotte & Stemberger (1999)	14 (N/S gender) CA-12:50 (9:16-14:16) WISC-III[11] VMA-8:28 (5:20-11:06)	N/R	First order FB	M&M FB	Open-ended verbal responses about FB based on changed content	M&M box, pencil	36% correct answers
13	Sparrevohn & Howie (1995)	15 (N/S gender, Low V.A) CA-9:0 (5:8-13.6) PPVT VMA-5:2 (4:0-6:3) 15 (N/S gender) CA-11:4 (8:1-15:2) PPV VMA-10:5 (7:2-16:1)	School, home	Belief, first & second order FB	1. Inferred belief 2. Not own belief 3. Explicit FB 4. Smarties FB 5. Village FB	Open-ended verbal responses about belief, first order FB & second order FB	Nine pictures for picture stories, smarties box, Lego toy village	1. 100 % 2. 83% 3. 67% 4. 53% 5. 30% correct answers

No.	Author	Participants	Settings	Mental states	Target Tasks	Measurement Methods	Materials	Findings
14	Steel, Joseph & Tager-Flusberg (2003)	57 (N/S gender) CA-7:5 (4:2-14:0) DAS[12]VMA-6:3 (4:2-9:8)	N/R	Pretence, desire, Perception, knowledge, first & second order FB, lies, jokes, moral judgement & traits	1. Pretend 2. Desire 3. Perception /knowledge 4. Unexpected contents FB 5. Changed location FB 6. Second order FB 7. Lies & Jokes 8. Moral Judgement 9. Traits	Open-ended verbal responses about a number of mental states (N/S)	N/R	1. 49% 2. 39% 3. 26% 4. 19% 5. 25% 6. 12% 7. 5% 8. 4% 9. 7% correct answers
15	Swettenham, Baron-Cohen, Gomez & Walsh (1996)	8 (N/S gender) CA-11:6 (8:9-14.4) TROG MA- 6:0 (5:0-6:0)	School	First order FB & thoughts	1. Sally & Anne FB 2. Smarties FB 3. Appearance-Reality (AR) 4. Seeing-Leads-to-Knowing	Open-ended verbal responses about FB based on changed content & location. Three versions of AR to attribute mental states, thoughts & beliefs to oneself	Smarties box, pencil, concrete materials for A-R tasks, box, two doll characters	1. 87% 2. 37% 3. 75% 4. 37% correct answers

[1] Specified details not reported
[2] British Picture Vocabulary Test
[3] Leiter International Performance Scale
[4] Not reported
[5] Wechsler Intelligence Scale for Children R
[6] Clinical Evaluation of Language Fundamentals-Revised
[7] Not applicable
[8] Test of Reception of Grammar
[9] Wechsler Adult Intelligence Scale
[10] Peabody Picture Vocabulary Test
[11] Wechsler Intelligence Scale for Children III
[12] Differential Abilities Scales

A changed location task (e.g., the Sally and Anne task, Baron-Cohen et al., 1985) was the most frequently used test to measure false belief, followed by a changed contents task (e.g., the M & M task, Sicotte & Stemberger, 1999). First order false belief (i.e., Sally believes a marble is in a basket), which is the simplest form, was measured in 10 studies and second order false belief task (i.e., Anne knows Sally believes a marble is in a basket) was measured in five studies. The implications of the tendency to rely on false belief in investigating Theory-of-Mind will be discussed in Section 3.3.4.

3.3.1.3 Measurement Methods

Most Theory-of-Mind studies have relied heavily on the verbal abilities of individuals with ASD, using open-ended verbal responses to evaluate Theory-of-Mind. Only one study, conducted by Brown and Whiten (2000), investigated Theory-of-Mind understanding through direct observations in natural settings, using a number of elements as evidence of Theory-of-Mind understanding including mental state language, joint attention, empathy, and language demonstrating understanding of others' mental states. Adopting a variety of measurement methods allows for a variety of Theory-of-Mind expressions to be considered within a study.

3.3.1.4 Materials

A total of 10 studies used concrete materials to demonstrate Theory-of-Mind tasks to the ASD population, including thought bubble cards (Kerr & Durkin, 2004), the two doll protagonists Sally and Anne, a marble, a basket (Baron-Cohen et al., 1985) and a series of photographs (Brent et al., 2004). Only one study used semi-concrete materials, four simple black and white line drawings, to depict social situations (Blackshaw et al., 2001) and two studies (Ozonoff & McEvoy, 1994; Sally & Hill, 2006) reported social vignettes without specifying the materials employed.

The materials used in these studies need to be understood in relation to the chronological ages of participants. As explained in Section 3.3.1.1, 14 of the 15 studies included participants older than the teens, and for mature participants materials like dolls or marbles can be age inappropriate. This issue was considered in planning the present study.

3.3.1.5 Findings

These studies revealed a degree of Theory-of-Mind among participants with ASD which is especially interesting considering the specific deficit approach commonly assumed in studies of this population. Considering false belief tasks first, 38.88% of 332 participants answered questions regarding first order false belief appropriately and so 'passed false belief tasks' – using the language of most researchers (e.g., Baron-Cohen et al., 1985, p. 42). The use of these terms is discussed in Section 3.3.4.

A study of Charman and Baron-Cohen (1995), with a sample of 19 participants with ASD (mean VMA 4:8), investigated first order own false belief (i.e., representing one's own false belief) rather than others' false belief. They reported 26.3% gave an appropriate answer. The other studies were confined to investigating the false belief of others, and the significance of understanding one's own false belief is discussed further in Section 3.3.4

Second order false belief, which is more complex (Section 3.3.1.2 for an example), was understood by 43.25% of 146 participants with ASD. For example, Bauminger and Kasari (1999) reported that 68% of 22 children (mean VIQ 107.22) understood the Village false belief task. Similar results were found in two other studies. In the Sally and Hill (2006) study, 55.56% (mean VIQ 96.29) answered appropriately in the Birthday Puppy story false belief task, while 76% (mean VIQ 83) answered appropriately in the Overcoat story false belief task conducted by Ozonoff and McEvoy (1994). These results are higher than one early study that reported a 20% relevant answer rate (Baron-Cohen et al., 1985).

The results of second order false belief tests varied widely, from a reported 68% pass rate Bauminger and Kasari's (1999) study to 12% in Steele et al.'s (2003) study. These variations can be explained through differences in verbal mental ability, with participants showing high verbal abilities giving a higher rate of appropriate answers.

Happé (1994) and Bauminger and Kasari (1999) suggested the importance of examining the ability of subjects to justify their answers in second order false belief tasks, and reported a poorer performance by participants with ASD in justification questions than in the belief questions themselves. Nevertheless, as Bauminger and Kasari (1999) pointed out, the universality of the ASD deficit remains inconclusive. The implications of this finding are discussed in Section 3.3.4.

This section has discussed the evaluation of Theory-of-Mind among participants with ASD in 15 quantitative studies. These studies showed that participants with ASD differ widely in their Theory-of-Mind abilities. False belief is predominantly relied upon to measure Theory-of-Mind, often using age inappropriate materials. Theory-of-Mind measurements were generally based on verbal communication. A new approach is needed to address these issues, which will be provided by this present study. The following section reviews intervention studies of Theory-of-Mind.

3.3.2 Theory-of-Mind Intervention Studies

This section examines Theory-of-Mind studies focused on enhancing Theory-of-Mind abilities in individuals with ASD. A total of 23 studies are reviewed according to their research design and findings. The research design of these studies is reviewed focusing on participants and settings, teaching tasks, teaching methods and target tasks (Section 3.3.2.1). Intervention effects are discussed in Section 3.3.2.2.

3.3.2.1 Research Design

The research design of intervention studies is examined in terms of their participants, settings, teaching tasks, teaching methods and target tasks. Results are presented in Table 3.2.

Participants and Settings. A total of 165 participants with ASD took part in 23 studies. Their chronological age (CA) ranged from 2:5 to 28:0 and their verbal mental age (VMA) from 1:3 to 9:0. Half the participants showed VMA above 4:0, and a quarter below 4:00. Verbal ability of the remaining participants was either not reported, or reported as Verbal IQ score rather than VMA.

Participants with above VMA 4:00 were allocated to more complicated Theory-of-Mind intervention studies (e.g., false belief) and those with below VMA 4:00 to less sophisticated studies (e.g., joint attention or imitation). In 13 studies that reported the gender of participants, 89.7% of participants were male and 10.3% were female. This gender ratio, nine boys per one girl, is higher than that found in prevalence studies (e.g., Baird et al., 2000; Chakrabarti & Formbonne, 2001). In terms of settings, studies were most frequently conducted at school (six studies), followed by clinic and home (two studies each).

Table 3.2 ***Theory-of-Mind Intervention Studies***

No.	Author	Participants	Settings	Teaching Tasks	Teaching Methods	Teaching Materials	Duration of Training	Target Tasks	Method of Measurement	Results
1	Bauminger (2002)	15 (4 F, 11 M) CA- 8:08 to 17:33 VIQ- above 69	School	Curriculum embedded problem solving & social skill programmes	Demonstration-&-practice	Social problem vignettes	3 sessions a week, 1hr/ses. 28 wks	Emotion	Standardised tests, direct observation & teacher-rated social skills	6/15 increase in basic emotions 4/15 increase in complex emotions
2	Chin & Bernard-Opitz (2000)	3 (M) CA- 5:11-7:9 average IQ score	Home	Conversational skills	Question-&-answer, prompting & role play	N/R*	9 sessions twice a wk 1hr/ses. 4.5 wks	False belief (FB)	Direct observation (duration), FB tasks & a questionnaire	0/3 increases in false belief tasks
3	Fisher & Happé (2005)	10 (N/S* gender) CA- 10:50 BPVP[1] VMA-7:23 (7-CG[2])	School	Pictures-in- the head techniques	Demonstration & Question-&-answer	Concrete materials depicting thought-pictures	5-10 daily sessions, 25 min/ses. 1-2 wks	FB	FB tasks & a questionnaire	8/10 increase in FB tasks
4	Hadwin, Baron-Cohen, Howlin & Hill (1996)	10 (N/S gender) CA- 9:02 TROG[3] VMA-5:08	N/R	Five levelled Emotion	Demonstration & Question-&-answer	Photos, cartoons & drawings depicting emotions	8 daily sessions, 30 min/ses.	Emotion	Mean number of levels (MNL) passed in emotion	MNL in emotion 4.60 in post test (P<.01) & 2.50 in pretest
5	Hadwin et al. (1996)	10 (N/S gender) CA- 9:02 TROG VMA-5:02	N/R	Five levelled FB	Demonstration & Question-&-answer	Concrete materials to teach perspective taking & computerised FB task	8 daily sessions, 30 min/ses.	FB	MNL in FB	MNL in belief 3.10 in post test (P<.01) & 0.9 in pretest
6	Hadwin et al. (1996)	10 (N/S gender) CA- 9:03 TROG VMA-5:00	N/R	Five levelled Pretend play	Modelling-&-prompting	Toys	8 daily sessions, 30 min/ses.	Pretend play	MNL in pretend play	MNL in play 2.40 in post test & 3.20 in pretest

No.	Author	Participants	Settings	Teaching Tasks	Teaching Methods	Teaching Materials	Duration of Training	Target Tasks	Method of Measurement	Results
7	Hadwin et al. (1997)	10 (1 F, 9M) CA- 4: 08 to 9:06 TROG VMA-3:03 to 11:0	N/R	Five levelled Emotion	Demonstration & Question-&-answer	Picture book	8sessions 30min/ses.	Mental state words	Story telling (event)	0/10 increases in use of mental state words
8	Hadwin et al. (1997)	10 (M) CA- 5: 03 to 13:07 TROG VMA-2:00 to 8:00	N/R	Five levelled FB	Demonstration & Question-&-answer	Picture book	8sessions 30min/ses.	Mental state words	Story telling (event)	0/10 increases in use of mental state words
9	Hadwin et al. (1997)	10 (2F, 8M) CA- 4: 04 to 13:03 TROG VMA-3:03 to 9:00	N/R	Five levelled pretend play	Modelling-&-prompting	Picture book	8sessions 30min/ses.	Mental state words	Story telling (event)	0/10 increases in use of mental state words
10	Ingersoll & Schreibman (2006)	5 (N/S gender) CA-2:5 to 3:9 MA- 1:3 to 2:5	Clinic	Reciprocal imitation skills	Contingent imitation, modelling & reinforcement	Toys	8 session a week 20min/ses 10 wks	Joint attention & pretend play	Direct observation (intervals) & standardised tests	4/5 increase in joint attention & pretend play
11	Martins & Harris (2006)	3 (M) CA-3:8 to 4:7 MA-above 1:3	Clinic	Analysed behaviour of responding to joint attention	Time delay prompting-&-reinforcement	Preferred items chosen by participants	42, 25 & 33 sessions, 3 times a wk, 10-20 min/ ses. 8-14 wks	Joint attention	Direct observation (event & duration)	3/3 increase in responding to joint attention
12	McGregor, Whiten & Blackburn (1998)	8 (1 F, 7 M) CA-8:6 to 28 BPVS VMA-2:2 to 6:3 (8-CG)	N/R	Intention highlighted & picture-in-the-head techniques	Demonstration & Question-&-answer	Concrete materials depicting thought-pictures	Five-week block (N/S)	FB	FB tasks	6 /8 increase in a FB task

No.	Author	Participants	Settings	Teaching Tasks	Teaching Methods	Teaching Materials	Duration of Training	Target Tasks	Method of Measurement	Results
13	Ozonoff & Miller (1995)	5 (M) CA-13:5-14:0 VMA –74-99 (4-CG)	N/R	Social skills training programme	Demonstration, modelling, role play & practicing	N/R	14 sessions 90min/ses. 18 wks	FB	FB tasks & a questionnaire	4/5 increase in FB tasks
14	Sherratt (2002)	5 (M) CA-5 to 6 VA: 2:10 NVA: 5:6	School	Structured & teacher-led play	Modelling-&-prompting	(Non) representational materials	15 weekly sessions, 40 min/ses.	Pretend play	Standardised tests & direct observation (event)	5/5 increase in generating pretend play
15	Silver & Oakes (2001)	11 (N/S gender) CA-10:0 to 18:0 BPVS VMA: over 7:0 (11-CG)	School	Emotion	Demonstration & Question-&-answer	Computer programme, The Emotion Trainer	10 sessions 30 min/ses.	Emotion	Emotion tests	11/11 increase in emotions
16	Stafford (2000)	1 (M) non-verbal (N/S VMA)	Home	Emotions teaching drill	Question-&-answer	Photos with emotions	7 sessions a week, 2.5 hrs/ses. 24 wks	Emotion	Direct question (emotions)	1/1 increases in recognising emotions
17	Starr & Baine (1996)	5 (1 F, 4 M) CA-9:4 to 12:1 VMA- 3:5 to 4:7 NVMA-4:5 to 6:10	School	Colour & size A-R tasks	Demonstration & Question-&-answer	Concrete materials	2 sessions a day 30 min/ses. 5 days	Colour & size A-R[4] distinction	Direct question (A-R)	3/5 increase in colour & size A-R distinction
18	Steiner Bell & Kirby (2002)	3 (M) CA-6:7 to 7:11	School	Four levelled emotion & Five levelled FB	Demonstration & Question-&-answer	3 videotapes (emotion, FB & Little Red Riding Hood)	12 sessions 30-40 min/ses.	Emotion & FB	Direct question (emotion & FB)	2/3 increase in emotion & belief
19	Swettenham (1996)	8 (N/S gender) CA-10:9 BPVS VMA-3:8 NVMA-4:3 (16-CG)	N/R	FB computer instruction	Question-&-answer	Computerised Sally-Anne FB task	2 sessions a day 4 days	FB	FB tasks	8/8 increase in FB tasks in computer & paper versions

No.	Author	Participants	Settings	Teaching Tasks	Teaching Methods	Teaching Materials	Duration of Training	Target Tasks	Method of Measurement	Results
20	Wellman et al. (2002)	7 (M) CA- 8 to 18 TROG VMA-4:0 to 6:6	(N/S) quiet room	Pictures-in- the head techniques	Demonstration & Question-&-answer	Thought bubbles with concrete materials	5 sessions 30 min/ses.	FB	A FB task	6/7 increase in a FB task
21	Wellman et al. (2002)	10 (1F, 9M) CA-5 to 17 TROG VMA-4:0 to 8:0	(N/S) quiet room	Pictures-in- the head techniques	Demonstration & Question-&-answer	Thought bubbles with concrete materials	5 sessions 30 min/ses.	FB	A FB task	7/10 increase in a FB task
22	Whalen, Schreibman & Ingersoll (2006)	4 (N/S gender) CA-4:0 to 4:4 MA- 1:4 to 1:9	Research laboratory	Responding & initiating joint attention	Demonstration-&-prompting	N/R	10 weeks (N/S)	Symbolic play & imitation	Direct observation (event & intervals), rating scale & standardised tests	4/4 increase in symbolic play & imitation
23	Zercher, Hunt, Schuler & Webster (2001)	2 twin boys CA-6:3	Sunday school of a church	Peer supported play group intervention	Prompting (planning, cueing & coaching)	Poster for visual guidance	16 weekly sessions 30min/ses.	Joint attention & symbolic play	Direct observation (event)	2/2 increase in joint attention & symbolic play

N/R* - Not reported, N/S* - No specified details reported
[1.] BPVP - British Picture Vocabulary Scale
[2.] CG - Control Group
[3.] TROG - Test for Reception of Grammar
[4.] A-R - Appearance-Reality

Teaching Tasks. Teaching tasks refer to what was taught to participants with ASD in order to enhance their Theory-of-Mind ability. The frequency with which specific teaching tasks were used indicates which mental states or related skills were considered significant in enhancing the Theory-of-Mind of participants. Like the Theory-of-Mind evaluation studies discussed in Section 3.3.1, these intervention studies were conducted with more focus on false belief than on other mental states. However, fewer intervention studies – nine out of 23 – focused on false belief, compared to 13 out of 15 evaluation studies.

Of the 23 studies, nine taught false belief, five taught emotion, four taught pretend play, two taught joint attention and social skills respectively and one study taught imitation and conversational skills respectively. False belief was considered the most significant mental state, followed by emotion and pretend play to enhance Theory-of-Mind.

Teaching Methods. This section focuses on how participants with ASD were taught the teaching tasks. Direct teaching strategies, including demonstration and question-answer, were used in all false belief and emotion interventions. Indirect teaching strategies, such as modelling, prompting, and reinforcement, were used for enhancing pretend play, joint attention and imitation skills. In all cases, concrete intervention materials, such as photos and toys, were used regardless of target tasks and teaching strategies.

The number of intervention sessions ranged from five to over 168, and the lengths of interventions varied from five days to seven months. The most frequent duration of a session was around 30 minutes (13 studies), varying between 10-20 minutes and 2.5 hours. Imitation and joint attention tended to be taught using briefer sessions (range 10 to 20 minutes) than those used for other mental states.

Target Tasks. Target tasks refer to what was expected to be enhanced after instructing in the teaching tasks, and four studies (e.g., Ingersoll & Schreibman, 2006; Whalen et al., 2006) looked for changes in more than one mental state or related skills. As in the teaching tasks, false belief was the most common target task (10 out of 23 studies). Of 23 studies, five studies had emotion and pretend play respectively as target tasks, and three had the use of mental state words and joint attention respectively. A single study had imitating behaviour as target task.

The patterns of intervention design are revealed by the relationship between target tasks and teaching tasks. These studies reveal two patterns. The first was to make the teaching and target task the same – to teach a task and measure the effectiveness of

intervention from performance in the same task. This was done in 17 studies. The second pattern was to have different teaching and target tasks – to teach a task and measure the effectiveness of intervention using a different task. This was seen in the remaining six studies (Chin & Bernard-Opitz, 2000; Hadwin et al., 1997; Ingersoll & Schreibman, 2006; Whalen et al., 2006). (Note that Hadwin et al., 1997, is divided into three sub-studies.) These patterns of intervention design appeared to influence the results of the intervention, as discussed in the following section.

A general characteristic of these intervention studies was that those studies aiming to increase understanding of false belief, emotion and mental state words tended to recruit participants with higher verbal mental ages (e.g., Fisher & Happé, 2005; Hadwin et al., 1997), while those teaching imitation or joint attention tended to recruit participants with lower verbal mental ages (e.g., Ingersoll & Schreibman 2006; Whalen et al., 2006).

3.3.2.2 Intervention Findings

Some 18 out of the 23 studies reported varying degrees of intervention effects among participants with ASD. Individuals with ASD demonstrated learning abilities in false belief (e.g., Swettenham, 1996; Wellman et al., 2002), emotion (e.g., Silver & Oakes, 2001), pretend play (e.g., Whalen et al., 2006) and joint attention (e.g., Martins & Harris, 2006).

Of the 23 studies, five reported no intervention effects. These studies measured increase in false belief (Chin & Bernard-Opitz, 2000), pretend play (Hadwin et al., 1996) and the use of words indicating mental states (Hadwin et al.,1997 in three sub-studies). Except for the study of Hadwin et al. (1996), four studies which demonstrated no intervention effects used the second intervention design, teaching a task and measuring the effectiveness of intervention using a different task.

Many factors might contribute to the absence of intervention effects, for example, differences between the groups and the length of interventions. However, having different teaching and target tasks might contribute to this absence, as there would be little relation between the tasks being taught and those which were expected to demonstrate enhancement. However, two other studies (Ingersoll & Schreibman, 2006; Whalen et al., 2006) that adopted the second intervention design did demonstrate intervention effects. Ingersoll and Schreibman (2006) found an increase in pretend play and joint attention after teaching imitation skills. Whalen et al. (2006) found an increase in pretend play and imitation after teaching joint attention.

Generalisation effects may be linked to the closeness of the Theory-of-Mind components being taught. It may be that imitation skills are more closely related to pretend play and joint attention (e.g., as in Ingersoll & Schreibman, 2006) than conversation skills to false belief (e.g., as in Chin & Bernard-Opitz, 2000), and that joint attention is more closely related to pretend play and imitation (e.g., as in Whalen et al., 2006) than emotion, false belief and pretend play to words containing mental states (e.g., as in Hadwin et al., 1997). This may explain why generalising the effects of intervention into another task was difficult in the studies of Chin and Bernard-Opitz (2000) and Hadwin et al. (1997).

The intervention studies were examined according to the effects of generalisation, the ability to apply the intervention effect to another task. They were analysed in four categories: settings, persons, tasks and materials. Of the 23 studies, 14 examined the generalisation effects of interventions. Of these, 10 studies found generalisation effects within different degrees and one study (Chin & Bernard-Opitz, 2000) did not report the result of generalisation effects. In addition, three studies did not find any generalisation effects (Hadwin et al., 1996; Swettenham, 1996; Wellman et al., 2002) (Table 3.3).

Table 3.3 ***Generalisation and Follow-Up Effects***

No.	Author	Type and results of generalisation			
		Across settings	**Across persons**	**Across tasks**	**Across materials**
1	Bauminger (2002)	N/A*	N/A	N/A	N/A
2	Chin & Bernard-Opitz (2000)	N/A	A peer (N/S*) No result reported	Novel conversational topics (N/S) No result reported	N/A
3	Fisher & Happé (2005)	N/A	N/A	The penny hiding task generalisation found ($Z=-1.63$, $p<.05$)	N/A
4	Hadwin et al. (1996)	N/A	N/A	No generalisation found from learning emotion to FB & play	Novel photos& protagonists A significant difference found ($F(2,10)=8.54$, $p=.002$)

No.	Author	Type and results of generalisation			
		Across settings	**Across persons**	**Across tasks**	**Across materials**
5	Hadwin et al. (1996)	N/A	N/A	No generalisation found from learning FB to emotion & play	Novel coloured pictures A significant difference found ($F(2,10)=7.27$, $p=.008$)
6	Hadwin et al. (1996)	N/A	N/A	No generalisation found from learning play to emotion & FB	Novel toys No difference found ($F(2,10)=4.20$, $p=.120$)
7-9	Hadwin et al. (1997)	N/A	N/A	N/A	N/A
10	Ingersoll & Schreibman (2006)	Novel setting (N/S) 3/5 generalised	Novel therapist (N/S) Joint attention & pretend play	N/A play to all novel situations	Novel toys (N/S) 4/5 generalised imitation to all novel situations
11	Martins & Harris (2006)	Novel room (N/S) 3/3 generalised	Novel teacher (N/S) joint attention to a novel	N/A setting & a teacher	Novel materials No results reported
12	McGregor et al. (1998)	N/A	N/A	5/8 generalised FB to A-R	N/A
13	Ozonoff & Miller (1995)	N/A	N/A	N/A	N/A
14	Sherratt (2002)	N/A	N/A	N/A	N/A
15	Silver & Oakes (2001)	N/A	N/A	N/A	N/A
16	Stafford (2000)	N/A	N/A	N/A	1/1 generalised emotions to novel photos
17	Starr & Baine (1993)	N/A	N/A	N/A	3/5 generalised colour & size A-R distinction to novel materials
18	Steiner Bell & Kirby (2002)	N/A	N/A	2/3 generalised emotion & FB to FB & Little Red Riding Hood tasks	N/A
19	Swettenham (1996)	N/A	N/A	0/8 generalised to distant FB tasks	N/A
20	Wellman et al. (2002)	N/A	N/A	0/7 generalised FB to smarties task	N/A

No.	Author	Type and results of generalisation			
		Across settings	Across persons	Across tasks	Across materials
21	Wellman et al. (2002)	N/A	N/A	5/10 generalised FB to smarties task 4/10 to a Seeing-Knowing task	N/A
22	Whalen et al. (2006)	N/A	N/A	N/A	N/A
23	Zercher et al. (2001)	N/A	N/A	N/A	N/A

N/A* - Not assessed, N/S* - No specified details reported.

Of the 10 studies reporting generalisation effects, six taught false belief and four of these six found generalisation effects across tasks (Fisher & Happé, 2005; McGregor et al., 1998; Steiner-Bell & Kirby, 2002; Wellman et al., 2002). Examining these results closely, however, it appears that these were generalisations within rather than across tasks, as the generalisation moved from one kind of false belief task to another. None of these four studies demonstrated an unambiguous example of generalisation across tasks, for example teaching emotion and finding generalisation effects in false belief or pretend play. All of them could be interpreted as showing generalisation effects either within different kinds of false belief tasks, or across closely related tasks.

The remaining two studies that taught false belief (Hadwin et al., 1996; Starr & Baine, 1996) reported generalisation effects across materials, as did two studies teaching emotion (Hadwin et al., 1996; Stafford, 2000), while two studies teaching imitation and joint attention reported generalisation effects across settings and persons (Ingersoll & Schreibman, 2006; Martins & Harris, 2006).

What is striking about these studies is the difficulty of establishing generalisation effects across tasks. This is reminiscent of the absence of generalisation in the second intervention design mentioned above, in which related tasks were taught to improve target tasks. In both areas, lack of generalisation capacity across tasks appears to be a problem. Swettenham (1996) referred to this when he asked, ‘why were the children with autism able to generalise to the close transfer tasks (different materials) but not to the distant transfer tasks (different scenarios)?’ (p. 163). Further investigation in this area is required.

This section has discussed how Theory-of-Mind has been taught to individuals with ASD. Like Theory-of-Mind evaluation studies, intervention studies focused on false belief tasks more than other mental states. While direct teaching strategies, such as demonstration and question-answer, were used to teach false belief and emotion, indirect teaching strategies, such as modelling and prompting, were used for developing pretend play, joint attention, and imitation skills. Furthermore, studies teaching false belief and emotion tend to include participants with ASD with higher verbal mental age than those teaching imitation and joint attention.

The majority of studies, 18 out of 23, reported intervention effects in participants with ASD. This indicates that participants with ASD can learn Theory-of-Mind. Of the 23 studies, 10 studies also reported generalisation effects across settings, persons or materials – but not across tasks, strictly speaking. Even so, these results indicate that participants with ASD can, within limits, generalise intervention effects into different occasions.

Overall, the reviews of both Theory-of-Mind evaluation and intervention studies demonstrated the dominance of false belief, and thus on understanding the minds of others in Theory-of-Mind studies. These issues are discussed in Section 3.4. Another similarity, perhaps more important, between two types of studies concerns the lack of any role for subjectivity, the lived experience of individuals with ASD. This is discussed in the following section.

3.3.3 Subjective Experiences of Theory-of-Mind

People with ASD have made little contribution to the study of ASD, as they have rarely been believed to be capable of offering insights into their own condition (Cesaroni & Garber, 1991; Volkmar & Cohen, 1985). In recent times, however, there has been a growing awareness of the importance of hearing their voices so they can directly express their experience rather than have this inferred from their behaviour through, for example, false belief tasks.

This study studies the subjective experiences of people with ASD through a phenomenological approach, based on first and third person data. First person data of the lived experience of people with ASD have been obtained through the analysis of autobiographical materials and personal websites. Third person data have been obtained through the use of semi-structured interviews. Studies concerning the subjective

experience of ASD were selected on the criterion of academic articles containing first-person accounts of individuals with ASD. A total of 11 studies were selected, and this section discusses the participants, methodologies and findings of these studies.

3.3.3.1 Participants and Methodologies

Qualitative studies of people with ASD tend to use small samples in order to gain a deeper understanding of the actual lived experience of ASD. This section examines accounts by 20 individuals with ASD regarding their inner experiences, including five who wrote anonymously on internet websites. Among the 15 named individuals, six were in their teens, four in their 20s, three in their 30s and two were in their 50s. They included 11 males and four females. They demonstrated various levels of performance from high functioning ASD with superior intelligence (e.g., Vincelette, 2000; Ward & Alar, 2000) to more limited functioning, supported by alternative augmentative communication (e.g., Leszcynski, 2000). The most frequently used data collection method was autobiographical writing, followed by interviews and correspondence between researchers and individuals with ASD. Details are found in Table 3.4.

Table 3.4 ***Studies Representing Subjective Experiences of Individuals with ASD***

Author	Subject	Forms of Information	Themes of Experiences
Volkmar & Cohen (1985)	Tony (22 yrs, male)	Autobiographical writing	Emotion-fear, aversion Indifference to people Good memory Obsession & disruptive behaviour Perceptual sensory difficulty
Cesaroni & Garber (1991)	Albert (13 yrs, male) Jim (27 yrs, male)	Interviews Correspondence Autobiographical writing (poems, essays, art work)	Memory Perceptual sensory difficulty Stereotypical behaviour Social interaction & empathy
Grant (2000)	Grant (35 yrs, female)	Autobiographical writing	Perceptual sensory difficulty Spirituality
Leszcynski (2000)	Leszcynski (21 yrs, male)	Autobiographical writing	Perceptual sensory difficulty Affection Normal or different

Author	Subject	Forms of Information	Themes of Experiences
Ward & Alar (2000)	Ward (22 yrs, male)	Autobiographical writing	Perceptual sensory difficulty Stereotypical behaviour Affection Social interaction Theory-of-Mind Conversation difficulty Emotion-satisfaction
McMullen (2000)	McMullen (in the 50s, female)	Autobiographical writing	Stereotypical behaviour Theory-of-Mind & empathy Conversation difficulty Normal or different Emotion-satisfaction Spirituality
Vincelette (2000)	Vincelette (54 yrs, male)	Autobiographical writing	Mutism Social interaction
O'Neill (2000)	O'Neill (31 yrs, female)	Autobiographical writing	Mutism Social interaction Normal or different Emotion-satisfaction Spirituality
Bovee (2000)	Bovee (31 yrs, male)	Autobiographical writing	Theory-of-Mind Rights of people with ASD Wrong concept about ASD
Jones, Quigney & Huws (2003)	Five anonymous people with ASD run their own websites	Autobiographical writing	Perceptual sensory difficulty Perceptual sensory enjoyment Coping mechanisms Normal or different
Carrington, Papinczak & Templeton (2003)	Five secondary school students (14-18 yrs, 1 female, 4 male)	Semi-structured interviews	Social interaction Need for following rules Mask social difficulties

The number of participants in these studies was small and their age and social circumstances were varied, as were the methodological approaches used to elucidate their experience. Their findings also varied widely.

3.3.3.2 Findings

A review of these studies identified eight salient issues for people with ASD, relating to social interaction, communication, perceptual sensory experiences, behaviour problems, the perception of being normal or different, strength, emotion and empathy, and Theory-of-Mind. Their subjective experiences regarding these issues are discussed below.

Social Interaction created problems for individuals with ASD. Carrington et al. (2003) reported that four of the five students interviewed reported being teased by their

peers despite their desire for friendship. Some students found it was difficult to grasp the concept of friends and friendship. However, some also expressed satisfaction with their friendships.

The experience of being teased was what Ward hated most at his junior high school (Ward & Alar, 2000). Vincelette (2000), in his 50s, recalled being 'punished for being different' (p. 238) during his school life, and how he managed his expulsion so he could avoid being beaten up. O'Neill (2000) provided a similar story.

> My anger turned into defiance. Nobody really noticed me, except to criticise me. My loss of self-esteem was due to treatment like this. Not only the name calling, physical hitting, rejection, and echoing laughter of my classmates, but the apathy and rigid thinking of my teachers, who emphasised that there was only one way of learning (p. 226).

Difficulties in social interaction were linked to difficulties in communication. Of the five students in the study by Carrington et al. (2003), two students spoke of how they struggled unsuccessfully to participate in conversations with peers. Ward felt he had few friends because of his communication problems (Ward & Alar, 2000).

Communication was also difficult for individuals with ASD. Mutism was one problem. Vincelette (2000) said he began to speak only at year five and was diagnosed as having intellectual disabilities, until his first IQ test when he scored above 140. O'Neill (2000), in contrast, began speaking earlier and then stopped, and commented that 'to judge someone by the fact that she speaks or does not speak and to escalate that into a huge deal is petty. People extend into their souls, they are not surface entities' (p. 224).

McMullen (2000) spoke of her frequent frustration in communicating her thoughts, especially in group settings, because people focused on how she spoke rather than on what she tried to say. Ward said:

> I had a really hard time learning to talk. I knew only 30 words when I was 3. Half of those words were the names of numbers. I started using short sentences when I was 4. Sometimes I would repeat things that I heard from other people or on the TV. I asked my first question when I was 5. For a long time, I mixed up my pronouns. I would say things like, 'you want a cookie' when I meant I wanted a cookie. (Ward & Alar, 2000 p. 232)

Ward later became very good at public speaking, and explained he could do this because he did not have to look at people's eyes and mouths, particularly their teeth, which was

very painful for him. This indicates that some communication problems are linked with difficult perceptual sensory experiences.

Perceptual sensory experiences could be turbulent, distorted or overloaded, as reported in the studies of Cesaroni and Garber (1991). Jones et al. (2003) also reported pleasurable sensory perceptions, specifically from the mono-channelling of sensory perception. Mono-channelling indicated 'the individual with ASD was unable to take in stimulation from more than one or two senses at a time' (p. 120).

Painful sensory experiences were reported by more individuals with ASD than pleasurable experiences. Pain was often associated with taste and, in particular, sound (Grant, 2000; Ward & Alar, 2000). Hypersensitivity could be a problem, especially in relation to food (Jone et al., 2003; Volkmar & Cohen, 1985; Ward & Alar, 2000).

Behavioural problems caused difficulty in the lives of people with ASD. These included disruptive and compulsive behaviour (Volkmar & Cohen, 1985) and tantrums, rocking, banging, scratching, and kicking (McMullen, 2000; Ward & Alar, 2000). Such problems tended to decline with age (McMullan, 2000). Ward used head-banging to ease anxiety, and over time he learned to get the same result by swinging his head through the air without hitting anything (Ward & Alar, 2000). Anxiety was also eased by touching and rubbing (Jone et al., 2003).

Perception of being normal or different caused difficulty for individuals with ASD. Tony believed he was normal but found out, with immense frustration, he could not be accepted as normal (Volkmar & Cohen, 1985). Leszcynski (2000) expressed a similar frustration, saying, 'I have autism. I didn't catch it. You cannot get it from me. My brain doesn't work right. I wish I was normal' (p. 248).

O'Neill (2000), however, questioned the concept of normality, saying, 'I feel that being 'weird' is better than being 'normal' for what is normal but a commonly held perception that everyone fits into a mould and any deviation from that is severely punished?' (p. 224). McMullan (2000) spoke of her sense of relief when she knew there are many others with ASD so she could feel 'We are alike' and think 'I wasn't crazy, and my perspectives were valid' (p. 239). They learned to see the strengths of individuals with ASD.

Strength can be shown by people with ASD in affection, memory and spirituality. Leszcynski (2000), with very limited expressive language, and Ward (Ward & Alar, 2000),

with very fluent expressive language, showed their affection for their family, especially their mothers. Tony (Volkmar & Cohen, 1985) and Vincelette (2000) provided very detailed descriptions of the past. Vincelette, for example, when in his 50s could remember where he lived when he was a baby and describe what he saw from his wooden crib.

Spirituality was another area of strength for individuals with ASD. Their struggles to gain insight into how ASD has affected their lives has led to a deepening of spirituality. O'Neill (2000) said she found deep peace and a sense of being centred when she meditated. Grant (2000) felt at home in church, knowing she was accepted as she was. McMullen (2000) said, 'I have changed from being ashamed of my autistic struggles to being proud of what God has done in me' (p. 242).

Emotion and empathy are areas of complexity and controversy in the field of ASD. Individuals with ASD experienced a range of emotions as they struggled with the consequences of their condition, including anxiety, anger (Volkmar & Cohen, 1985) and frustration (e.g., Carrington et al., 2003), but they also experienced satisfaction (e.g., O'Neill, 2000; Grant, 2000; McMullen, 2000; Carrington et al., 2003).

Empathy was reported as both a problem (Volkmar & Cohen, 1985) and a strength. McMullan (2000) said the immense difficulties she encountered helped her to understand herself and others, which helped her to relate to other students struggling at school. Jim suggested an apparent lack of empathy could indicate weak expressive and receptive communication skills rather than the actual absence of empathy (Cesaroni & Garber, 1991).

Theory-of-Mind was also a complex issue for individuals with ASD. While some individuals with ASD have difficulty in understanding how other people think (e.g., Ward & Alar, 2000), it was not difficult for others (e.g., McMullen, 2000). Bovee (2000) commented critically:

> The concept of 'theory of mind' is much talked about in the autism field. It is a 'neurotypical' concept that explains why people with autism do not think in the same way that people without autism do. It does not explain the corollary that people without autism don't think in the same way as people with autism do. I think that one has to look at both parts of this theory and give them equal status. It is not wrong to think in a different way, whether it be autistic or neurotypical. Theory of mind suggests that people with autism cannot make good guesses about what people without autism are thinking and then make good social choices based on that. I can also say that people without autism cannot truly guess very well what people with autism are

> thinking. I applaud the work of Uta-Frith and Simon-Cohen, but I am adding the other piece that should be there and is just as valid. (p. 251)

This comment sums up the differences between Theory-of-Mind as subjectively experienced and objectively measured, and explains why subjective experiences should be included in Theory-of-Mind studies. As Bovee (2000) pointed out, there are many issues within the field of ASD that need to be addressed from the perspectives of those with ASD, and as Theory-of-Mind concerns how their minds work, it is one of them.

Frith and Happé (1999) provide an example of how the inner world of people with ASD can appear from the perspective of researchers who take a deficit approach to Theory-of-Mind and study it from outside. The article is titled 'What is it like to be Autistic?'

> What would a mind without introspective awareness be like? Perhaps it would contain only first-order representations of events and experiences. First-order representations can be seen as relatively close to freshly processed perceptual information (description of objects and events: what it is and where it is). They could be tagged for being true or false, and tagged for when the event happened. However, representations in such a mind would not be tagged for propositional attitude (whether they are a thought, an ongoing experience or a memory), and they might all be held of equal factual status. There would be no modification of representations according to whether they were deprived from another person's opinion or from own opinion (p. 8).

When this extract is compared with the writings of individuals with ASD a wide gap in perception seems evident, and this may indicate a similar gap between how individuals with ASD experience their Theory-of-Mind and what researchers conclude from their observations. The next section discusses this issue further, incorporating findings from a review of Theory-of-Mind evaluation studies (Section 3.3.1), Theory-of-Mind intervention studies (Section 3.3.2) and studies regarding subjective experiences of Theory-of-Mind (Section 3.3.3).

3.3.4 Questions for Theory-of-Mind Research

Section 3.3.1 reviewed 15 Theory-of-Mind evaluation studies of people with ASD, of which nine used a capacity for false belief as the sole evaluative factor, while the other six used more than one mental state. Section 3.3.2 reviewed 23 Theory-of-Mind intervention studies conducted with individuals with ASD, of which 19 reported positive improvements in their ability to understand Theory-of-Mind. The most commonly used criterion for testing the effectiveness of Theory-of-Mind intervention was false belief capacity, found in

10 studies. Section 3.3.3 examined the subjective experiences of individuals with ASD by reviewing 11 studies containing first-person accounts. The results were varied. People with ASD experienced a variety of mental states at differing levels of performance, experienced as difficulties and strengths. Some individuals with ASD could infer what others think and feel with little difficulty, while others had immense difficulty.

These reviews raise four questions: (1) Is false belief equivalent to Theory-of-Mind?; (2) Is Theory-of-Mind limited to a theory of the minds of others?; (3) Do Theory-of-Mind tests reflect the inner experience of participants' Theory-of-Mind?; and (4) Is the specific deficit approach to evaluating Theory-of-Mind sufficient to understand Theory-of-Mind?

False Belief and Theory-of-Mind. Since Wimmer and Perner (1983) developed Maxi's story, false belief tasks have functioned as a major tool to evaluate the presence of Theory-of-Mind. This story was created to demonstrate the presence or absence of a second order mental representation capacity, which Dennett (1978) and Pylyshyn (1978) posited as crucial evidence for Theory-of-Mind. Since then, false belief tasks have become the litmus test for Theory-of-Mind, to the point where it has come to represent Theory-of-Mind itself, creating, possibly without deliberation, an underlying assumption that false belief *is* Theory-of-Mind. For example, when Wellman et al. (2001) conducted a meta-analysis of 178 false belief studies, they named it 'Meta-analysis of Theory-of-Mind Development: The Truth about False Belief'.

Theory-of-Mind and the Minds of Others. Taking false belief tasks to represent Theory-of-Mind has also created an undue focus on the minds of others. False belief tasks are used to test for second order beliefs, the ability to think about other people's thoughts (Bauminger & Kasari, 1999). Since standard false belief tasks (e.g., the Smarties task, and the Sally and Anne task) have become central in the definition of Theory-of-Mind, the importance of mental imputation to oneself seems to have faded away. As mentioned in Section 3.3.1, out of nine studies that focused on false belief, one's own false belief was investigated in only one of them (e.g., Charman & Baron-Cohen, 1995).

This change can be seen in the contrast between a classic definition of Theory-of-Mind found in Premack and Woodruff's (1978) early study – 'the ability to impute mental states to himself and others (p. 515)' – and a more recent definition – 'the ability to ascribe

thoughts, feelings, ideas, and intentions to others and to employ this ability to anticipate the behaviour of others' (Muris et al., 1999, p. 67).

Frith and Happé (1999) have suggested that children can form a concept of self only to the extent they can form a concept of other (e.g., Gopnik & Melzoff, 1994), so that 'when people with ASD cannot report and understand the psychological states of others, they do not report those states of themselves' (p. 5). This argument supports the emphasis on the minds of others in Theory-of-Mind, but while it is clear that the sense of self and that of other are intertwined, the exact nature of this relationship remains unknown.

Testing Theory-of-Mind or Lived Experience. Another issue concerns the disconnection between the results of false belief tests and the actual lived experience of Theory-of-Mind. Studies using false belief tasks to measure Theory-of-Mind in individuals with ASD credited possession or absence of Theory-of-Mind to people with ASD on the basis of 'pass' or 'fail' in these tests (e.g., Baron-Cohen et al., 1985, p. 38). People with ASD were divided into 'passers' and 'failers' according to their performance on false belief tasks (e.g., Fombonne et al., 1994, p. 180; Happé, 1995, p. 845). Studies using false belief tasks generated the terms 'cognitive deficit or Theory-of-Mind deficit' (e.g., Baron-Cohen et al., 1985 p. 44; Hadwin et al., 1996, p. 346) or 'mind blindness' (e.g., Baron-Cohen, 1995, p. 5; Steiner-Bell & Kirby, 1998, p. 2) to describe major difficulties of people with ASD in Theory-of-Mind.

These views, however, are questionable, especially when considering that performances in paper-and-pencil Theory-of-Mind tasks do not transfer to real life situations (Bauminger & Kasari, 1999). If, for example, a person with ASD performs badly in false belief tasks but functions well in real life situations, what should be the basis for how the person's Theory-of-Mind is viewed? This is an area where people with ASD feel they are treated unfairly (e.g., Bovee, 2000; Cesaroni & Garber, 1991; O'Neill, 2000).

It could be difficult for the result of a test to be more real than the actual, everyday experiences of people with ASD. Section 3.3.3 pointed out the diversity found among individuals with ASD regarding their ability to understand what others think and feel. While one person with ASD has difficulties understanding what others think (Ward & Alar, 2000), another can relate to others both cognitively and emotionally (McMullen, 2000). Furthermore, one person with ASD spoke of her concerns not only for herself but

for all creatures, wishing to give back what she has as her gift of life (O'Neill, 2000). How do these real life results mesh with the concept of 'mind blindness?'

The gap between performance in test and real life situations also raises the issue of the nature of false belief tasks. They begin with prescribed answers that allow simple judgments of success or failure in the demonstration of Theory-of-Mind. This encourages researchers to look for answers which can be judged as pass or fail rather than focusing on *how* people with ASD construct their answers. This, in turn, results in potentially important information on the workings of the minds of people with ASD being overlooked. It is time to consider the limitations of the methods that are being used to measure the Theory-of-Mind of people with ASD and to look for ways to improve. It is, in fact, time to incorporate the lived experience of Theory-of-Mind into Theory-of-Mind research.

The Specific Deficit Approach. The specific deficit approach to understanding the Theory-of-Mind of people with ASD was based on early studies on false belief in children with ASD that showed a proportion of children with ASD demonstrated difficultly in understanding meta-representations in the form of false belief. The conclusion was that they had a deficit in Theory-of-Mind, and that this deficit was specific to the ASD population.

However, the review of Theory-of-Mind evaluation studies in Section 3.3.1 revealed inconsistencies in their results. For example, out of 332 participants with ASD who were tested with first order false belief tasks (e.g., Sally and Anne story, and M & M task), 38.88% provided appropriate answers, and out of 146 participants who were tested with second order false belief tasks (e.g., Village, Birthday Puppy story and Overcoat story), 43.25% gave appropriate answers (see Section 3.3.1). These inconsistencies indicate that any deficit in Theory-of-Mind is unique to a particular sample, and cannot be the basis for generalisations of the ASD population as a whole.

Kasari and Bauminger (1999) questioned the universality of Theory-of-Mind deficit in the ASD population. They found no difference between participants with high functioning ASD and typically developing participants regarding second-order false belief tasks. Furthermore, they claimed 'autism does not involve a specific impairment in theory of mind' and that 'theory of mind deficits are not unique to autism' (p. 85).

To say people with ASD suffer from 'mind blindness' or a 'Theory-of-Mind deficit' necessarily labels an entire population, and the effect of this may be to blind

researchers to the fact and significance of the diversity of Theory-of-Mind abilities within this population, and within the non-ASD population. This is not to suggest people with ASD have no difficulty with Theory-of-Mind, but it means that the successful performance of some people with ASD in this area needs to be taken seriously in framing the problem of Theory-of-Mind. An approach to Theory-of-Mind in the ASD population needs to be able to account for the diversity found throughout that population, as well as throughout the non-ASD population.

The specific deficit approach also tends to blind researchers to the question of *how* individuals with ASD arrive at the answers to false belief problems. Being oriented to a result – whether there is or is not a Theory-of-Mind deficit – this approach fails to enquire into what is happening in the mind that brings a person to a 'pass' or 'fail' in a false belief test. But it is precisely this area of enquiry that promises to be extremely useful for an understanding of Theory-of-Mind, and for the development of interventions within the field of general education as well as special education.

The discussion of the issues raised in this section need to go beyond a simple binary approach of pass or fail, in order to account for the wide variety of individual differences found within the ASD population. What is needed, therefore, is a methodology which allows for the inclusion of the variety of Theory-of-Mind experiences of people with ASD. To find a foundation for such a methodology, this study will return to philosophy as a source of ways to view and study the mind, and special education, as a source of ways to view and accommodate disabilities.

3.4 Theory-of-Mind: An Interdisciplinary Approach

This section discusses the study of mind from a philosophical perspective in order to assist in developing a methodology for studying Theory-of-Mind in the ASD population. This methodology would be interdisciplinary, lying at the conjunction of philosophy, psychology and special education. These three disciplines share a single subject, the human mind, working from different perspectives and using different methods. This chapter concludes with some research questions to guide the investigation into the Theory-of-Mind of people with ASD as subjectively experienced by students with ASD and objectively understood by their teachers.

3.4.1 Philosophical Issues in the Study of Experience

The mind can be understood either subjectively or objectively (Nagel, 1986). A subjective understanding of mind conveys the experience of mind, but is characterised by a knowledge that is private, individual, and lacking the public nature that is required in the social sciences. An objective understanding of mind is characterised by knowledge that is public, open to all, but gained at the cost of losing a sense of the lived experience of mind (Hwang, Evans & Mackenzie, 2007).

At the heart of the objective study of consciousness is what Chalmers calls the 'hard problem' of consciousness (Chalmers, 1995, p. 3). The easy problems of consciousness involve explaining cognitive abilities and functions, the causal mechanisms of behaviour that arise from the experience of mental states. For Chalmers (1995), these problems are easy because no matter how successful the solutions may be, they leave untouched the question of experience itself.

What does it mean to *experience*? This question was examined by Nagel in his seminal essay *What is it Like to be a Bat?* (1974). He argued that experience inescapably entails subjectivity, which has a very specific character. For an organism to have conscious experience, there must be 'something it is like to *be* that organism … something it is like *for* the organism' (p. 436).

Nagel (1974) points out that the use of the expression 'what it is like' can be misleading, as here it does not mean 'what (in our experience) it *resembles*' but rather 'how it is for the subject himself' (p. 440). One can imagine, for example, being a bat – hanging upside down, sensing the world chiefly through sound, and eating insects – but what all this tells is how it would be like for *us* to live like a bat. It does not tell us what it is like for a *bat* to be a bat. The evidence for that must come from bats, not from us.

In other words, subjective experience has the quality of being 'essentially connected with a single point of view' and such a view is necessarily abandoned in an objective study (Nagel, 1974, p. 437). For Nagel (1986), a view of the world becomes more objective as it abandons an individual perspective and so becomes available to others. A view of the world becomes more subjective the more it remains dependent on the perspective of the individual. Ultimate objectivity would be a view in which the viewer is eliminated altogether. It would be a view from nowhere (Nagel, 1986).

The movement from subjectivity to objectivity travels along a continuum, from a view based on one specific perspective to a view from nowhere. Subjectivity implies a view that is unique, and therefore private, while objectivity implies a view that is universal, and therefore shared. Of course, the two ends of this continuum are abstractions. There is no such thing as a view from nowhere, nor an experience that is *purely* private, because all views possessed by humans are based on a shared humanity. So for Nagel, the fundamental issue is not one of the privacy of experience, but of the type of experience. We, as human beings, cannot know what it is like to be a bat; but we do know what it is like to be a human being. Of course, we also find a continuum of experience among humans. We cannot know what it would be like to be blind from birth, but we can know, in the sense that we can imagine, what it would be like to lose our sight. Nagel (1974) says:

> The distance between oneself and other persons … can fall anywhere on a continuum … My point is rather that even to form a *conception* of what it is like to be a bat … one must take up the bat's point of view. If one can take it up roughly, or partially, then one's conception will also be rough or partial. (Note 8, p. 442)

It follows that the attempt to study the lived experience of people with ASD necessarily involves imagination, the capacity to take up a point of view which is not our own. Imagination helps bridge the gap between the providers and interpreters of the subjective experiences that make up ASD. What is required is a method that provides an objective means of studying and classifying the subjective, individual experiences of a particular population. This would be a method that enables a journey from the individual and subjective to the shared and objective, but without losing contact with the individuality of the subject(s) concerned. A grounded theory approach can provide such a method. It is based firmly on the lived experience of individuals, but through the systematic analysis of subjective data it allows for the emergence of a shared, objective understanding of the nature of Theory-of-Mind. This is discussed further in Chapter 4 *Methodology*.

Where would the data for such an enterprise come from? Ultimately, it would have to rely on language – reports, whether written or spoken, from those undergoing the experience (Chalmers, 1999). It may not be possible to fully understand what it is like to be a person with ASD, any more than it is possible to fully understand what it is like to be any other human being. What can be achieved, however, is an exploration of a shared humanity by opening up communication with people with ASD, in a way that enables this

communication to be part of an emerging scientific understanding of this particular population (Chalmers, 1999).

3.4.2 Viewing Disabilities through Special Education

As philosophy assists in viewing and studying mind, special education assists in viewing and accommodating disabilities. Special education can be broadly defined as educating individuals with disabilities. This study brings to the study of Theory-of-Mind in students with ASD two special education concepts which constitute views of disability and suggests methods to accommodate them. These are the social model of disabilities and self-determination.

Social Model of Disabilities. This study adopts a social model of disabilities, which sees disability as socially constructed (Oliver, 1990). It is therefore sensitive to the need to construct a social environment where people with disabilities can function effectively, and so no longer be 'disabled' within it. Such a model sees the aim of research into people with disabilities to be their personal liberation, allowing them the freedom to pursue their own projects and aspirations (Moore, Beazley & Maelzer, 1998).

Self-Determination. This study also respects the principles of self-determination. Self-determination refers to 'the specific behaviours or actions in which people engage that, in turn, enable them to exert control over their lives' (Wehmeyer, Sands, Knowlton & Kozleski, 2002, p. 237). Self determined behaviour is characterised by autonomous and self-regulated behaviour, psychologically empowered initiation and response, and self-realising action (Wehmeyer, Agran & Hughes, 1998). Self-determination is based on the concept of normalisation, a normal daily rhythm for people with disabilities and the opportunity for them to undergo the normal developmental experiences of the life cycle (Nirje, 1969).

The grounded theory approach respects these two principles of special education, as it is based on the assumption that knowledge comes from communication with the subjects of study. These two principles have, in particular, influenced the modes of communication used in this study. (Refer to Chapter 4 *Methodology* for details.) The social model of disabilities is chiefly concerned with creating an environment which can accommodate disability. The environment of this study was shaped by giving students with ASD the freedom to express their inner experiences in whatever way they chose, whether speaking,

writing or drawing. This element of choice is an expression of self determination, empowering participants to choose what they want and reject what they do not want, and so both principles of special education are entailed in the practice of including and respecting the voices of students with ASD.

3.4.3 Rationale and Research Questions based on an Interdisciplinary Approach

Research on Theory-of-Mind has been conducted in various fields, including psychology, philosophy, psychiatry and education (Flavell, 2004). However, the review of Theory-of-Mind studies has revealed limitations in the way Theory-of-Mind has been conceived of and studied, limitations that have particular relevance for special education (Section 3.3.4). This study investigates Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers based on an interdisciplinary approach embracing psychology, philosophy and education (Figure 3.2). The perceived strengths and weaknesses of previous Theory-of-Mind studies in the field of psychology have provided the starting point for this study. Based on the foundation of psychology, this study will be supported by philosophy of mind regarding the study of mind (Section 3.4.1) and by special education regarding the accommodation of disabilities (Section 3.4.2).

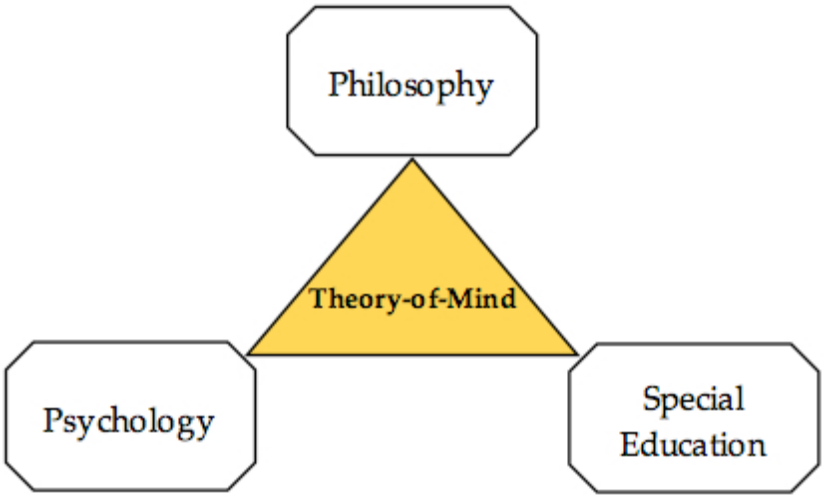


Figure 3.2 **Interdisciplinary approach to Theory-of-Mind**

Traditional Theory-of-Mind study has focused on mind as an entity possessed of characteristics that can be measured objectively by a number of standard tasks. But while these tasks can assess minds psychologically (i.e., in terms of what they do), less attention

has been given to examining minds phenomenally (i.e., in terms of how they feel). Therefore many people with ASD have been widely accepted, on the basis of psychological tests, to have no Theory-of-Mind, or a Theory-of-Mind 'deficit' regardless of individual differences between them and their own subjective experiences.

This study applies concepts from philosophy of mind (e.g., the phenomenological study of mind) and special education (e.g., the social model of disabilities and self-determination) to its methodology, in order to accommodate the individual experiences and needs of students with ASD. This will facilitate the process of allowing students with ASD to bring out their inner experiences which, in turn, can provide valuable implications for education. Looking at teachers' understanding of the Theory-of-Mind of their students with ASD will help educators to better understand their students with ASD and assist them to achieve their full potential.

This study comprises two major parts, Theory-of-Mind as subjectively experienced by students with ASD and Theory-of-Mind as objectively understood by their teachers. This study takes a first person perspective to elucidate the nature of mind as experienced by people with ASD. – a phenomenology of mind. The following questions will be explored:

1.1 How do students with ASD experience their own minds and internal worlds?
1.2 How do students with ASD understand the minds of others and the external world?
1.3 How is the experience of one's own mind and internal world connected to the understanding of the minds of others and the external world?

The answers to these questions require a qualitative and phenomenological stance, an inside-out approach, because knowledge of human minds and actions always requires understanding the subjective consciousness of the person from the inside, and internal understanding is a central concept of qualitative inquiry (Schwandt, 2000).

This study also explores teachers' understanding of and attitudes towards the Theory-of-Mind of their students with ASD through the following questions:

2.1 How do educational professionals construe the Theory-of-Mind understanding of their students with ASD?
2.2 What are the similarities and differences between teachers' understanding of the Theory-of-Mind of their students with ASD and the subjective experiences of Theory-of-Mind held by students with ASD?

Answers to these questions are sought guided by two methodologies, a grounded theory approach and mixed methods research. This is discussed further in the next chapter, *Methodology*.

CHAPTER 4
METHODOLOGY

4.1 Introduction

The present study is an investigation into the nature of Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers, guided by a grounded theory approach and a mixed methods research design (Figure 4.1). This is in contrast to previous studies of Theory-of-Mind, which have focused on Theory-of-Mind as objectively measured, usually in terms of false belief (e.g., Baron-Cohen, Leslie & Frith, 1985; Perner, Frith, Leslie & Leekam, 1989).

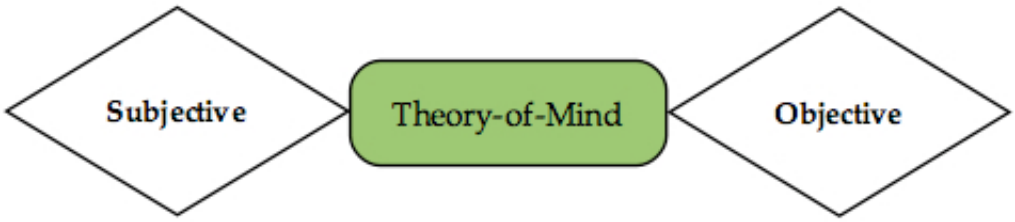


Figure 4.1 **Theory-of-Mind subjectively experienced and objectively understood**

This study aims to build a theory embracing both subjective and objective aspects of Theory-of-Mind. A grounded theory approach enables a theory building process that accommodates the complex nature of mind, and a mixed methods research design strengthens the theory building process and allows any findings to be triangulated between both qualitative and quantitative approaches.

The investigation was divided into two studies. Study 1, *Theory-of-Mind as subjectively experienced by students with ASD*, sought answers to three research questions: (1) How do students with ASD experience their own minds and internal worlds?; (2) How do students with ASD understand the minds of others and the external world?; and (3) How is the experience of one's own mind and internal world connected to the understanding of the minds of others and the external world?

Study 2, *Theory-of-Mind as objectively understood by their teachers*, sought answers to two research questions: (1) How do educational professionals construe the Theory-of-Mind understanding of their students with ASD?; and (2) What are the

similarities and differences between teachers' understanding of the Theory-of-Mind of students with ASD and the subjective experiences of Theory-of-Mind held by their students?

This chapter is composed of nine sections (Figure 4.2). Section 4.1 *Introduction* provides an overall review of the methodology. Section 4.2 *Methodological considerations* discusses the two methodologies adopted by this study, grounded theory and mixed methods research. Section 4.3 *Research design* addresses the theoretical issues impacting on this study and its overall research design. Section 4.4 *Development of data collection instruments* introduces the data collection methods that have been developed for this study. After ethics approval was gained (Section 4.5 *Ethical considerations*), these data collection methods were implemented in the pilot and main studies (Section 4.6 *Data collection*). Section 4.7 *Data analysis* discusses how qualitative and quantitative data were collected for Studies 1 and 2, analysed, compared and integrated according to eight analytic stages. Finally, a review of this chapter is presented in Section 4.8 *Conclusion*.

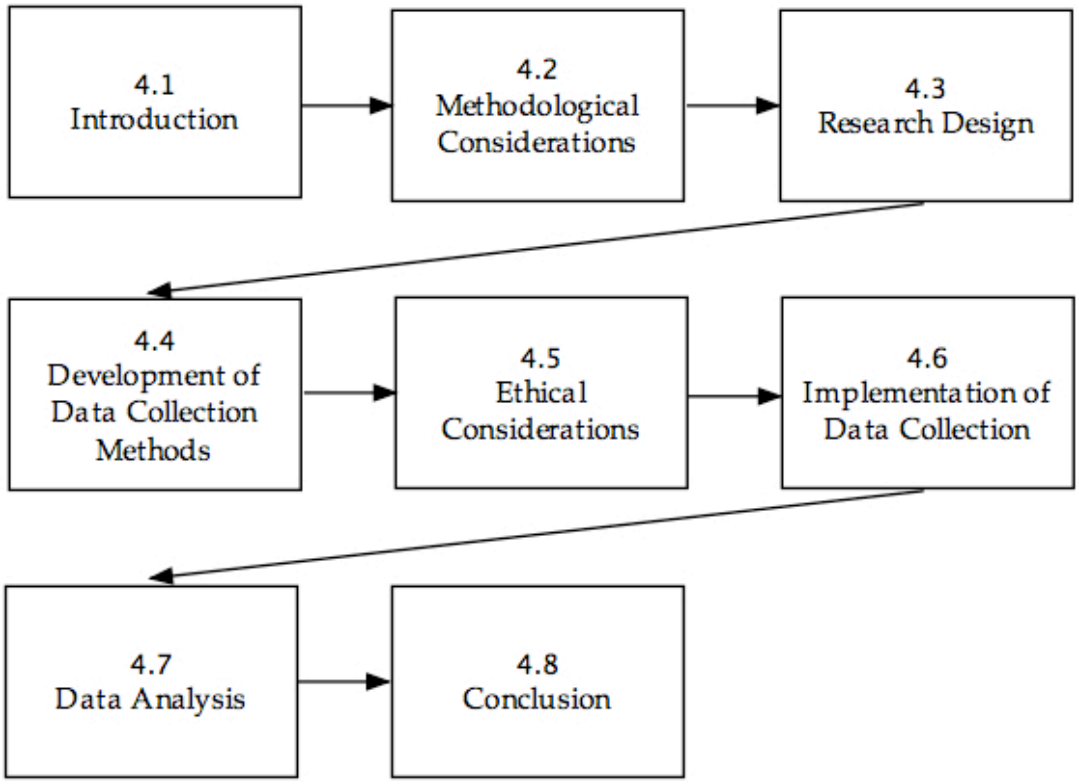


Figure 4.2 **Structure of chapter four**

4.2 Methodological Considerations

A methodology provides the framework of the entire process of research (Creswell & Clark, 2007). Entailing an understanding of the philosophical principles and social contexts underlying research, it is broader than the specific data collection and analysis methods employed (Newman, 2006). The present study adopts two methodologies, a grounded theory approach and a mixed methods research design. This section discusses the definition and rationale of these two methodologies, and their role in the design and conduct of the study.

4.2.1 Grounded Theory Approach

Grounded theory provides the primary methodology used in this study. Glaser defines grounded theory as 'a specific methodology on how to get from systematically collecting data to producing a multivariate conceptual theory' (Glaser, 1999, p. 836). Grounded theory methodology aims to generate theory through a process of constant comparison (Kendall, 1999), and emphasises the need to begin a project with no preconceived theory (Strauss & Corbin, 1998).

The absence of a preconceived theory may lead to grounded theory being regarded as purely inductive. Charmaz (2005) argues against this, saying 'no qualitative method rests on pure induction' (p. 509), because the conceptual categories that are the result of grounded theory analysis, and that give rise to a theory, themselves emerge from the researcher's interpretation of data. In other words, in grounded theory analysis, theory and data are held in an on-going conversation, in which the direction is set by the data rather than by a theory.

This debate between inductive and deductive approaches is related to the use of literature. Glaser (1992) saw the role of grounded theory as generating new knowledge rather than adding to old. He therefore felt it better for a researcher to review the related literature only after core categories emerge from the specific data, to prevent the analytic process from being contaminated. This works best when researching in a new area, when there is not a great deal of literature already existent. When an abundance of literature on the topic does exist, he advised that the role of grounded theory would be to organise or synthesise the existing literature in new ways. In any event, he saw the role of grounded theory as allowing something original to emerge from the data.

Interviews play a central role in data collection for a grounded theory study (Creswell, 1998). Grounded theory then guides data analysis methods through constant comparison of data within an iterative, inductive and deductive cycle, allowing theory to emerge directly from data (Charmaz, 2005). It begins with basic description, grows to conceptual ordering and develops to theory (Patton, 2002). This systematic analysis, integrating the strengths of quantitative methods with qualitative approaches (Walker & Myrick, 2006) makes grounded theory a specific methodology.

4.2.1.1 Variations of Grounded Theory

Grounded theory originated from the work of Glaser and Strauss (1967), who developed it independently of each other (Glaser, 1978, 1992; Strauss & Corbin, 1998). Since then different two versions, Glaserian and Straussian, of grounded theory have emerged. The differences between the two can be seen within the ways that theory emerges from the process of data analysis.

Glaser (1978) divides this process into two phases, substantive coding and theoretical coding. *Substantive coding* develops categories and properties by conceptualising data line by line. A category is a conceptual element of a theory, and a property is a conceptual element of a category (Glaser & Strauss, 1967). Substantive coding is divided into open coding and selective coding. Open coding refers to the initial stage, where the researcher has no preconceived concepts and is open to whatever may emerge from the data. Once the data yields a core category the coding process becomes selective, as it is guided by the emergent core category (Glaser, 1992). *Theoretical coding* emerges from the relationships between a number of categories (both core and near core) which give rise to a theory (Glaser, 1978).

Strauss and Corbin (1998) classify data analysis into a three-phase process of open coding, axial coding and selective coding. *Open coding* is a creative process that analyses the data into discrete phenomena that appear to have significance – 'concepts'. This corresponds to Glaser's concept of open coding.

Axial coding examines the categories revealed by open coding, treating each as an 'axis' around which conceptual relationships can emerge. Categories are contextualised to reveal a broader pattern that can tell an explanatory story regarding the workings of the revealed phenomena. This process is aided by the use of a prescribed 'paradigm', an organisational scheme that is applied to the categories (Strauss & Corbin, 1998). The

paradigm is made up of: *Conditions*, the circumstances within which the phenomena occur, answering such questions as 'Why?', 'Where?' and 'When?'; *actions/intentions*, focusing on human responses to these conditions, answering such questions as 'By whom?' and 'How?'; and *consequences*, which are the outcomes of actions/intentions. *Selective coding* integrates these categories into a theory (Strauss & Corbin, 1998). This third is similar to Glaser's theoretical coding.

The major difference between the two versions of grounded theory is the use of a prescribed coding paradigm as part of what Strauss and Corbin (1998) call axial coding (Kendall, 1999; Walker & Myrick, 2006). Glaser (1992) argues that axial coding would constrain the openness of a study by directing researchers toward data that fulfils the paradigm, rather than allowing a theory to emerge naturally from the data itself. This criticism is shared by other grounded theory researchers (e.g., Robrecht, 1995; Walker & Myrick, 2006). Kelle (2005) however, sees the help the paradigm can give to novices by providing a clear framework to data analysis. Kendall (1999) describes it as an escape from being lost in data. At the same time Kelle (2005) and Kendall (1999) both acknowledge the limitations of the coding paradigm, that it is linked to a certain micro-sociological perspective (e.g., looking for causes and consequences) and tends to end with a descriptive product instead of what a grounded theory aims to produce, a theory.

4.2.1.2 Data Analysis and Verification of Grounded Theory

In all versions of grounded theory, regardless of Glaserian or Straussian versions, the general process of data analysis is *constant comparison*. This is well described by Walker and Myrick (2006).

In coding, data are broken down, compared, and then placed in a category. Similar data are placed in similar categories, and different data create new categories. Coding is an iterative, inductive, yet reductive process that organises data, from which the researcher can then construct themes, essences, descriptions, and theories (Walker & Myrick, 2006, p. 549).

Both Glaser and Strauss emphasise the importance of 'memoing', the writing-up of ideas as they occur to the researcher during data analysis. Glaser (1999) defines theoretical memoing as the core stage of grounded theory. Strauss and Corbin (1998) see memos as analytical rather than descriptive, containing 'the products of analysis or direction for the analyst' (p. 217). Birks, Chapman and Francis (2008) believe that the significance of

memoing is not limited to grounded theory as it allows the conceptual leap from raw data to explanatory abstractions in qualitative study.

For verifying data, Glaser (1978) believes that thorough substantive coding, conceptualising data line by line, leads to the verification of the categories. In other words, the method of constant comparison itself verifies the accuracy of the work (Walker & Myrick, 2006). Strauss and Corbin (1998) provide two methods to validate the theoretical scheme. The first is to return to the raw data and compare the scheme against it. The second method, known as member check, is to check the story that has emerged from data analysis with the respondents (Creswell & Clark, 2007).

4.2.1.3 Application of Grounded Theory to This Study

This study adopts a grounded theory approach to the study of Theory-of-Mind in students with ASD because: The subjective experiences of Theory-of-Mind in students with ASD have not been studied before; these subjective experiences need to be explored in order to build a theory; and the nature of mind requires a systematic analytic approach to handle its complexity.

This study uses theoretical sampling to collect data from 'individuals who can contribute to the evolving theory' (Creswell, 1998, p. 118). Qualitative data were collected using in-depth interviews as a primary method and document review as a secondary method. For purposes of data analysis, this study remains aware of the difference between Glaserian and Straussian grounded theory and adopts a Glaserian approach as it is less prescriptive and more open than the Straussian approach, better suiting the complexity of the mind which is the subject matter of this study. The data analysis process is discussed in detail in Section 4.7.

4.2.2 Mixed Methods Research

Mixed methods research provides the secondary methodology used in this study. Creswell and Clark (2007) define mixed methods research as 'the combination of quantitative and qualitative approaches [which] provides a better understanding of research problems than either approach alone' (pp. 8-9). According to Johnson and Onwegbuzie (2004), mixed methods research allows researchers the freedom to select what they see as the most suitable approach to research questions, without any preconceived assumptions regarding

the superiority of a given research method. Mixed methods research can therefore embrace both qualitative and quantitative approaches.

Philosophically, the mixed methods research paradigm is associated with pragmatism, as its primary concern is whatever method gives a workable solution to a given research question (Creswell & Clark, 2007). This emphasis on results allows it to break free from the traditional debate between qualitative and quantitative methods (Johnson & Onwuegbuzie, 2004), and by unifying them into a single study offers to offset their respective weaknesses (Creswell & Clark, 2007). Practically, mixed methods research is characterised by the use of triangulation and multiplism (Greene, Caracelli & Graham, 1989). Triangulation strengthens the validity of research results by using multiple methods to investigate the same phenomenon, thus offsetting biases, and multiplism supports triangulation by recruiting as many data sources as possible (Greene et al., 1989).

4.2.2.1 Mixed Methods Design

Greene et al. (1989) speak of five mixed methods research designs – triangulation, development, expansion, complementarity and initiation – of which the first three are relevant to this study because they strengthen the validity of the results gained. Triangulation seeks a convergence from different methods, while development refers to the use of the results gained from one method to guide the use of another method. Lastly, expansion refers to the use of appropriate methods in order to increase the range and depth of the inquiry (Greene et al., 1989).

Creswell and Clark (2007) provide a four-fold classification of mixed methods research design. These are triangulation, embedded, explanatory and exploratory designs. Triangulation design is identical with that defined by Greene et al. (1989). Embedded design incorporates different forms of data into a study to increase the number of workable solutions that are available for different questions (Creswell & Clark, 2007). Explanatory and exploratory designs use both quantitative and qualitative data, supplementing one with the other to develop or build upon the initial results. In explanatory design, the initial data is quantitative, while in exploratory design the initial data is qualitative (Creswell & Clark, 2007). In this way they are similar to the concept of development design as explained by Greene et al. (1989).

This study draws upon the triangulation and exploratory designs in particular. Triangulation is used to strengthen the validity of research findings, and exploratory

design, which is particularly oriented to a qualitative study, is relevant to the context of this study, where instruments are not available, variables are unknown, and a guiding framework or theory is not available (Creswell & Clark, 2007). Section 4.2.2.3 further discusses how these designs of mixed methods research were applied in this study.

4.2.2.2 Data Analysis and Validity

Creswell and Clark (2007) propose two types of mixed methods data analysis, sequential and concurrent. Sequential data analysis fits with exploratory design. It is composed of three stages. In studies such as this, which is predominantly qualitative, analysis begins with qualitative data analysis, transforms the results into quantitative data in stage two, and correlates the two sets of quantitative data. Concurrent data analysis fits with triangulation. It consists of two phases, where two sets of data are first analysed independently of each other, and then merged into one set of data.

In both types of mixed methods data analysis, data are transformed from qualitative to quantitative or vice versa. This data transformation process is unique to mixed methods research, and it raises the issue of how to check the validity of the results.

The most common validity threats in mixed methods research concern data transformation and convergence on the one hand, and the selection of weak results from one study to inform the other study on the other (Creswell & Clark, 2007). For the first validity threat, Creswell and Clark advise developing a matrix that makes the data transformation process as transparent as possible. For the second validity threat, they advise the necessity of choosing only the significant results of the study, those which reveal major themes, as the foundation for follow-up analysis.

4.2.2.3 Application of Mixed Methods Research to this Study

This study comprises two smaller studies, Study 1 and Study 2. Study 1, *Theory-of-Mind as subjectively experienced by students with ASD*, uses an exploratory design in order to develop a clear picture of the subjective experiences of Theory-of-Mind held by students with ASD. No previous studies of the Theory-of-Mind of the ASD population have taken this approach, and so no clear variables are known. Further, this approach could expand our understanding of Theory-of-Mind in the ASD population beyond a normative model that is based on limited testing (e.g., false belief tasks) to credit Theory-of-Mind.

The subjective experiences of Theory-of-Mind are explored through the qualitative methods of in-depth interviews and document review. This is followed by a quantitative study of IQ and social competence using psychological instruments. Qualitative data are analysed guided by a grounded theory approach. Major themes from the qualitative results are then transformed into a quantitative form so they can be analysed statistically and compared with the quantitative data (Figure 4.3).

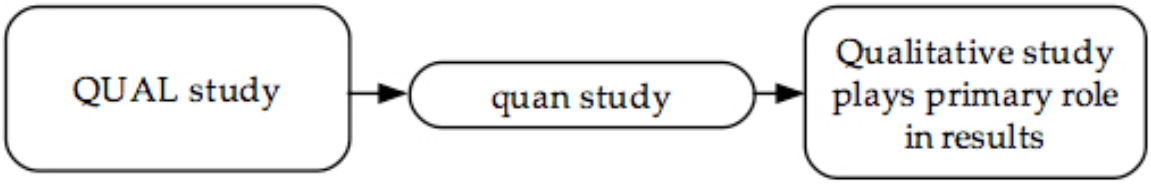


Figure 4.3 **Exploratory design of Study 1 (Adapted from Creswell & Clark, 2007)**

Study 2, *Theory-of-Mind as objectively understood by their teachers*, compares and triangulates qualitative data gained from in-depth interviews and document review with the quantitative data gained from the Teacher questionnaire (Figure 4.4).

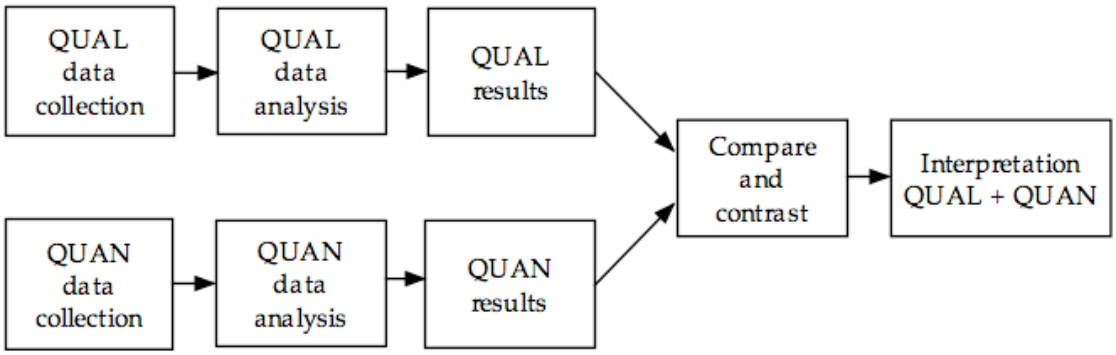


Figure 4.4 **Triangulation design of Study 2 (Adapted from Creswell & Clark, 2007)**

This section has discussed the two methodologies used in this study, a grounded theory approach and mixed methods research. Section 4.3 discusses the research design of Studies 1 and 2 as products of these two methodologies, beginning with the theoretical views on mind and disabilities which had a significant influence on the planning and design of this study.

4.3 Research Design

As mentioned above, this study adopts a mixed methods research design composed of qualitative and quantitative data collection methods. Qualitative data collection methods comprise in-depth interviews with students with ASD and their teachers, and a review of documents produced by students and teachers. Quantitative data collection methods comprise psychological tests evaluating IQ and social competence of students, and a questionnaire for teachers (Table 4.1).

Table 4.1 ***Summary of Data Collection Methods***

Methods	**Participants**			
	Students		**Teachers**	
Qualitative	In-depth interview	Document review	In-depth interview	Document review
Quantitative	IQ	Social competence	Questionnaire	

Study 1 concerns the inner experiences of students with ASD regarding Theory-of-Mind, and Study 2 investigates the understanding of these inner experiences held by their teachers. These studies are analysed independently, and their results compared and integrated (Figure 4.5).

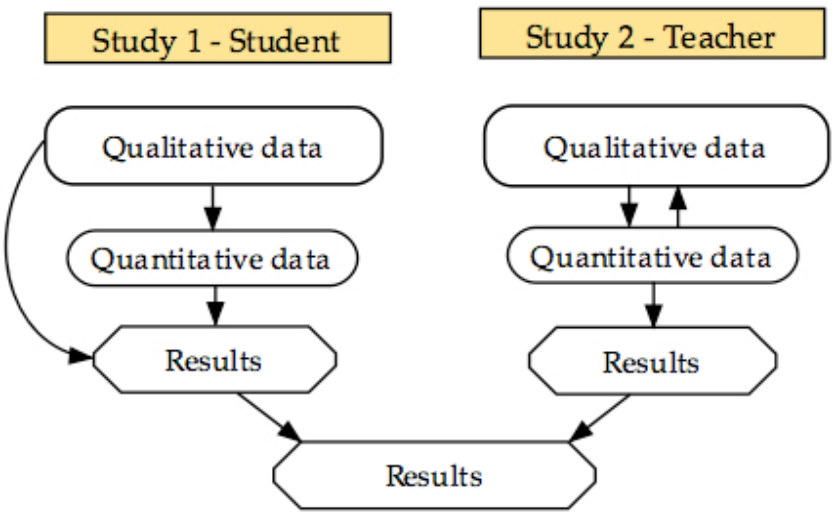


Figure 4.5 **Research design of Studies 1 & 2**

Research Design of Study 1. The subjective experiences of Theory-of-Mind held by students with ASD were first sought in a qualitative study, using in-depth interviews supplemented with document review. The interview schedule is discussed in Section 4.4.1.1, and the document review in Section 4.6.4.1. A quantitative study was then undertaken, using IQ and social competence evaluations (Figure 4.6). Evaluation tools for IQ and social competence are discussed in Section 4.6.4.1.

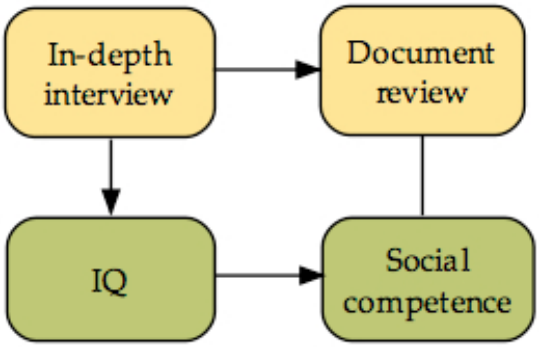


Figure 4.6 **Research design of Study 1**

Research Design of Study 2. The understanding of teachers regarding the Theory-of-Mind experiences of their students with ASD was sought through qualitative and quantitative study (Figure 4.7). The qualitative study was composed of in-depth interview with teachers and a review of teacher-produced documents. The teacher questionnaire provided quantitative data. The interview guide and the teacher questionnaire are discussed in Section 4.4.2.1 and 4.4.2.2.

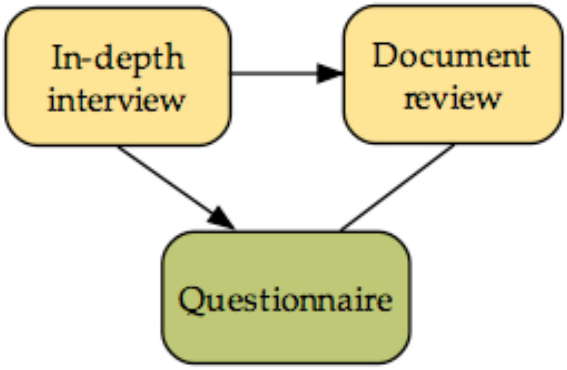


Figure 4.7 **Research design of Study 2**

4.4 Development of Data Collection Instruments

Interview schedules were composed for students with ASD and their teachers. The students' interview schedules were transformed into an interview booklet to allow interviewees to express themselves in writing if they wished to. The development of these instruments is discussed in the following section.

4.4.1 Development of Data Collection Instruments for Study 1

4.4.1.1 Student Interview Schedule

The student interview schedule was developed to allow for a semi-structured interview using open-ended questions. The questions emerged from a reading of autobiographies written by people with ASD. Glaser (1992) saw such nonprofessional ethnographic literature as helpful, at any stage of research, in generating concepts for grounded theory. This literature provided concrete materials to assist in the process of drawing out the inner experiences of students with ASD. Drawings and stories from the intervention book, *Teaching Children with Autism to Mind-Read: A Practical Guide for Teachers and Parents* (Howlin, Baron-Cohen & Hadwin, 1999) were also a source of material for the interview schedule (Section 4.6.4.1).

First person accounts of the experience of ASD came from five autobiographies written by people with ASD: *Do you understand me?* (Brøsen, 2005); *Born on a blue day* (Tammet, 2006); *Send in the idiots* (Nazeer, 2006); *Life behind glass* (Lawson, 1998); and *Thinking in pictures* (Grandin, 2006). These five books were selected on the basis of the authors' age, disabilities, and the richness of their inner experience. The ages of the authors ranged from the teens to the fifties.

The autobiographies yielded nine frequently mentioned themes concerning subjective experiences of the mind, one's own and that of others. These are desire, emotion, empathy, false belief, perception, sensory perception, social relationships, thinking processes and relationships with animals. These themes are briefly discussed below.

Desire was clearly articulated through what the authors liked and disliked. For example, Brøsen (2005) said that she 'prefers things to be the same every day' (p. 7) and she 'dislikes it when other people swear and talk rudely about each other' (p. 27). She also hopes to grow old and retire so she can live in a little white house in the country and raise

lots of cats. Tammet (2006) tells of his love for fairy tales. 'From about the time I first started school I developed a great love for and fascination with fairy tales – the stories and intricately detailed illustrations filled my head with vivid mental pictures of towns overflowing with porridge' (p. 55).

Emotion was a mystery to Lawson (1998), who confessed, 'I find emotions interchangeable and confusing. Growing up, I was not able to distinguish between anger, fear, anxiety, frustration or disappointment' (p. 8). Tammet (2006) said, 'Thinking of calendars always makes me feel good, all those numbers and patterns in one place. Different days of the week elicit different colours and emotions in my head. Tuesdays are a warm colour while Thursdays are fuzzy' (p. 8).

Empathy was acknowledged as being difficult to develop (Nazeer, 2006). Nazeer wanted to see how this affects the lives of people with ASD, saying 'I want to understand how a life is different when it lacks these elements or when they're not fully formed' (p. 7). This issue provided one motivation for his journey to find his classmates with whom he studied at a nursery for children with ASD. Grandin (2006) explained how she learnt empathy through the use of a self-invented squeeze machine. She said, 'as my nervous system learned to tolerate the soothing pressure from my squeeze machine, I discovered that the comforting feeling made me a kinder and gentler person' (p. 84). Afterwards, 'I was able to transfer that good feeling to that cat. As I became gentler, the cat began to stay with me' (p. 84).

False belief appeared as an issue in the work of Nazeer (2006) and Grandin (2006). Nazeer expressed doubt about the reliability of false belief task experiments for children with ASD, as they could be tainted by the anxiety they create in their subjects. Grandin explained how it is very difficult for her to understand how others practise deception, but not impossible. She writes:

> Some researchers don't believe autistics are capable of deception. They subscribe to Uta Frith's conception of autism, wherein people with the syndrome lack a 'Theory-of-Mind'. According to Frith, many people with autism are not able to figure out what another person may be thinking. It is true that autistics with severe cognitive deficits are unable to look at situations from the vantage point of another person. But I have always used visualisation and logic to solve problems and work out how people will react, and I have always understood deception. (pp. 156-157)

Perception was felt to be significantly different from those without ASD. Lawson (1998) expressed her feeling of being different from others because ASD gave her a sense of

being a perpetual onlooker towards her own life. She said, 'I knew I was different, but I didn't know why' (p. 40). Grandin (2006) wrote, 'While I was trapped between the windows, it was almost impossible to communicate through the glass. Being autistic is like being trapped like this' (p. 20). She was aware of a sense of otherness from her early years. This feeling of otherness was also expressed by Tammet (2006), who said, 'for many years I grew up with no understanding of why I felt so different from my peers and apart from the world around me' (p. 13).

Sensory perception was characterised by extreme sensitivity. Brøsen (2005) wrote, 'I have a very heavy blanket filled with hollow balls. I need it because my skin doesn't have the same sensitivity as other people's skin. The balls help my skin to feel the way it should' (p. 41). She also explained how she reacted to unpleasant touches, saying, 'I sometimes hit people, without meaning to, if they touched me, because it felt really bad' (p. 41). Lawson (1998) had the same problem. 'I did not understand why I was afraid of touch but now I think it just caused lots of sensations that were overwhelming for me. At the same time, I wished I could be hugged or touched' (p. 41). Lawson also explained how everyday sounds, such as car horns, or the buzzer on a microwave oven, caused her discomfort.

Social relationships are described as presenting difficulties. Brøsen (2005) said, 'I find it very hard to see which way to pass people when they are walking towards me' (p. 17). She expressed her wish for friendship, saying 'I usually keep to myself. Whenever I do play with the girls from my form I'm very happy' (p. 23). Lawson (1998) explained her difficulty in managing her affection towards a female friend, as she became her friend's shadow which in turn disturbed her friend.

Thinking processes are said by Grandin (2006) and Tammet (2006) to be largely visual. Grandin said, 'I also visualise verbs. The word *jumping* triggers a memory of jumping hurdles at the mock Olympics held at my elementary school' (p. 14). Grandin used visual thinking for abstract thought. She said 'As a teenager and young adult I had to use concrete symbols to understand abstract concepts such as getting along with people and moving on to the next steps of my life' (p. 17). Tammet associated words with colour. He wrote, '*yoghurt* is a yellow word, *video* is purple and *gate* is green. I can even make the colour of a word change by mentally adding initial letters to turn the word into another. *At* is a red word, but add the letter H to get *hat* and it becomes a white word' (p. 11). Grandin,

however, developed other ways of thinking, including musically and mathematically, as well as verbal logically driven thinking.

Relationships with animals are important to some of these authors (Brøsen, 2005; Grandin, 2006; Lawson, 1998; Tammet, 2006). They could relate to animals better than to people, and it was easier for them to understand the intentions and desires of animals than those of people (Brøsen, 2005; Grandin, 2006).

These nine themes formed the basis of the interview schedule. Once constructed, it was revised through three discussion sessions with three experts in ASD, special education and research methodology. The first expert, who was awarded a PhD in special education with a thesis on intervention programs for students with ASD, has extensive experience with students with ASD, and has taught at a number of universities on ASD and intervention. This expert advised on the applicability of the interview schedule. The second expert was awarded a PhD in special education with a thesis concerning comparative and ethnographic research on inclusion in English and Greek secondary schools. This expert advised on methods of inquiry. The third expert was awarded a PhD with a thesis on longitudinal studies of early childhood, and is a specialist in special education and research methodology.

The interview schedule was translated into Korean and its applicability was refined through three meetings with five Korean special education teachers in Republic of Korea. These teachers all majored in special education and have worked at special schools and special units of mainstream schools for five to 10 years. They also advised on interview materials, selecting stories and drawings from the intervention workbook *Teaching children with autism to mind-read: A practical guide for teachers and parents* (Howlin et al., 1999) which were felt to be culturally appropriate.

The interview schedule was structured by following a direction from concrete to abstract, from affective to cognitive, and from self to other. Interview questions formed with concrete materials open the interview, followed by questions concerning abstract topics. Questions about feeling come first, and questions about thinking follow. Questions about the student himself come first, followed by questions about others.

4.4.1.2 Student Interview Booklet

The interview schedule was made into a booklet, which allowed for an alternative form of communication during interviews for those students who prefer writing over speaking. (Refer to Appendices A1 and A2 for English and Korean versions of the interview booklet.) The interview booklet is made up of self completion statements based on the interview schedule. Examples are presented in Table 4.2.

Table 4.2 ***Examples of Self-Completion Statements in Interview Booklet***

Interview Schedule Questions	Interview Booklet Questions
How do you feel when your friend hits you?	When my friend hits me, I feel ( ).
How do you feel when your mum is very sick?	When my mum is very sick, I feel ( ).
What does your friend do for you?	My friend does ( ) for me.
What sounds do you like?	I like to hear ( ).
When you think of the word 'crying', what does it remind you of?	'Crying' reminds me of ( ).

This section discussed the development of data collection instruments for Study 1. The next section discusses the development of data collection instruments for Study 2.

4.4.2 Development of Data Collection Instruments for Study 2

A teacher interview guide and questionnaire were developed to gather data on teachers' beliefs and attitudes regarding the Theory-of-Mind of their students with ASD. The interview guide was designed to gather qualitative data from in-depth interviews with teachers, while the questionnaire was designed to gather quantitative data.

4.4.2.1 Teacher Interview Guide

A teacher interview guide was developed to seek data on the understanding of teachers regarding their students' Theory-of-Mind. It was designed to provide a general direction and overall consistency regarding the contents and structure of the interview, while allowing the freedom to build an in-depth conversation tailored by the interviewer (Patton, 2002). The guide covers their students' family, medical and educational background, their observations of and attitudes towards of their students' experiences of Theory-of-Mind (Table 4.3).

Table 4.3 ***Teacher Interview Guide***

Medical and family background	Medication Disability diagnosis Siblings
Educational background	Previous educational placement Current abilities and disabilities Educational progress regarding the ability to understand mental states and control behaviours
Observation of students' Theory-of-Mind experiences	Demonstration of behaviours related to the nine themes and mental states Anecdotes indicating students' experiences regarding mental states
Attitudes towards students' Theory-of-Mind	Overall ability of students to understand their own mental states and those of others, and any behaviours based on them Developmental potential of students regarding their ability to understand mental states and the behaviour that is influenced by mental states

4.4.2.2 Teacher Questionnaire

The Teacher questionnaire was designed to gather data on how teachers of students with ASD regard Theory-of-Mind as experienced by their students. It was necessary to develop a questionnaire because no other instrument was available. The questionnaire also allowed teachers' views to be triangulated with their interviews and reviewed documents.

The developmental process of the Teacher questionnaire was guided by Neumann (2006). It was designed to elucidate the research questions by reflecting the nine themes found in the student interview schedule, along with the teachers' own experiences of teaching students with ASD. Likert scales with five levels of agreement were decided upon for response categories, and they were: One, *strongly agree*; two, *agree*; three, *neutral*; four, *disagree*; and five, *strongly disagree.* The questionnaire was then subjected to expert evaluation and formatted into four pages including a cover page, observing the advice of Neuman (2006), that the layout for a questionnaire should be 'clear, neat and easy to follow' (p. 295) (refer to Appendices B-1 and B-2 for English and Korean versions).

The Teacher Questionnaire was composed on the basis of eight themes: Overall ability and developmental potential of students with ASD in terms of Theory-of-Mind; emotions; emotional bonds and social relationships; the relationship between understanding one's own mind and that of another; understanding the mental states of others; sensory perception and the perception of being different; thinking and information processing; and false belief. These themes were chosen to reflect the themes used for the

Student Interview Schedule (Section 4.4.1.1) and the research questions for Study 2 regarding teachers' understanding of their students' Theory-of-Mind (Section 4.1). A total of 34 questions were composed following these eight themes. They are presented in Table 4.4.

Table 4.4 ***Themes and Questions of Teacher Questionnaire***

Theme 1: Overall ability and developmental potential of students with ASD in terms of Theory-of-Mind.	1.	I think that students with ASD do not understand that people act on the basis of mental states, such as intention, desire, emotion, false belief and thought.
	2.	I think that for students with ASD, the ability to understand that people act on the basis of mental states, such as intention, desire, emotion, belief and thought does not change over time.
	33.	I think that for students with ASD, the ability to understand that people act on the basis of mental states such as intention, desire, emotion, belief and thought can develop over time.
	34.	I think that for students with ASD, the ability to understand that people act on the basis of mental states such as intention, desire, emotion, belief and thought can deteriorate over time.
Theme 2: Emotions	3.	I think that students with ASD do not feel sadness.
	4.	I think that students with ASD do not feel happiness.
	5.	I think that students with ASD do not feel anger.
	6.	I think that students with ASD do not feel fear.
	7.	I think that students with ASD feel loneliness.
Theme 3: Emotional bonds and social relationships	8.	I think that students with ASD can develop strong emotional bonds with people.
	9.	I think that students with ASD can develop strong emotional bonds with animals.
	10.	I think that students with ASD are indifferent about having friends.
	11.	I think that students with ASD wish that their desire be understood by other people.
	23.	I think that students with ASD do not make eye contact.
	25.	I think that students with ASD can develop a sense of belonging.
Theme 4: Relationship between understanding one's own mind and that of others	12.	I think that students with ASD can understand the feelings of others if they understand their own feelings.
	13.	I think that students with ASD understand the feelings of others better if they can understand their own feelings.
	28.	I think that students with ASD can understand the intentions of others engaging in the same behaviour if they can understand their own intention to engage in a certain behaviour.
	29.	I think that students with ASD can understand the intentions of others engaging in the same behaviour better if they understand their own intention to engage in a certain behaviour.

Theme 5: Understanding the mental states of others	14.	I think that students with ASD do not understand the emotions of others.
	15.	I think that students with ASD do not understand the intentions of others.
	16.	I think that students with ASD do not understand the desires of others.
	17.	I think that students with ASD do not understand the beliefs of others.
	18.	I think that students with ASD do not understand the thoughts of others.
Theme 6: Sensory perception and perception of being different	19.	I think that students with ASD are extremely sensitive regarding one or more of the physical senses of seeing, hearing, touching, tasting and smelling.
	20.	I think that students with ASD are extremely insensitive regarding one or more of the physical senses of seeing, hearing, touching, tasting and smelling.
	21.	I think that some students with ASD experience the physical senses of seeing, hearing, touching, tasting and smelling in a mixed or jumbled way.
	22.	I think that students with ASD process sensory information (seeing, hearing, touching, tasting and smelling) differently to their peers without ASD.
	24.	I think that students with ASD are aware they are different from their peers without ASD.
Theme 7: Thinking and information process	30.	I think that students with ASD think in pictures.
	31.	I think that students with ASD process information differently from their peers without ASD.
	32.	I think that students with ASD process information with no individual differences.
Theme 8: False belief	26.	I think that students with ASD understand that reality and their beliefs about reality can be different.
	27.	I think that students with ASD understand that reality and other people's beliefs about reality can be different.

The questionnaire consisted of two sections. The first sought demographic information concerning the respondents, including their age, teaching experience, gender, nationality, and educational qualifications. The second section was made up of 34 statements based on Likert scales and four open ended questions. Statements sought information about teachers' attitudes and understanding of Theory-of-Mind as experienced by students with ASD. The remaining four questions explored the difficulties in teaching students with ASD, any memorable episodes, their opinions concerning the developmental possibilities of their students, and feedback about the questionnaire.

The Teacher Questionnaire was subjected to a process of expert evaluation as a validity check (de Vaus, 2002), using face validity in the absence of comparable instruments. It was evaluated by two experts in ASD and research methodology, mentioned

as the first and third experts in Section 4.4.1.1. The first expert evaluated the contents of questions, and consequently the wording of some questions was modified.

The third expert commented on the diversity and individuality of students with ASD in terms of their abilities and disabilities, and advised that teachers be asked to think of their individual students as they completed the questionnaire, rather than students with ASD in general. The researcher therefore planned to emphasise this recommendation to the teachers when they were presented with the questionnaire.

The questionnaire was translated into Korean and this translation was examined by the five Korean special education teachers. As a result of their feedback, the translation was adapted to fit Korean idioms. The final versions of the Teacher Questionnaire in English and Korean are presented in Appendices B1 and B2.

4.5 Ethical Considerations

This study went through the ethics approval process of the Human Research Ethics Committee (HREC) of the University of Sydney. Participant information sheets and consent forms for parents, guardians, teachers and principals, were reviewed by HREC, along with the Teacher Questionnaire (Appendix C).

Participant information sheets and consent forms were prepared in English and Korean. They were distributed prior to data collection. The participant information sheets cover the nature of the research, including its purpose, benefits and methods. They also cover the rights of participants and provide information on how to express concerns or suggestions. The interview consent form explains that consent is made on the basis of the information provided in the participant information sheet. It adds that participation is voluntary and withdrawal from the study is available at any time. It also clarifies the obligations of the researcher to maintain the confidentiality of participants, and to monitor any potential risks associated with participation in the study. The data collection process commenced at the completion of the ethics approval process.

4.6 Data Collection

This section discusses the implementation of data collection. It begins with a discussion on sampling, the role of the researcher, the timeline followed and materials used. This is

followed by an introduction to the data collection process for Study 1 and Study 2, in both their pilot and main study phases, discussed according to site, participants, data collection methods and procedures.

4.6.1 Sampling

This study adopted theoretical sampling as defined by Glaser (1978):

> Theoretical sampling is the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges. This process of data collection is controlled by the emerging theory, whether substantive or formal (p. 36).

The major focus of this study is the subjective experiences of Theory-of-Mind held by students with ASD and the understanding of these experiences held by their teachers. These issues are addressed in two separate studies. The sampling criteria for the students in Study 1 are diagnosis of ASD and possession of sufficient verbal communication skills to allow for in-depth interviews. Students fulfilling these two criteria were selected by their special education teachers. The sampling criterion for the teachers in Study 2 was a teacher of student participants selected on the basis of the two criteria given above.

Two sampling strategies were adopted, snowball sampling (Miles & Huberman, 1994) and multiple case sampling (Yin, 1989). Snowball sampling enabled the recruitment of students through a developing network of special education teachers. Multiple case sampling allowed for a wide variation of cases, which increased the transferability of results (Yin, 1989), as well as multiple comparison, which increased the representativeness of the concepts that emerged from the study (Strauss & Corbin, 1998).

4.6.2 Role of the Researcher

In both the pilot and main studies student participants spontaneously recognised the researcher as a teacher. Both interviewees and interviewer accepted that role. There are two reasons that may explain this perception. First, the researcher was introduced to students by their classroom teachers, so students seemed to accept the researcher as another teacher. Second, the researcher has worked for three years as a special education teacher in a mainstream primary school on the outskirts of Seoul, and the role of teacher may have emerged spontaneously during interviews.

Moore, Beazley and Maelzer (1998) indicated the need to clarify the role of the researcher in special education research. In this study, the researcher's role as teacher was clear to both interviewees and interviewer.

The researcher's second role was one of colleague, in particular during interviews with teacher participants. Before interviews, the researcher introduced her previous career and how her teaching experiences contributed to the planning and design of this study. The majority of teachers accepted the researcher as a colleague and seemed to respond to the interview schedule with openness.

Finally, teachers accepted the researcher as a researcher and expressed their difficulties to her regarding the education of students with ASD and understanding their students' inner worlds. They also spoke of their need for teaching materials based on students' subjective experiences and their wish to obtain such materials as a result of this study.

4.6.3 Timeline

Data collection commenced on 6 May 2007 and was completed on 10 July 2007. This period included the preparation of the data collection, the pilot study and the main study. During this period, the Teacher Questionnaire was pilot tested and the interview schedule was reviewed. Interview materials, including drawings and stories, were selected and prepared. The pilot study began on 14 May 2007 and was completed on 11 June 2007. A total of six visits were made for individual in-depth interviews with two students in one school.

The main study was conducted in three schools, from 16 May 2007 to 10 July, 2007 with a total of 29 visits. The two studies overlapped, but all questions asked in the main study had first been asked and evaluated in the pilot study. Data collection at the first school began on 16 May 2007 and ended on 4 July 2007, with a total of eight visits. The periods of data collection at the second school were briefer but more intense than those at the first school. The first visit was made on 23 May 2007 and the last visit on 10 July 2007, making a total of 12 full day visits. Data collection at the third school commenced on 22 June 2007 and was completed on 10 July 2007 after a total of nine visits.

4.6.4 Data Collection Methods and Materials

This study used in-depth interviews, document review, psychological tests, and a questionnaire as data collection methods. In-depth interviews and document review were used in both Study 1 and Study 2. Psychological tests were employed in Study 1 and a Teacher Questionnaire in Study 2. Data collection methods are discussed along with their materials in the following section.

4.6.4.1 Data Collection Methods and Materials for Study 1

In-depth interviews, guided by the interview schedule, were the primary method for studying students' subjective experiences of Theory-of-Mind (Section 4.4.1.2). Interviews entailed a one-on-one communication, employing both speech and writing. The interview booklet was developed to assist written communication. Drawings, either produced by students or taken from an intervention book, were used as visual aides to contextualise interview questions.

In-depth interviews with students were conducted using the interview booklet and interview materials. Interview materials included: (1) a board (54 x 11.5 cm) composed of four facial drawings conveying happiness, sadness, anger and fear; (2) four boards (27.5 x 11. 5 cm) with drawings of situations portraying these four emotions; (3) word cards (35 x 10 cm) illustrating oral questions; (4) three cards (20 x 14 cm) showing a cupcake, a kettle and an elephant; (5) two types of chocolate biscuit boxes and a biscuit; (6) a pencil and eraser; and (7) self-drawn portraits of self and a friend. Materials, including the self-drawn portraits, are presented in Appendix D.

Drawings of situations portraying the four emotions contain four scenarios. Happiness was illustrated by: (1) being given a cupcake. Fear was illustrated by (2) coming back home to a dark and empty house. Sadness was illustrated by (3) being unable to go shopping with mother because of sickness. Anger was illustrated by (4) having a pen being taken away while drawing. The chocolate biscuits for the biscuit boxes were chosen by two special education teachers on the basis of their students' preferences. They were 'Chicchoc' and 'Cancho'.

Psychological tests were used to evaluate IQ, social competence and degree of ASD. The Korean Education Developmental Institute Wechsler Intelligence Scale for Children-Revised (KEDI-WISC, 1991), designed for children under 16 years old, was used

in the pilot study and the Korean-Wechsler Adult Intelligence Scale (K-WAIS, 1992), designed for adults above 16 years old, was used in the main study. Two students in the main study were under 16 (CA 15:4 & 15:11), so both tests were administered for them.

The researcher administered IQ tests to students at the end of the last interview session, in the same places as the interviews. They were classrooms of the pilot study and the first school of the main study, and a school library and a small conference room at the second and third schools of the main study.

Social competence was evaluated through the Korean Vineland Social Maturity Scale (KVSMS, 1985). Social competence and the degree of ASD of students were evaluated by their teachers through completing KVSMS and the Korean Childhood Autism Rating Scale (KCARS, 1996). Teachers who had already evaluated their students' social competence and degree of ASD using the same instruments provided the results of their evaluation.

No validity check was made for the psychological tests. Both IQ tests, KEDI-WISC and K-WAIS, and the social competence test, KVSMS, have been standardised for people without ASD and do not provide norms for people with ASD, nor information to check validity.

No reliability check was made for the psychological tests. While IQ tests were administered by the researcher, who underwent training for evaluating a full battery of IQ and psychological tests, KVSMS and KCARS were administered by teachers of students. The reliability of KVSMS and KCARS was therefore problematic.

The degree of ASD was evaluated through the Korean Childhood Autism Rating Scale (KCARS, 1996), which is the Korean version of the Childhood Autism Rating Scale (CARS). Although KCARS was designed for children younger than those in the main study (whose CA was 15:4-19:11), it was employed in the absence of any other age appropriate diagnostic tools. As in other studies concerning mature individuals with ASD, the use of this age inappropriate diagnostic tool may raise doubts about its sensitivity in identifying the presence and degree of ASD. This issue is discussed in Section 4.6.6.2 through a comparison between the KCARS scores and autistic behavioural characteristics of students.

4.6.4.2 Data Collection Methods and Materials for Study 2

In-depth interviews, based on the Teacher Interview Guide, were the primary data collection method used in Study 2, the understanding held by teachers of their students' experiences of Theory-of-Mind. *Document review* was the second data collection method. The documents reviewed were Individualised Educational Programs (IEP) and Individualised Transition Programs (ITP). The purpose of the document review was to supplement the information provided by teachers in their interviews, and to include the voices of the students' previous teachers. The *teacher questionnaire*, based on the themes used in the Student Interview Schedule and the research questions for Study 2, was used to establish quantitative data regarding teachers' understanding of their students' Theory-of-Mind experiences.

4.6.5 Implementation of the Pilot Study

The pilot study focused on Study 1, particularly the in-depth interviews with students with ASD. It was conducted to test the applicability of data collection methods, checking the relevance of interview materials, the interview structure and forms of communication through the interviews. The second purpose was to identify the most suitable interviewer, whether the researcher or the classroom teacher.

By incorporating the assistance of teachers, the pilot study also sought to discover what role teachers might play in shedding light on the inner experiences of their students with ASD. The following section discusses the pilot study according to site, participants, procedures and implications for the main study.

Site. The pilot study was conducted in a special education classroom of a mainstream primary school located in Songpagu, a south-eastern area of Seoul. The classroom had the advantage of being already familiar to student participants.

Participants. Two students in the school fulfilled the sampling criteria of ASD and verbal communication. They had been screened according to KCARS conducted by their teacher. KCARS indicates scales below 30 as non ASD, between 30 and 36 as mild to moderate ASD, and above 36 as profound ASD. These students were marked 31 and 32.5 respectively. Both students could communicate verbally and in writing. They were 12 years old and placed in Year Five, receiving inclusive education in mainstream classrooms with the support of paraprofessionals and a special education teacher.

Procedures. Prior to the in-depth interviews with students, an interview with the special education teacher was conducted regarding family and education background, and the Theory-of-Mind experiences of the two students. The researcher was introduced to the students by the teacher, and they were interviewed by the researcher and the special education teacher. Conducting five interviews allowed the students to become familiar with the researcher, which helped to put them at ease.

Psychological tests, KCARS for degree of ASD and KEDI-WISC for IQ, were used to gather data about the students. KCARS were completed by the special education teacher, and KEDI-WISC was administered by the researcher. The paraprofessional provided general information about students in mainstream classrooms to the researcher, and provided an IEP for one student. The special education teacher completed the Teacher Questionnaire. It was analysed along with the other teacher questionnaire completed by teachers who participated in the main study.

Implications. The pilot study was conducted to test the applicability of data collection methods, including interview materials, interview structure and forms of communication, as well as to identify whether the researcher or the classroom teacher would be the most suitable interviewer.

Some modifications were made to the interview materials. Students had problems recognising sorrow and fear as represented in the drawings. Tear drops were added to the sad face to make its meaning clearer. Fear was conveyed in part by wrinkles, and students' immediate response to this was 'grand-dad' as their attention was captured by the wrinkles rather than the emotion meant to be portrayed. The wrinkles were removed. Drawing boards were laminated because students drew on them.

The interview schedule was organised following three principles. Questions went from concrete to abstract, from affective to cognitive, and from self to other. Finally came questions on thinking process and sensory perception. These principles worked well. For example, at the beginning of the interviews students could relate to the drawings and, aided by them, begin to communicate on the interview topics. By the end of the interviews they could answer abstract questions such as 'What does 'going to school' remind you of?'

The pilot study demonstrated that students responded most effectively to self-completion statements. Whether students communicated verbally or in writing made no perceptible difference to the quality of the interview. The use of word cards was

problematic, as finding relevant cards slowed the flow of conversation. However, it was decided to leave the use of word cards as an option in case they proved useful for some participants.

The pilot study demonstrated that it would be best to have the researcher conduct interviews rather than classroom teachers, for three reasons. First, having the teacher conduct the interview conveyed no perceptible advantage in terms of the information provided by students. While the teacher had more personal knowledge of the student, and so a sense of how to draw out their inner experience, the teacher's presence also created an atmosphere where the student felt pressured to provide the 'right' answer. Second, being less familiar with the interview schedule, the teacher often sought the researcher's instruction, disturbing the spontaneity and flow of the interviews. Finally, quality control could be compromised by the difficulty teachers had in finding time to prepare and conduct the interviews.

4.6.6 Implementation of the Main Study

The main study was conducted with 20 students with ASD and 11 of their teachers. Following what was learned in the pilot study, the researcher conducted in-depth interviews with students allowing different forms of communication and using modified interview materials. The structure of the interview schedule remained the same as in the pilot study. Implementation of the main study is discussed according to sites, participants and procedures.

4.6.6.1 Sites

The main study took place in three special schools in Seoul, Republic of Korea. There are three special schools catering for emotional disorders and ASD in Seoul, all located in south Seoul. A total of two of the special schools chosen for this study were in this area. The last school was located in north Seoul. It catered for intellectual disabilities, but because there were no special schools catering for emotional disorders and ASD in the area, a number of students with these disorders were enrolled here.

Interviews with student participants were conducted in a classroom in one school, a teachers' library in another and a conference room in the third. These places met the criteria of being quiet and undisturbed. Interviews with teacher participants took place in their classrooms or, in one school, the teachers' library.

4.6.6.2 Participants

Participants of Study 1 were selected by teachers and principals on the basis of three criteria provided by the researcher: (1) diagnosis of ASD; (2) verbal communication skills; and (3) senior secondary school or post secondary school students.

While the first criterion was students with ASD, this study included students no longer formally classified as ASD but who continued to demonstrate ASD in their behaviour. Some students were identified as having ASD in junior primary school, but as they grew older came to be regarded as no longer having ASD, even though they continued to show symptoms. This issue will be discussed below.

The second criterion was students with verbal communication skills. This criterion was crucial for conducting in-depth interviews. The vice principals and senior teachers at the special schools were asked to identify those students with ASD who had communication skills sufficient for in-depth interview.

The third criterion included post secondary students, who were part of a program designed to facilitate transition to adult life through work training. This program maintained the same school timetable as senior secondary courses, and had a similar curriculum.

Table 4.5 shows a summary of demographic data for the 20 student participants. Chronological age of participants ranged between 15 years 4 months and 19 years 10 months. Out of the 20, seven participants were aged 17, four were 16 and four were 19. Only two participants were 15. All participants were males. A total of 11 out of 20 students were classified as non-ASD according to KCARS, as discussed below.

Student participants evaluated in tests as non-ASD showed symptoms of ASD in their behaviour. Fred (CA 15:4), for example, had the lowest KCARS score (19), but was obsessive about food, doors and vehicles, and was very sensitive to lights. He demonstrated an expansive calendaric memory, for example saying within a couple of seconds which day of the week it will be on 7 June 2030. His IQ score was below 45, and according to K-WAIS this score is too low to identify his IQ performance.

Table 4.5 ***Demographic Summary of Student Participants***

No.	Pseudonym	Gender	CA	KCARS	KCARS Results	Class	Year
1	Bob	M	17: 4	25.5	non-ASD	Secondary	11
2	Brett	M	17: 4	31.5	mid-moderate	Secondary	10
3	Chris	M	17: 9	32	mid-moderate	Secondary	11
4	Daniel	M	16: 7	39	profound	Secondary	10
5	David	M	19: 0	38	profound	P-secondary	1
6	Edward	M	19:10	22	non-ASD	P-secondary	2
7	Fred	M	15: 4	19	non-ASD	Secondary	10
8	George	M	17:11	32	mild-moderate	Secondary	11
9	Ian	M	19: 0	22	non-ASD	P-secondary	1
10	Jerry	M	18: 10	21	non-ASD	Secondary	12
11	John	M	16:2	27	non-ASD	Secondary	10
12	Joshua	M	15: 11	34.5	mid-moderate	Secondary	10
13	Kevin	M	19: 1	19	non-ASD	P-secondary	1
14	Michael	M	17: 9	30	mid-moderate	Secondary	12
15	Nicholas	M	16: 8	27	non-ASD	Secondary	10
16	Patrick	M	16: 7	44.5	profound	Secondary	10
17	Paul	M	18: 2	30	mid-moderate	Secondary	12
18	Peter	M	17: 8	27	non-ASD	Secondary	11
19	Ron	M	18: 10	28	non-ASD	P-secondary	1
20	Tom	M	17: 1	23	non-ASD	Secondary	10

Jerry (CA 18:10) was another student participant identified as non-ASD, with a KCARS score of 21. He spoke in a monotone. He made requests through statements, avoiding the first person pronoun. For example, ‘Drink green tea’ means ‘May I drink green tea?’ or ‘I want to drink green tea’. He was very attached to his routines. Visually, he had a talent for learning written Chinese, creating drawings based on the feeling suggested by a Chinese character. He demonstrated a talent for interpreting four-character Chinese idioms. In his diary he described situations through spontaneous drawing. His drawings began with the most detailed aspect and moved out from there.

Edward (CA 19:10) was also classified non-ASD, with a KCARS score of 22. He often used echolalia and spoke in a monotone. His tendency to repeat phrases became more

intense when his routine was disturbed. He was very sensitive to touch, especially around the ears. He preferred to be alone in his classroom and often got into fights when he tried to force his classmates to leave.

Participants of Study 2 consisted of 11 teachers, seven females and four males (Table 4.6). Out of 11 teachers, seven teachers were in their 30s and five teachers had more than 10 years of teaching experience. School 1 provided one teacher, school 2 provided six, and school 3 provided four. Of the 11 teachers, six had more than one student participant, while the remaining five had one student participant each. All teacher participants majored in special education at university.

Table 4.6 ***Demographic Summary of Teacher Participants***

No.	Pseudonym	Gender	Age	Years of teaching	Major
1	Adam	M	30s	7	Special education
2	Brian	M	20s	2	Special education
3	Amy	F	30s	13	Special education
4	Betty	F	20s	2	Special education
5	Dennis	M	30s	10	Special education
6	Cathy	F	30s	3	Special education
7	Diane	F	30s	9	Special education
8	Emma	F	40s	over 20	Special education
9	Felicity	F	20s	1	Special education
10	Jenny	F	30s	10	Special education
11	Fredrick	M	30s	11	Special education

4.6.6.3 Procedures

Study 1. As in the pilot study, the primary method of collecting data from student participants was through in-depth, one-on-one interviews. Interviews were conducted with a range from two to four sessions. Each interview session lasted for a range of less than 10 minutes and more than an hour (Table 4.7). A short break was allowed when interviews went over 40 minutes. The IQs of student participants were evaluated by the researcher either during the final interview session or in a separate session after completion of the interview. In cases when IQ tests were administered during the final interview session, the

time for the last interview allowed for both interview and IQ assessment. Each IQ assessment session varied between approximately 20 and 50 minutes, depending on the quality of students' responses and the time students took to respond.

Table 4.7 ***Interview Timelines for Student Participants***

No.	Pseudonym	Interview 1	Duration	Interview 2	Duration	Interview 3	Duration	Interview 4	Duration
1	Bob	26 June	36 min	26 June	24 min	2 July	59 min		
2	Brett	12 June	39 min	13 June	41 min	21 June	40 min		
3	Chris	29 May	37 min	5 June	36 min	4 July	40 min		
4	Daniel	12 June	40 min	13 June	37 min	14 June	18 min	27 June	38 min
5	David	30 June	36 min	2 July	16 min	2 July	40 min		
6	Edward	13 June	32 min	14 June	31 min	18 June	36 min	28 June	50 min
7	Fred	15 June	36 min	20 June	40 min	22 June	40 min	10 July	5 min
8	George	29 May	32 min	30 May	38 min	5 June	32 min	4 July	50 min
9	Ian	14 June	8 min	18 June	30 min	28 June	40 min		
10	Jerry	18 June	41 min	21 June	70 min				
11	John	26 June	33 min	26 June	42 min	6 July	40 min		
12	Joshua	15 June	41 min	18 June	35 min	20 June	40 min		
13	Kevin	14 June	41 min	27 June	45 min				
14	Michael	25 June	37 min	6 July	21 min	6 July	52 min		
15	Nicholas	26 June	26 min	3 July	55 min				
16	Patrick	12 June	58 min	14 June	30 min				
17	Paul	25 June	40 min	6 July	20 min				
18	Peter	15 June	34 min	18 June	29 min	21 June	60 min		
19	Ron	30 June	45 min	2 July	50 min				
20	Tom	26 June	23 min	3 July	50 min				

During or after in-depth interviews with students, teachers evaluated their students' social competence and degree of ASD using KVSMS and KCARS. Documents produced by the students were sought from all teacher participants, but supplied only by three. These documents included diaries, drawings and study papers. While collecting data, the

researcher produced field notes, called theoretical memos in grounded theory analysis (Glaser, 1978; Strauss & Corbin, 1998). This is discussed in Section 4.7.4.

Procedures of Study 2. In-depth Interviews with teachers followed the Teacher Interview Guide (Section 4.4.2.1), which provided consistency in the interview process. The number of interview sessions varied with a range of one and three, each session lasting from 30 minutes to over one hour (Table 4.8). The number and duration of interview sessions depended upon the number of students taught by the teacher.

Table 4.8 ***Interview Timelines for Teacher Participants***

Pseudonym	Interview 1	Duration	Interview 2	Duration	Interview 3	Duration	Student #
Adam	27 June	20 min					1
Brian	27 June	35 min	28 June	52 min			2
Amy	22 June	74 min					4
Betty	25 June	60 min					1
Dennis	29 June	37 min					1
Cathy	10 July	20 min					2
Diane	28 June	51 min					1
Emma	3 July	38 min					2
Felicity	7 July	62 min					3
Jenny	21 May	65 min	28 May	44 min	19 June	32 min	2
Fredrick	20 June	67 min					1

At the end of interviews teachers were given the questionnaire discussed in Section 4.4.2.2. When the questionnaire was designed, it was considered essential for each teacher to complete it keeping in mind their own individual student rather than the ASD population in general. At that time it was assumed there would only be one student per teacher. By this point in the study, however, it had become clear that some teachers had more than one student with ASD, so these teachers were advised that if their students were so different that a single copy of the questionnaire could not address their particularities they could fill out more than one copy. As a result, teachers Amy and Jenny filled in the questionnaire three times and twice respectively as they thought their students demonstrated different abilities regarding Theory-of-Mind. (Refer to Table 4.8 for the number of students per teacher.)

Teachers were also requested to provide educational documents. Of the 11 teachers, only four provided IEPs and ITPs for their students. This low response rate seemed to be because the teachers' role in this study was already burdensome, and teachers were cautious about providing documents that might violate their students' privacy by revealing personal information about them.

4.7 Data Analysis

This section discusses how mixed methods research design and grounded theory approach were applied to the process of data analysis. Data analysis was conducted following the nine analytical stages of mixed methods research and the constant comparison method of grounded theory analysis.

4.7.1 Data Analysis in Mixed Methods Research

The process of data analysis was guided by the mixed methods research paradigm (Johnson & Onwegbuzie, 2004) (Section 4.2.2), as it provides a flexible but disciplined approach to analysis. Data analysis took place in a nine stage model developed for this study based on the work of Johnson and Onwuegbuzie (2004) and Creswell and Clark (2007). Table 4.9 shows the first six stages, in which qualitative and quantitative data go through the same analytic process. Table 4.10 shows the final three stages, in which the data from Study 1 and Study 2 are correlated and compared, and then integrated.

During data preparation (Stage 1) qualitative and quantitative data were analysed according to their specific natures (Table 4.9). Qualitative data were transcribed and imported to NVivo, a qualitative data analysis program. Quantitative data, in contrast, were assigned numeric values and entered as variables for SPSS, a quantitative data analysis program. Qualitative data were explored (Stage 2) by thorough reading and the composition of memos, while quantitative data were explored by conducting frequency analysis.

Qualitative data were analysed (Stage 3) through coding and constant comparison, and quantitative data were analysed by conducting descriptive statistical analysis. The qualitative results from data analysis were represented (Stage 4) by visual models and a theory, while the quantitative results were represented in tables and figures. Qualitative data were verified (Stage 5) by triangulation and peer review, and quantitative data were

verified by looking for face validity, factor analysis and applying internal consistency. Finally, qualitative data from student interviews were transformed into numeric codes for correlation (Stage 6).

Table 4.9 ***Stages in Data Analysis (Qualitative and Quantitative)***

Qualitative Procedures	Stages in Data Analysis	Quantitative Procedures
Transcribing text Preparing data for computer analysis, NVivo	**Stage 1** Preparing data for analysis	Coding data by assigning numeric values Recording new variables for SPSS analysis
Reading through data Writing memos	**Stage 2** Exploring data	Visually inspecting data Conducting frequencies and normality tests
Coding data Grouping codes into categories	**Stage 3** Analysing data	Choosing & conducting appropriate statistical test – Factor analysis & correlations
Representing findings in discussions of categories Presenting visual models Generating a theory	**Stage 4** Representing the data analysis	Representing results in statements of results Providing results in tables and figures
Triangulation Peer review	**Stage 5** Verifying data	Face validity Internal consistency (Cronbach alpha coefficient)
Quantifying qualitative data into numeric codes	**Stage 6** Transforming data	Not applicable

Table 4.10 ***Stages in Data Analysis (Studies 1 & 2)***

Study 1	Stages in Data Analysis	Study 2
Quantified & quantitative data	**Stage 7** Correlate data	Not applicable
Not applicable	**Stage 8** Comparing data	Qualitative & quantitative data
Results of analysis	**Stage 9** Integrating data	Results of analysis

From Stage 7, the dyad of qualitative and quantitative data ceased to define the form of the analysis, and was substituted by the dyad of Study 1 and Study 2. In Stage 7, the qualitative data gained from students in Study 1 that had already been quantified (in

Stage 6) was correlated with quantitative data. In Stage 8, the qualitative and quantitative data gained from teachers were compared. And finally, in Stage 9 all data were integrated.

4.7.2 Data Analysis in Study 1

This study aims to answer five research questions. They are:

1. How do students with ASD experience their own minds and internal worlds?
2. How do students with ASD understand the minds of others and the external world?
3. How is the experience of one's own mind and internal world connected to the understanding of the minds of others and the external world?
4. How do educational professionals construe the Theory-of-Mind understanding of their students with ASD?
5. What are the similarities and differences between teachers' understanding of the Theory-of-Mind of their students with ASD and the subjective experiences of Theory-of-Mind held by students with ASD?

Study 1 aimed to answer the first three and the last research question, using an exploratory design beginning with qualitative data analysis. This covers Stage 1, data preparation, to Stage 5, data verification (Figure 4.8). The categories that emerged from grounded theory analysis were then transformed into quantitative data (Stage 6), and correlated to find the relationships between IQ and social competence (Stage 7). The results of Study 1 were subject to data integration (Stage 9) for developing the theory which answers the last research question.

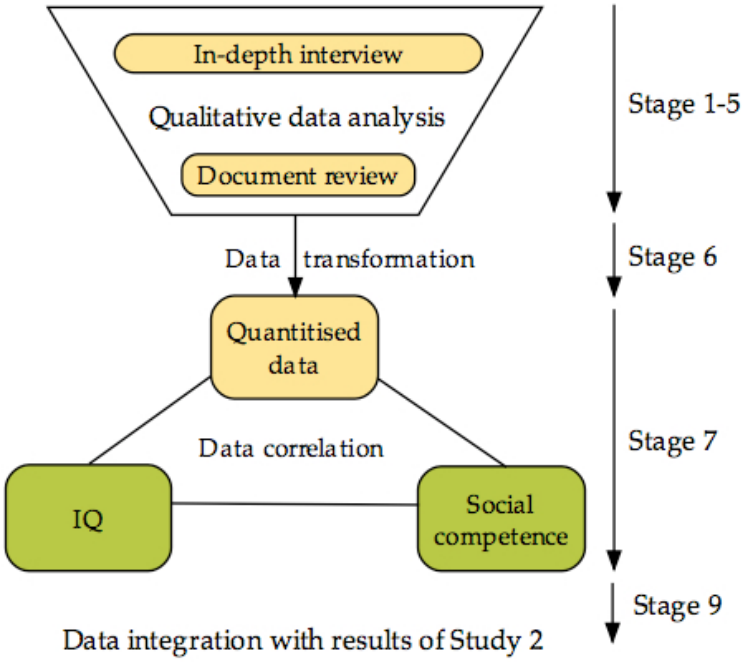


Figure 4.8 **Data analysis in Study 1**

4.7.3 Data Analysis in Study 2

Study 2 aimed to answer the fourth research question, 'How do educational professionals construe the Theory-of-Mind understanding of their students with ASD?' The answer to this question contributed to developing the theory, which in turn led to the answer of the last research question, 'What are the similarities and differences between teachers' understanding of the Theory-of-Mind of their students with ASD and the subjective experiences of Theory-of-Mind held by students with ASD?'

Study 2 adopted a trianguation design in which qualitative data (i.e., in-depth interviews and document review) and quantitative data (i.e., the Teacher questionnaire) were analysed separately for later comparison (Figure 4.9). Analysis of the two sets of data from Stage 1, data preparation, to Stage 5, data verification, took place separately. The two sets of results were then compared in Stage 8. The views of teachers that emerged as the result of comparison were integrated in Stage 9, with the results of Study 1.

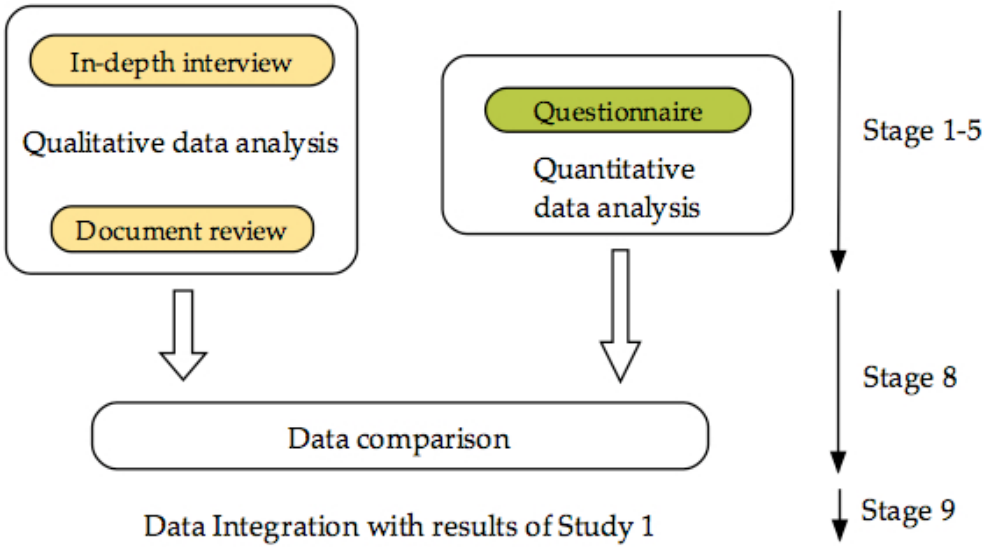


Figure 4.9 **Data analysis in Study 2**

4.7.4 Qualitative Data Analysis

The qualitative data generated in this study were analysed using a grounded theory approach. Data were analysed in Korean, in order to respect the cultural perspectives of interviewees (Barnes, 1996). Data analysis resulted in the generation of visual models and a theory. Subsequent sections explain this process, illustrated by examples gained from student participants.

Stage 1 – Qualitative Data Preparation. Qualitative data included in-depth interviews with students and teachers, documents produced by students and teachers, teachers' answers to open ended questions of the Teacher Questionnaire, and field notes. In-depth interviews with students produced 72 audio recordings with a total recording time of 28 hours 23 minutes 18 seconds. Field notes made by the researcher produced audio recordings of 45 minutes 5 seconds duration (Section 4.6.6.3). Interviews with teachers produced audio recordings lasting 10 hours 40 minutes 55 seconds. Interviews with students and teachers were transcribed verbatim. Sounds without meaning, such as humming and echolalia, were transcribed as 'humming' and 'echolalia'. Transcriptions were imported to NVivo.

Stage 2 – Qualitative Data Exploration. Creswell and Clark (2007) defined data exploration as a process of reading through data and making memos in order to develop a

preliminary understanding of the database. This method was followed here. Data exploration was also used to check the accuracy of interview transcriptions.

Stage 3 – Qualitative Data Analysis. Data analysis began with coding, which transforms raw data into theoretical constructions (Glaser, 1978; Strauss & Corbin, 1998). Coding aims to generate a set of categories and their properties that can give rise to a theory (Glaser, 1978). Glaser (1978) advised that it was best to begin by generating as many categories as possible, by coding the data in every way possible. Coding was assisted by using NVivo, a qualitative data analysis program.

In-depth interviews with students generated over 1,000 codes with 21 theoretical memos, while those with teachers generated 439 codes. Coding was a repetitive process of reading, thinking and naming data, along with writing memos. As Glaser (1978) said, this repetitive process is applied to the data line by line, seeking the purpose of any particular datum.

Some examples of open coding from student interviews follow. The English translated version is included in the body text and the original Korean is presented in Appendix E. SI stands for the student interviewee and RI stands for the researcher interviewer. Responses of students are often grammatically incorrect, but they are transcribed and coded verbatim. The first example is from the interview with Bob and the second example is from the interview with Brett. They are presented in Tables 4.11 and 4.12.

Table 4.11 ***Examples of Open Coding: Bob***

	Transcript	Code Name
RI:	How does this friend feel (pointing at a drawing showing a happy facial expression)?	Physical description rather than emotion
SI:	Being smile	
RI:	Being smile. So the feeling is?	Emotion-good
SI:	2) Good. (High-five between Bob and the researcher.)	Understanding a facial expression-good
RI:	(Pointing at a drawing showing an angry facial expression and looking at Bob.)	Emotion-angry Understanding a facial expression-angry
SI:	3) Angry!	
RI:	(High-five.) Very good!	

Table 4.12 ***Examples of Open Coding: Brett***

	Transcripts	Code Name
RI:	Do you prefer to speak or write?	Choice making
SI:	1) (Pointing at materials for speaking.)	
RI:	Please read this.	Association-smile
SI:	2) When I feel good?	Good
RI:	When does Brett feel good? (Pointing at a drawing with a smiling face.)	
SI:	3) Glad.	
RI:	(Presenting the interview booklet and pointing at a question.) Brett, how do you feel when you are given a present?	Positive emotion-glad
SI:	4) Glad.	
RI:	How do you feel when your friend hits you?	Negative emotion-frightened
SI:	5) Frightened.	
RI:	How do you feel when your mum is sick?	Emotion-confused
SI:	6) Good.	Empathy-confused Tend to say good regardless of questions Imagination-difficulty
RI:	If mum is sick?	Silence
SI:	7) …	
RI:	'Ouch! It hurts, Brett.' How do you feel about that? (Showing picture of figure left in bed as mother goes shopping.)	Physical description instead of emotion
SI:	8) Cannot go shopping.	
RI:	How do you feel if you cannot go shopping with mum because she is sick?	Silence
SI:	9) …	
RI:	Brett.	Silence
SI:	10) …	
RI:	How do you feel if mum is sick?	Negative emotion-frightened
SI:	11) Frightened	Understanding causality of emotions-external, frightened, causal, self, 1 step

Once established, codes were grouped together according to their similarities and differences. Grouped codes made up categories, and categories emerged into hierarchies. For example, 'positive emotion-glad' was grouped into the category, 'positive-emotion'. This was grouped into the category, 'emotion' and 'emotion' was subsequently grouped into the category, 'mental states'.

Accompanying this process was a search for a core category. Glaser (1978; 2004) explains that the core category can be any kind of theoretical code as long as it functions to integrate the theory and render it dense and saturated. Finding a core category was not easy. Glaser (1978) acknowledged this difficulty and provided 11 criteria to assist in identifying a core category (Table 4.13).

The interviews with students generated a large number of codes regarding mental states and communication styles from which two possible core categories emerged, *thinking in association* and *imagination*. The process of how a core category emerges is central to grounded theory analysis (Strauss & Corbin, 1998), and is shown in detail in Section 5.2.

Table 4.13 ***Criteria for a Core Category (from Glaser, 1978, pp. 95-96)***

1	It must be central, that is related to as many other categories and their properties as possible and more than other candidates for the core category …
2	It must reoccur frequently in the data. By its frequent reoccurrence it comes to be seen as a stable pattern and becomes more and more related to other variables …
3	By being related to many other categories and reoccurring frequently, it takes more time to saturate the core category than other categories.
4	It relates meaningfully and easily with other categories …
5	A core category in a substantive study, has clear and grabbing implication for formal theory …
6	Based on the above criteria, the core category has considerable carry-through …
7	It is completely variable. Its frequent relations to other categories make it highly dependently variable in degree, dimension and type.
8	While accounting for variation in the problematic behaviour, a core category is also a dimension of the problem …
9	The criteria above generate such a rich core category, that in turn they tend to prevent … other sources of establishing a core which are not grounded …
10	The above criteria also generate a false criterion yet which indicates it is core. The analyst begins to see the core category in all relations, whether grounded or not, because it has so much grab and explanatory power. This logical switch must be guarded against, while taking it simultaneously as a positive indicator of core.
11	The core category can be any kind of theoretical code …

Once the core categories emerged, grouping and relating codes and categories could become more systematic. The work of relating codes and categories is called *theoretical coding* by Glaser (1978; 2004) and *selective coding* by Strauss and Corbin (1998). Glaser (1978) defines this phase of analysis as ‘conceptualising how the substantive codes may

relate to each other as hypotheses to be integrated into a theory' (p. 72), indicating its creative aspect. Strauss and Corbin (1998) see it as 'the process of integrating and refining the theory. In integration, categories are organised around a central explanatory concept … Once the theoretical scheme is outlined, the analyst is ready to refine the theory, trimming off excess and filling in poorly developed categories' (p. 161).

Glaser (1978) presents 16 coding families that can be used in grounded theory analysis as ways of relating categories, including the core category, to each other. This study adopts two coding families, the interactive family and the six Cs. The interactive family represents a search for any kind of mutually dependent relationship between categories, and is fundamental to any theory that attempts to capture their activity and nature. The six Cs represent a subset of possible relationships; causes, contexts, contingencies, consequences, covariances and conditions.

In this study, *imagination* emerged as a core category. Imagination was seen as not a simple entity but functioning along spectra, from logical to associational and from fluent to impeded. Other categories are related to this core, using whatever coding family seems appropriate.

Following the two coding families mentioned above, categories such as *emotion*, *thinking, visual perception* and *anticipation* can be related to the core category, *imagination*, in terms of their direct interactions with it. This represents the interactive family, but within it these categories can be seen as providing the *context* of the core category, where 'context' is one of the six Cs. Other categories, for example, *self and self-image*, *other and image of other*, and *attitudes towards social relationships* can be seen as *consequences* of the interactions between the categories of *emotion*, *thinking*, and so on, on the one hand, and of the core category, *imagination*, on the other. 'Consequence' is another of the six Cs.

In brief, in the process of grounded theory analysis the researcher looks for the relationships between the categories that have emerged during coding. These relationships could take any form, but the six Cs provide a specific set of relationships that are of particular interest.

Writing theoretical memos is an essential procedure of grounded theory analysis (Strauss & Corbin, 1998). Glaser (1978) saw them as allowing theory to emerge from 'ideas about codes and their relationships as they strike the analyst while coding' (p. 85).

This study generated a total of 50 memos of the researcher, 8 memos, in audio form, during data collection and 42 memos, in written form, during coding. The memos generated during data collection encapsulated the researcher's insights into students' feelings and thoughts as they arose from their responses during interviews. The memos generated during coding concerned categories and the relationships between categories. The core categories developed over time through this process of memo writing.

Here is an example of a memo written by the researcher about difficulties in feeling empathy. Titled 'Possible reasons why empathy is difficult', it was written on 31 March 2008:

> First reason is difficulty in imagination. When we feel for someone, we first need to put ourselves in the situation that someone is in or remember how it was like to be in that situation. It requires projection and similar experiences. So difficulty to feel empathy may come from having projection problems or no similar experiences. Another possible reason is thinking in association. Mind goes wherever it is taken and students talk about it.

Here is another memo about empathy. Titled 'Empathy experienced by students and observed by teachers', it was written on 30 March 2008:

> Analysis from the teacher interviews demonstrated no evidence about empathy expressed by students with ASD. However students interviews did demonstrate that students felt or at least understood empathy experienced by them and empathy of others understood by them. It may be the differences between subjective experiences and objective observation of subjective experiences.

Writing theoretical memos is one of the core stages in collecting and analysing data for this study, and clarifies the results of data analysis.

Stage 4 – Representing Qualitative Data Analysis. The results of data analysis are represented in diagrams, as recommended by Strauss and Corbin (1998). They present the categories generated from theoretical coding and the relationships between them. This procedure was extremely helpful for deciding the core category. Figure 4.10 shows an early visual model with *thinking in association* as the core category, caused by *selective attention* and *persistency*. *Thinking in association* appeared in various mental states, drawn here surrounding the core category, and was in turn a cause of *image of self and other*, *communication difficulty*, *persistent interest*, *difficulty in sympathy and empathy*, and *difficulty in imagination*.

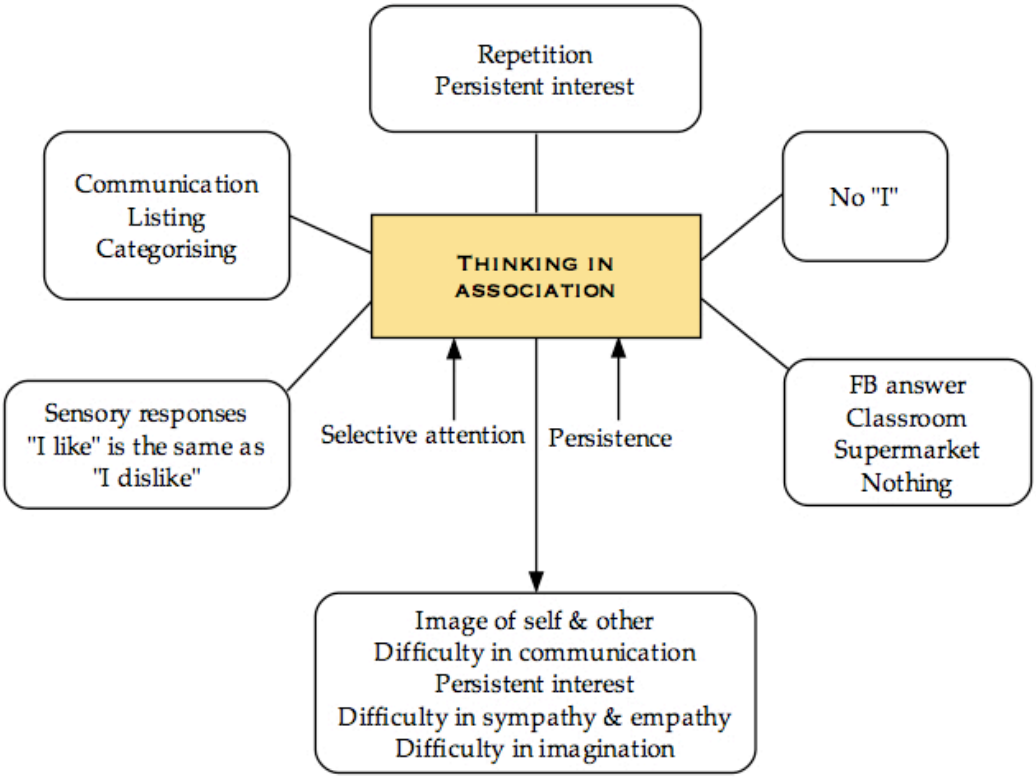


Figure 4.10 **Thinking in association as core category (Early Model)**

As explained earlier, this model did not fit the data entirely, so another model was generated with *Imagination* as the core category. This is presented in Chapter 5. The results of data analysis are finally presented in a theory, emerging from the relationships between the categories (Strauss & Corbin, 1998). This theory is discussed further in Chapters 5 and 7.

Stage 5 – Verifying Qualitative Data Analysis. Verification issues regarding mixed methods research design and grounded theory approach have been discussed above (Sections 4.2.1 and 4.2.2). The validity of qualitative data depends on its accuracy (Creswell & Clark, 2007), and is checked by verifying the qualitative data collected and the qualitative analysis process.

A member check was considered as a means of verifying the qualitative data. This involves checking summaries of findings with key participants for the accuracy of their responses within the findings (Creswell & Clark, 2007). This, however, was unsuitable given the nature of the disabilities of participants. Instead, peer review was conducted to establish the consistency and trustworthiness of the qualitative data collected. A total of 20

percent of the transcriptions from interviews with students and teachers were checked by a peer, demonstrating the accuracy of the transcriptions.

The peer majored in special education and had five years of teaching experience with students with disabilities. She holds a Master of Philosophy degree and is currently conducting research for a PhD in special education. She is a native Korean speaker and can therefore understand transcriptions written in Korean. All these factors make the peer fully qualified in terms of education, research, culture and language. As advised by Creswell (1998), the peer and the researcher maintained an audit trail of debriefing sessions.

4.7.5 Quantitative Data Analysis

Stage 1 – Quantitative Data Preparation. Quantitative data were collected from Study 1, *Theory-of-Mind as subjectively experienced by students with ASD*, and Study 2, *Theory-of-Mind as objectively understood by their teachers*. For Study 1, the Korean-Wechsler Adult Intelligence Scale (K-WAIS) and Korean Vineland Social Maturity Scale (KVSMS) were used to assess students' IQ and social competence. For Study 2, the Teacher Questionnaire was conducted. Quantitative data preparation began with scoring the results of K-WAIS and KVSMS. All quantitative data, including the Teacher Questionnaire, were recoded in SPSS, a quantitative data analysis program, for analysis.

Stage 2 – Quantitative Data Exploration. Creswell and Clark (2007) advised that quantitative data be explored by 'visually inspecting the data and conducting a descriptive analysis to determine the general trends in the data' (p. 130). This study conducted frequency and normality tests for the results of K-WAIS and KVSMS, and frequency tests for the Teacher Questionnaire, assisted by SPSS. The results of the tests are discussed in Chapter 6 *Theory-of-Mind: Components and Continuum*.

Stage 3 – Quantitative Data Analysis. Quantitative data analysis in this study includes correlation coefficient tests, exploratory factor analysis, and frequencies and percentages. Correlation coefficient tests were used to look at the relationships between the Theory-of-Mind components, IQ (K-WAIS) and social competence (KVSMS) of students with ASD. The Theory-of-Mind components needed to be transformed from qualitative into quantitative data, and this is discussed in *Stage 6 – Data Transformation*.

As explained earlier, the Teacher Questionnaire was developed for this study because there was no existing instrument to study teachers' understanding of their

students' Theory-of-Mind. Exploratory factor analysis was used to discover the common underlying dimensions, or factors, from the questionnaire (Field, 2000), and the results are discussed in the following section. After factor analysis, the Teacher Questionnaire was analysed with descriptive statistical methods including frequencies and percentages.

Exploratory factor analysis exposes clusters of large correlation coefficients between subsets of variables (Field, 2004). Communalities, the proportion of common variance present in the data, are essential to factor analysis (Field, 2004). Communalities of items were extracted through principle component analysis. These communalities are presented in Table 4.14. The item *Sensory perception different from peers without ASD* showed the lowest communality (.571). Items *Feeling anger* and *Feeling fear* demonstrated the highest communality (.986).

Table 4.14 ***Communalities***

		Initial	Extraction
1.	Ability to understand ToM	1.000	.931
2.	ToM remains stable over time	1.000	.884
3.	Feeling sadness	1.000	.972
4.	Feeling happiness	1.000	.985
5.	Feeling anger	1.000	.986
6.	Feeling fear	1.000	.986
7.	Feeling loneliness	1.000	.801
8.	Emotional bond with people	1.000	.934
9.	Emotional bond with animals	1.000	.913
10.	Desire for friendship	1.000	.868
11.	Desire to be understood by people	1.000	.936
12.	Understanding of mental states of other based on understanding of own mental states	1.000	.852
13.	Better understanding of mental states of other with understanding of own mental states	1.000	.928
14.	Understand emotion of other	1.000	.902
15.	Understand intention of other	1.000	.873
16.	Understand desire of other	1.000	.905
17.	Understand belief of other	1.000	.874
18.	Understand thought of other	1.000	.872
19.	Sensitivity of sensory perception	1.000	.906
20.	Insensitivity of sensory perception	1.000	.880
21.	Sensory overload	1.000	.841

		Initial	Extraction
22.	Sensory perception different from peers without ASD	1.000	.571
23.	Eye contact	1.000	.873
24.	Perception of being different	1.000	.836
25.	Developing sense of belonging	1.000	.901
26.	Understand own false belief	1.000	.945
27.	Understand false belief of other	1.000	.933
28.	Understand intention of other with understanding of own intention	1.000	.848
29.	Better understanding of intention of other with understanding of own intention	1.000	.890
30.	Thinking in picture	1.000	.843
31.	Information process different from peers without ASD	1.000	.806
32.	Individual difference in processing information	1.000	.951
33.	Progressive ToM	1.000	.955
34.	Regressive ToM	1.000	.922

Extraction Method: Principal Component Analysis

Table 4.15 shows the total variance present. At the initial stage it shows the factors and their associated eigenvalues, the percentage of variance and the cumulative percentages. A total of six factors were expected to be extracted because their eigenvalues were greater than 1. This means 89.127 percent of the variance would be explained with the six extracted factors.

Table 4.15 ***Total Variance Explained***

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.140	41.588	41.588	14.140	41.588	41.588	9.475	27.869	27.869
2	7.015	20.631	62.219	7.015	20.631	62.219	6.935	20.398	48.267
3	3.922	11.535	73.754	3.922	11.535	73.754	5.363	15.772	64.039
4	2.294	6.747	80.501	2.294	6.747	80.501	4.009	11.792	75.831
5	1.751	5.149	85.650	1.751	5.149	85.650	2.706	7.959	83.791
6	1.182	3.477	89.127	1.182	3.477	89.127	1.814	5.336	89.127
7	.938	2.759	91.886						
8	.830	2.442	94.328						
9	.617	1.814	96.142						
10	.458	1.347	97.489						
11	.379	1.115	98.605						
12	.244	.718	99.322						
13	.192	.566	99.888						
14	.038	.112	100.000						
15	1.068E-15	3.140E-15	100.000						
16	8.226E-16	2.419E-15	100.000						
17	6.444E-16	1.895E-15	100.000						
18	4.813E-16	1.416E-15	100.000						

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
19	3.847E-16	1.131E-15	100.000						
20	3.362E-16	9.888E-16	100.000						
21	1.580E-16	4.646E-16	100.000						
22	5.310E-17	1.562E-16	100.000						
23	5.252E-18	1.545E-17	100.000						
24	-2.947E-32	-8.667E-32	100.000						
25	-3.302E-17	-9.712E-17	100.000						
26	-9.301E-17	-2.735E-16	100.000						
27	-1.972E-16	-5.799E-16	100.000						
28	-2.950E-16	-8.676E-16	100.000						
29	-3.774E-16	-1.110E-15	100.000						
30	-4.458E-16	-1.311E-15	100.000						
31	-4.842E-16	-1.424E-15	100.000						
32	-8.428E-16	-2.479E-15	100.000						
33	-1.301E-15	-3.827E-15	100.000						
34	-2.047E-15	-6.020E-15	100.000						

Extraction Method: Principal Component Analysis.

Figure 4.11 shows the Scree Plot for the data. A Scree Plot is 'a graph of each eigenvalue (Y-axis) against the factor with which it is associated (X-axis)' (Field, 2004, p. 436). It displays the eigenvalues for each variance present and indicates that there are six factors with eigenvalues greater than 1, with the first four factors predominant.

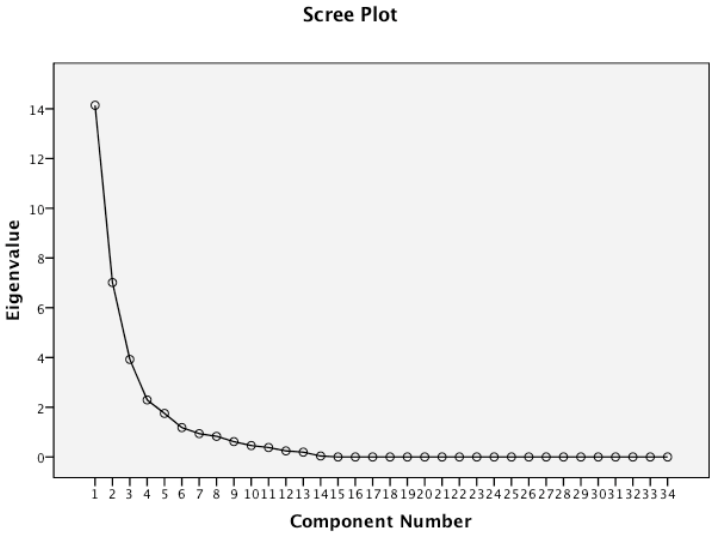


Figure 4.11 **Scree Plot for data**

Table 4.16 shows the correlations between the variables and components. Complex variables had high correlations with more than one component, and so required component rotation. Varimax rotation was chosen because it results in more interpretable clusters of factors by loading a smaller number of variables highly onto each factor (Field, 2004).

Table 4.16 ***Component Matrixa***

		Component					
		1	**2**	**3**	**4**	**5**	**6**
8.	Emotional bond with people	.946					
5.	Feeling anger	.906					
6.	Feeling fear	.906					
19.	Sensitivity of sensory perception	.901					
4.	Feeling happiness	.899					
3.	Feeling sadness	.881					
32.	Individual difference in processing information	.849					
2.	ToM remains stable over time	.840					

		Component					
		1	2	3	4	5	6
1.	Ability to understand ToM	.837					
13.	Better understanding of mental states of other with understanding of own mental states	.797					
7.	Feeling loneliness	.785					
14.	Understand emotion of other	.774					
11.	Desire to be understood by people	.773	.532				
18.	Understand thought of other	.771					
23.	Eye contact	.729					
12.	Understanding of mental states of other based on understanding of own mental states	.668	.566				
27.	Understand false belief of other	-.651	.644				
24.	Perception of being different	-.620					
21.	Sensory overload		.702				
31.	Information process different from peers without ASD		-.654				
26.	Understand one's own false belief		.652				
17.	Understand belief of other		.634				
16.	Understand desire of other	.542	.630				
10.	Desire for friendship		.624				
15.	Understand intention of other	.563	.586				
30.	Thinking in picture		.577				
22.	Sensory perception different from peers without ASD		.507				
29.	Better understanding of intention of other with understanding of own intention			.784			
33.	Progressive ToM	.536		.737			
28.	Understand intention of other with understanding of own intention			.655			
25.	Developing sense of belonging			.648			
34.	Regressive ToM			.647			
20.	Insensitivity of sensory perception		.502		.594		
9.	Emotional bond with animals					.710	

Extraction Method: Principal Component Analysis.

a. 6 components extracted.

Table 4.17 displays the rotated component matrix. According to this matrix, Component 1 is composed of the first nine items (3-8, 19, 32, 33) and item 25 with loadings ranging

from .54 to .92. Component 2 consists of 10 items (1-2, 11-18). Component 3 consists of eight items (10, 23, 24, 26-30), with loadings ranging from -.55 to .89. Component 4 consists of three items (20-22), with loadings ranging from .66 to .81.

Table 4.17 ***Rotated Component Matrix***[a]

		Component					
		1	**2**	**3**	**4**	**5**	**6**
32.	Individual difference in processing information	.927					
3.	Feeling sadness	.924					
4.	Feeling happiness	.912					
5.	Feeling anger	.901					
6.	Feeling fear	.901					
7.	Feeling loneliness	.846					
8.	Emotional bond with people	.781					
33.	Progressive ToM	.677					
19.	Sensitivity of sensory perception	.648					
16.	Understand desire of other		.931				
17.	Understand belief of other		.917				
18.	Understand thought of other		.837				
15.	Understand intention of other		.824				
14.	Understand emotion of other		.798				
2.	ToM remains stable over time		.636				
1.	Ability to understand ToM	.511	.634				
11.	Desire to be understood by people		.624			.508	
13.	Better understanding of mental states of other with understanding of own mental states	.576	.612				
12.	Understanding of mental states of other based on understanding of own mental states		.564		.504		
31.	Information process different from peers without ASD		-.538				.505
29.	Better understanding of intention of other with understanding of own intention			.892			
28.	Understand intention of other with understanding of own intention			.854			
24.	Perception of being different			.766			

		Component					
		1	2	3	4	5	6
30.	Thinking in picture			.749			
26.	Understand one's own false belief	-.517		.728			
27.	Understand false belief of other	-.625		.703			
10.	Desire for friendship			.698			
23.	Eye contact			-.552			
20.	Insensitivity of sensory perception				.819		
21.	Sensory overload				.783		
25.	Developing sense of belonging	.544			-.737		
22.	Sensory perception different from peers without ASD				.666		
9.	Emotional bond with animals					.917	
34.	Regressive ToM						.836

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

[a.] Rotation converged in 10 iterations.

All components demonstrated correlation to a degree between moderated and high. This factor analysis, however, should be interpreted cautiously, for two reasons. First, the majority of items show dual or triple loadings greater than .5 on more than one component. Secondly, this exploratory factor analysis was conducted based on a small sample size (n=15). According to Coakes and Steed (2003), this sample size meets the minimum requirement (n=5) but is far less than an acceptable sample size (n=100) or a preferable sample size (n=more than 200).

Stages 4 and 5 – Representing and Verifying Quantitative Data Analysis. In Stage 4 the results of quantitative data analysis are provided in tables and figures. Tables and figures concerning IQ and social competence are presented in Chapter 6, and those concerning the Teacher Questionnaire are presented in Chapter 7.

Stage 5 concerns the verification of the quantitative data analysis. As discussed in Section 4.6.4.1, validity and reliability regarding IQ and social competence assessment were not checked. However, those of the Teacher Questionnaire were checked, through face validity and internal consistency (e.g., Cronbach alpha coefficient).

As there was no previously validated instrument of this nature, the Teacher Questionnaire could only be validated by means of an expert panel (Section 4.4.2.2). This is what de Vaus (2002) calls face validity and it is useful when there is no other instruments available to compare with in order to establish validity.

The reliability of the Teacher Questionnaire was checked regarding internal consistency, which compares a respondent's response on an item to every other scale item (de Vaus, 2002). Cronbach's Alpha coefficient of internal consistency was tested to ensure the 34 items of the Teacher Questionnaire produced a reliable scale (Clakes & Steed, 2003) with 15 cases of the questionnaire. Cronbach's Alpha was .911, indicating excellent reliability. The cases include one special teacher from the pilot study and 11 teachers from the main study. Among the 11 teachers, three teachers completed the Teacher Questionnaire more than once, as more than one student from their class participated in this study and they felt their students' expressions of Theory-of-Mind were too individual to be confined to a single questionnaire.

Stage 6 – Data Transformation. Qualitative data from interviews with students regarding empathy, false belief tasks and visual perception were transformed into quantitative data. The selection criteria of data for transformation were components of Theory-of-Mind within which the full spectra of imagination was found working, as discussed in Section 6.2.1. These newly quantified data were compared with the results of IQ and social competence tests. The data transformation process was made transparent by the development of a matrix showing the methods of data transformation (Creswell & Clark, 2007).

As shown in Table 4.18, answers regarding *false belief* and *visual perception* were classified as 'right', 'wrong' and 'no answer'. Questions regarding *empathy* were classified as 'clear demonstration', 'no demonstration' and, if contradictory answers were provided, 'unclear demonstration'. Questions regarding *thinking in association* were classified using three codes. Code 1, *dominant demonstration*, indicates this category appeared more than 10 times in interview transcripts. Code 2, *occasional demonstration*, indicated it appeared fewer than 10 times, and Code 3, *No demonstration*, indicated it did not appear at all. This category showed particular problems, which are discussed fully in Section 6.2.2.

Table 4.18 ***Matrix of Qualitative Data Transformation***

No.	Category	Code 1	Code 2	Code 3	Code 4
1	False belief changed content-Self	Right answer	Wrong answer	Both right/wrong	No answer
2	False belief changed content-Other	Right answer	Wrong answer	Both right/wrong	No answer
3	False belief changed location-Other	Right answer	Wrong answer	Both right/wrong	No answer
4	Visual perception elephant-Self	Right answer	Wrong answer	No answer	
5	Visual perception elephant-Other	Right answer	Wrong answer	No answer	
6	Visual perception muffin/kettle-Self	Right answer	Wrong answer	No answer	
7	Visual perception muffin/kettle-Other	Right answer	Wrong answer	No answer	
8	Empathy of self for other	Clear demonstration	Unclear demonstration	No demonstration	
9	Empathy of other	Clear demonstration	Unclear demonstration	No demonstration	
10	Think in association	Dominant demonstration	Occasional demonstration	No demonstration	

Stage 7 – Data Correlation. After data transformation, quantified data concerning empathy, false belief and visual perception (from the perspectives of self and other) and understanding false belief were analysed through the correlation coefficient tests to clarify their relationships with IQ and social competence. The results are presented in Chapter 6.

Stage 8 – Data Comparison. The understanding held by teachers of the Theory-of-Mind experiences of their students with ASD was sought through in-depth interview, document review and Teacher Questionnaire. The interview and document review generated qualitative results, while the Teacher Questionnaire resulted in numeric data generated through descriptive statistical analyses. The two sets of results were then compared for similarities and differences. The results are presented in Chapter 7.

Stage 9 – Data Integration. This study seeks to build an understanding of Theory-of-Mind that embraces both subjective and objective perspectives. The last stage of data analysis seeks to fulfil this purpose by integrating the results from Studies 1 and 2 by

comparing the similarities and differences between these two aspects of Theory-of-Mind. This is discussed in Chapter 8.

4.8 Conclusion

This study investigates Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers. A grounded theory approach and mixed methods research design provided the philosophical and methodological scaffoldings to design, collect and analyse the data, both qualitative and quantitative, that could answer the research questions. In Study 1, the subjective experiences of students' Theory-of-Mind were explored with in-depth interviews and document analysis. Their IQ and social competence were assessed through the Korean-Wechsler Adult Intelligence Scale (K-WAIS) and Korean Vineland Social Maturity Scale (KVSMS). These two sets of results were compared, in a search for any relationships between them. In Study 2, teachers' understanding of these students' Theory-of-Mind was explored using in-depth interviews and document review. These qualitative data were supplemented by a questionnaire. Both studies were subjected to triangulation. In Study 1, the qualitative data of the interview and document review were triangulated. In Study 2, the qualitative data were triangulated as in Study 1, and all this qualitative data were in turn triangulated with the quantitative data gained from the questionnaire.

Two methodological stances guided the process of data analysis. Grounded theory analysis provided the tools to systematically analyse the qualitative data collected from students and teachers and generate a theory. Descriptive statistics were used to clarify not only the relationships between subjective experiences of Theory-of-Mind, IQ, and social competence, but also teachers' understandings of their students' Theory-of-Mind. A questionnaire was constructed to inquire into teachers' understanding of their students' Theory-of-Mind quantitatively. It underwent exploratory factor analysis and internal consistency tests. The two sets of data, qualitative and quantitative, were explored, analysed, represented and validated under the guidance of a mixed methods research design. As a result, this study provides insight into Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers.

The following chapters present the findings of the investigation. Chapter 5 *Theory-of-Mind as subjectively experienced by students with ASD* discusses the subjective experiences of

Theory-of-Mind directly expressed by students with ASD. Chapter 6 *Theory-of-Mind: Components and continuum* discusses the relationships between these experiences and objectively measured IQ and social competence. Chapter 7 *Outside-in: Theory-of-Mind of Students with ASD as understood by their teachers* presents the understanding held by teachers of their students with ASD.

CHAPTER 5

THEORY-OF-MIND AS SUBJECTIVELY EXPERIENCED BY STUDENTS WITH ASD

5.1 Introduction

This chapter examines the findings of Study 1 that emerged from a grounded theory analysis of Theory-of-Mind as subjectively experienced by students with ASD. It aims to answer three research questions. (1) How do students with ASD experience their own minds and internal worlds? (2) how do students with ASD understand the minds of others and the external world? (3) how is the experience of one's own mind and internal world connected to the understanding of the minds of others and the external world?

As discussed in Chapter 4 *Methodology*, qualitative data concerning subjective experiences of Theory-of-Mind were gathered from 20 secondary and post secondary school students with ASD through in-depth interviews and document review. The data were analysed through a grounded theory analysis, from which emerged a coherent and meaningful narrative.

Figure 5.1 introduces the structure of this chapter. Section 5.1 *Introduction* reviews the research questions and the methods employed for investigating Theory-of-Mind as subjectively experienced by students with ASD. Section 5.2 *Core Category: Imagination* discusses imagination, the core category that emerged from grounded theory analysis, in terms of the process that led to its discovery, its characteristics and its functions. Section 5.3 *Interactions between Imagination and Mental States* addresses the relationships between the core category and the other categories by examining the interactions between imagination and other mental states. Section 5.4 *Results of Interactions between Imagination and Mental States* discusses the results of these interactions, in the form of concepts of self and other, and communication styles. Lastly, Section 5.5 *Conclusion* provides a summary of the Theory-of-Mind of students with ASD as subjectively experienced.

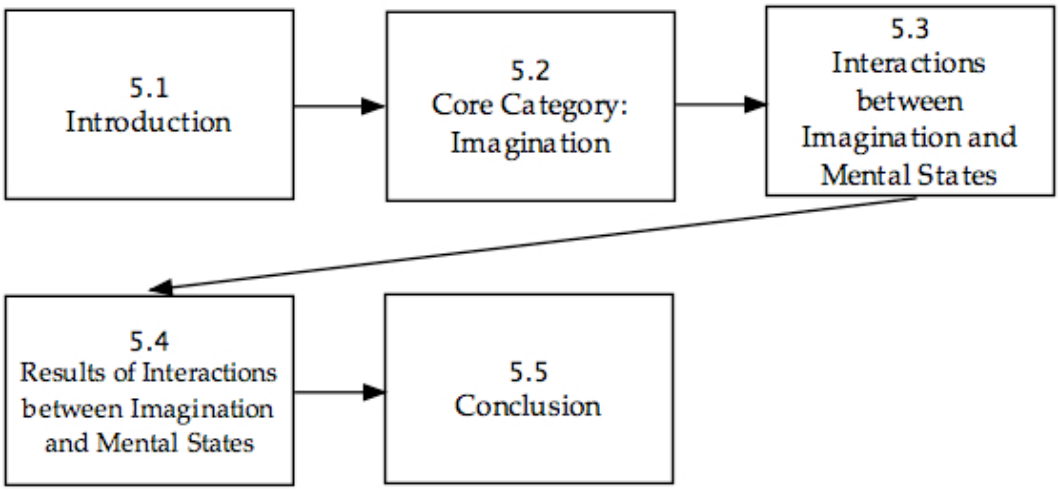


Figure 5.1 **Structure of chapter five**

5.2 Core Category: Imagination

Central to a grounded theory approach is the discovery of a 'core category', a category that is central, occurs frequently, and crystallises the other categories to form stable patterns of relationship and meaning. The core category that ultimately emerged from this process was 'imagination'. This section discusses how imagination was discovered as a core category, followed by its characteristics and functions.

5.2.1 Discovery Process of Core Category

The first candidate for core category was thinking in association. The data threw up a number of unexpected answers to questions, answers that were not immediately understandable. For example, the question, 'When are you happy?' brought the response, 'Sad' while the question, 'When are you sad?' brought the response, 'Happy'. These kinds of answers occurred frequently, creating a pattern of responses that occurred across a number of individuals. They seemed to be based on *thinking in association*.

In the example given above, it appears the student seized upon the single word 'happy' or 'sad' and associated it with its opposite, rather than taking the apparent meaning of the question and responding accordingly. However, while thinking in association explained some of the data, it did not explain those responses that are logically understandable within their contexts. For example, when the question, 'When are you sad?' brought the response, 'Mum is sick'.

These responses seemed to be characterised by logical thinking, taking the meaning of the entire sentence and seeing its causal implications. So it is appropriate to say that thinking in association appeared in the limitations of students with ASD, what they could *not* do, as opposed to logical thinking which appeared in the abilities of students with ASD, what they *could* do. From this, the core category emerged as *thinking* itself, but appearing along a spectrum, from logical to associational.

While this core category demonstrated explanatory power, something more was needed. Take the question-answer pattern of: 'How do you feel when your mum is sick?' 'Good.' Again, thinking in association appears evident, here between 'mum' and 'good' but more than thinking was at work. Something more fundamental was happening here, and that something appeared to be feeling.

Thinking is not feeling, but communication *about* feeling. For example, a student feels sad. This is feeling. A student speaks about his sadness. This involves thinking. Sadness must be conceptualised in some way in order to be communicated. Communicating emotion involves both thinking, which enables the communication, and feeling, that which is being communicated. What joins them? It was found to be the recognition of another's feeling, which is sympathy, and feeling for another, which is empathy.

Sympathy requires the capacity to imagine what it would be like to be that person, to be viewing the world from his or her perspective. Similarly, an understanding of one's own feelings in different circumstances requires imagination. How would I feel if circumstances changed – if, for example, my mother fell sick? So the response 'Good' to the question, 'How do you feel when your mum is sick?' indicates not just a particular kind of thinking, but a failure of imagination. Conversely, the response 'Bad' to the same question indicates not just logical thinking, but logical thinking supported by imagination.

And so another core category emerged, that of *imagination*. This again appears along a spectrum, from impeded imagination, where a student with ASD cannot place himself in another situation, to fluent imagination, where he does so naturally. With two core categories, thinking and imagination, having emerged, it was seen that imagination was the major core category, as placing oneself in the situation of another requires more than feeling or thinking. Take, for example, false belief. An understanding of false belief requires the ability to think about what another thinks, and this requires imagination, since

in order to think about what another thinks one must place oneself – imagine oneself – in that person's situation.

Imagination emerged as a core category only after thinking, which indicates that it was more hidden. Imagination can be seen only when it works along with other mental states, such as emotion and thinking. Or, the kind of imagination referred to here, which lies hidden within the workings of other mental states, can be called introvert imagination, as distinct from extrovert imagination.

Extrovert imagination in this study refers to the kind of imagination normally associated with pretend or symbolic play. Extrovert imagination includes the recognition that what is imagined is not real, while introvert imagination does not. Pretend play, as an example of extravert imagination, embraces both the world of fantasy and that of normal, everyday reality. The one who pretends knows she is pretending. Extrovert imagination is therefore relatively obvious and deliberate.

Introvert imagination, however, is more subtle and spontaneous. For example, when feeling for someone who has lost a family member, people put themselves in that situation by imagining what it would be like if it happened to them. This can occur without any special effort, and so the presence of imagination tends not to be recognised. One simply knows how it feels. Further, this kind of imagination functions beyond play, and so is taken to simply reflect reality. While imagination outside of play is fundamental to thinking and feeling it tends to be taken for granted, ceases to be noticed, and so disappears from view.

Imagination emerged as a core category only towards the end of the analysis. Once exposed, however, its explanatory power was considerable, uniting the disparate categories resulting from grounded theory analysis. Figure 5.2 shows the subjective experiences of Theory-of-Mind with imagination functioning as a core category. It provides a schematic map of the central findings of this study. This chapter, indeed, could be seen as a commentary on Figure 5.2, and will unpack the information contained within it.

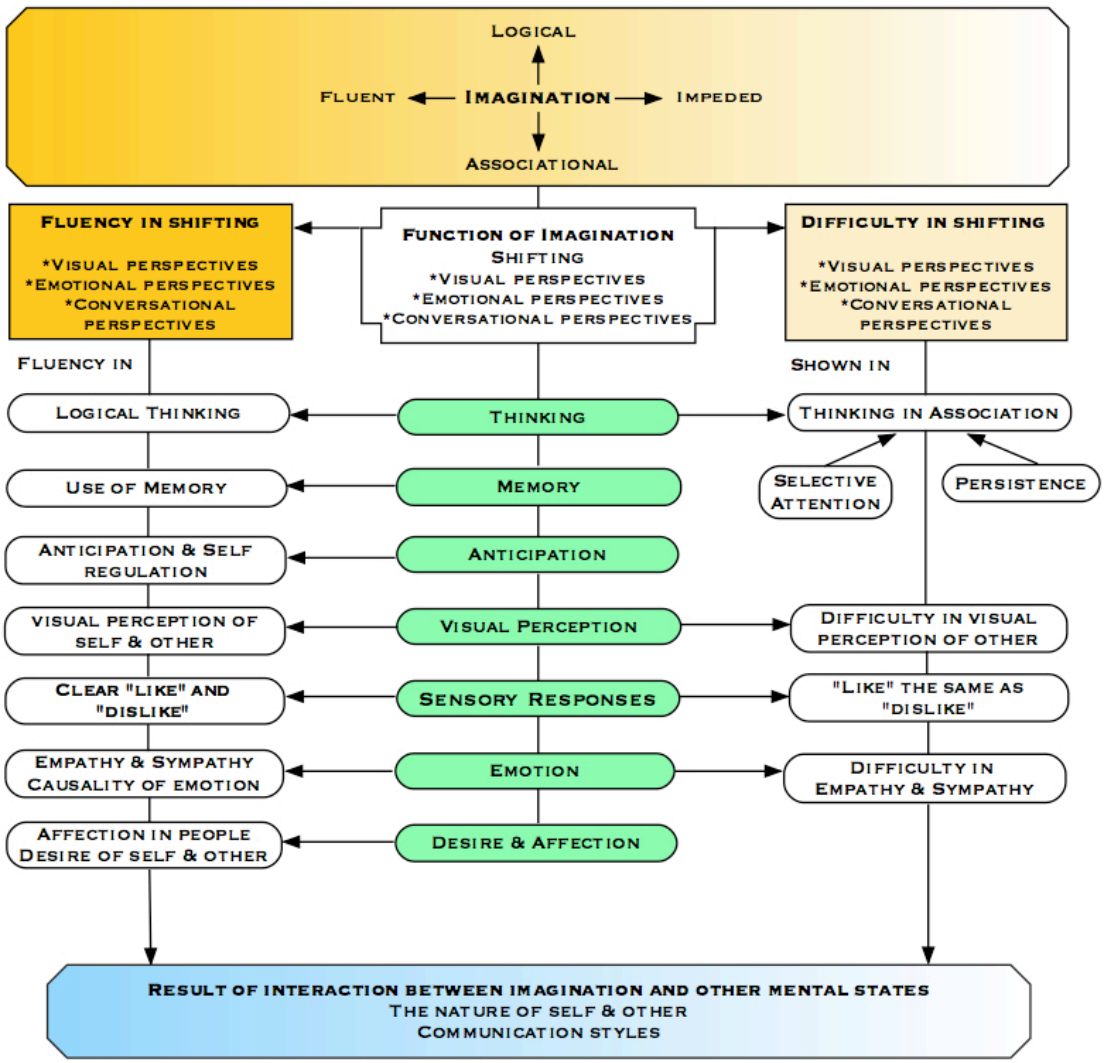


Figure 5.2 **Subjective experiences of Theory-of-Mind**

As has been seen with the example of pretend play, imagination crosses boundaries from one viewpoint to another. This movement across boundaries can be fluent or impeded. Boundaries can be crossed logically or in association (Section 5.2.2). The crossing of boundaries enables the capacity to shift visual, emotional and conversational perspectives (Section 5.2.3). As such, it can be seen to interact with the mental states that emerged in this study as components of Theory-of-Mind – thinking, memory, anticipation, visual perception, sensory responses, emotion, desire and affection (Section 5.3). This interaction appears to give rise to much of the everyday experience of students with ASD, in particular self image and images of other, relationships with self and others, and communication (Section 5.4). The next section discusses the characteristics and functions of imagination in detail.

5.2.2 Characteristics of Imagination: Imagination on Spectra

Imagination was found to be a continuum, functioning along spectra (Figure 5.3). One spectrum lies between the poles of logical and associational imagination. Logical imagination follows patterns of causation in which events are imagined to follow each other in sequences that show consistent, lawful directions. The normative quality of these sequences allows images of the self and the world to be shared with others.

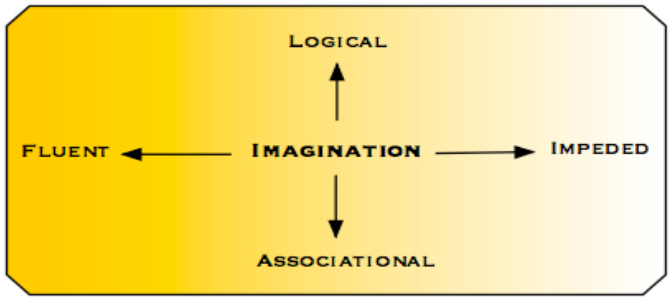


Figure 5.3 **Spectra of imagination**

For example, a student says his mother is sick and he feels sad. There is no difficulty understanding this situation, as it can be seen unfolding according to a sequence that is easily shared: Event A = 'My mother is sick' leads to Event B = 'I feel sad.'

Logical imagination thus has a shared, agreed quality to it, making it easy for others to understand. Associational imagination, in contrast, implies a more unique, privately experienced understanding of the self and the world based on individual patterns of association.

For example, a student says his mother is sick and he feels good. The causal sequence seems disjointed and it is difficult to understand the situation, but assuming associational imagination it can be reconstructed so it becomes understandable: Event A, 'My mother is sick' gives rise to Event B, 'I love my mother'; Event B gives rise to Event C, 'My mother reminds me of feeling good'; and Event C gives rise to Event D, 'I feel good.' Here, the relationship between Events B and C is centrally important, and it is associational rather than logical. As such, it is difficult to share, not readily apparent to others unless explained. The relationship between Events A and D can be discerned socially, and people naturally tend to assume an immediate link between them. People can assume Event A has caused Event D, and are shocked or confused by this.

This spectrum of imagination, between the poles of logical and associational, therefore has social implications. Logical imagination does not create social difficulties for the individual, as it constructs a sense of the world that others can share. Associational imagination does create social difficulties when an individual's thinking and perception are dominated by it, as it constructs a sense of the self and the world that is not easily understood by others, and so may leave the individual in isolation.

Social implications are also found in the second spectrum of imagination, lying between the poles of fluent and impeded. This spectrum refers to the degree of effort required to exercise imagination, so that a perspective on the world different from that currently experienced can be brought to mind easily, or with difficulty, or not at all. 'Fluent' imagination suggests an ease and spontaneity in imagination. For example, the spontaneous understanding that what I see from my perspective is different from what another sees from their perspective, as examined in the elephant task and the muffin and kettle task. 'Impeded' imagination suggests difficulty in imagination, even the impossibility of it. For example, a student with ASD might labour to understand that what he sees from his perspective is different from what another sees from their perspective, or may be unable to understand this at all. This was often found in this study.

When mapping these poles of imagination schematically, four types of imagination can be produced (Figure 5.3): (1) fluent/logical; (2) impeded/logical; (3) fluent/ associational; and (4) impeded/associational. However, the subjective experiences of students with ASD demonstrated only the first three types of imagination. No clear examples of impeded/associational imagination were found in the data, possibly because imagination in association needs little or no mental effort, as in fantasy or day-dreaming. Furthermore, the boundary between impeded/logical imagination and fluent/associational imagination is not precise, and hence the use of the concept of spectra to describe the continuity of the characteristics of imagination.

5.2.3 Functions of Imagination: Shifting Perspectives

Imagination on spectra was found to function in the shift in perspective that enables a person to understand themselves and others by transcending present experience to some degree. This study uncovered shifts in three aspects of the experience of students with ASD: Visual perspectives; emotional perspectives; and conversational perspectives (Figure 5.4). Fluent/logical imagination enables fluency in shifting visual, emotional and

conversational perspectives, while impeded/logical imagination or fluent/associational imagination creates difficulty in shifting them.

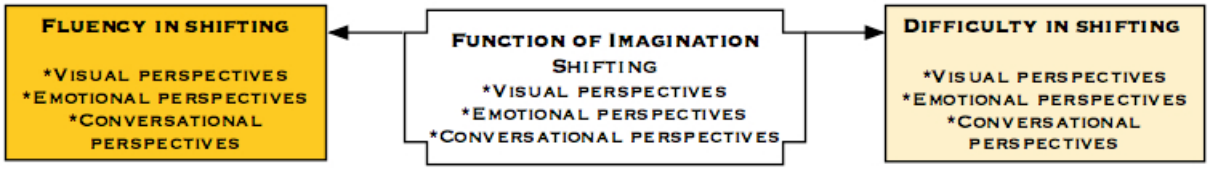


Figure 5.4 **Functions of imagination**

The first aspect was found in the capacity to shift visual perception so as to understand differences in the appearance of objects depending on whether they are right side up or up side down, and whether they are being viewed from one place or another. The second was found in the capacity for sympathy and empathy. The third was found in the movement of perspective between two parties in conversation. They are discussed in detail in the following sections.

5.2.3.1 Shifting Visual Perspectives

Imagination underpins the recognition that people see different things from different physical locations (Figure 5.5). Logical imagination accommodates the movement of visual perspective between self and other. It allows the recognition that a picture appears in one way from one's own perspective and another way from someone else's perspective. In the elephant task, for example, a picture which is right side up from the student's perspective is recognised to be upside down from the perspective of the researcher, sitting opposite.

Figure 5.5 **Function 1 – shifting visual perspectives**

Fluent/logical imagination accommodates this shift with ease, while impeded/logical imagination is demonstrated by a degree of difficulty to move from the assumption that others see what I see regardless of their circumstances. One example is found in the muffin-kettle task, where although a student with ASD knows that the picture has two sides, one showing a muffin and the other a kettle, he does not understand that the researcher on the other side of the cards sees a different picture.

Fluent/associational imagination was indicated in these tasks by visual attention tending to focus on a single detail of a picture. For example, asked what he can see when presented with a picture of a kettle, one student with ASD named the handle of the kettle lid, rather than the kettle itself. Another example was a student focusing on a flower decoration on the baking paper in a cupcake drawing, rather than the whole cupcake. Shifting visual perspectives is further discussed in Section 5.3.3 *Imagination in Visual Perception*.

5.2.3.2 Shifting Emotional Perspectives

Imagination also enables movement between the perspectives of self and others regarding emotion, and is essential for the ability to experience sympathy and empathy. In this study, 'sympathy' is used to refer to students' capacity to recognise the feelings of another, while 'empathy' is used to refer to students' capacity to share the feelings of another.

While some students demonstrated fluent logical imagination within emotion by recognising sympathy and experiencing empathy, other students showed difficulties in them (Figure 5.6). Difficulties in sympathy and empathy appear linked to impeded/logical imagination or fluent/associational imagination.

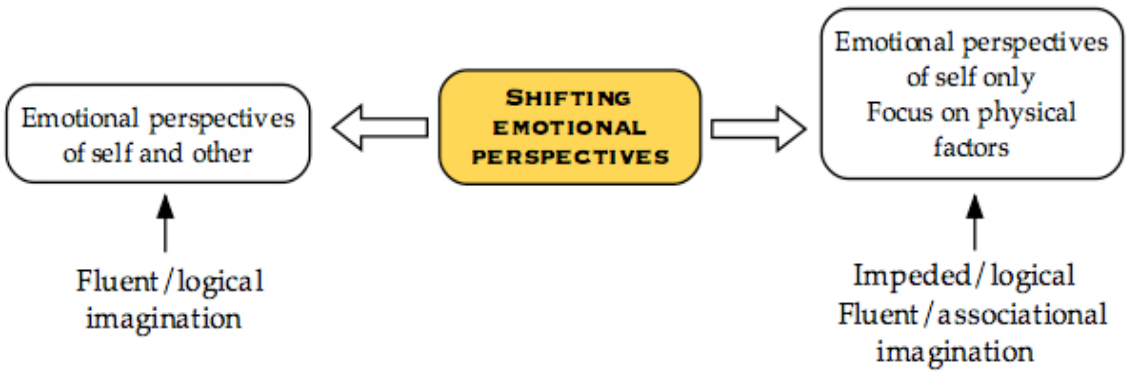


Figure 5.6 **Function 2 – shifting emotional perspectives**

As an example of impeded/logical imagination, some students with ASD demonstrated difficulty in recognising someone else's emotion caused by a certain situation while they could recognise their own feeling in the same situation. For example, a student said he felt 'frightened' at night going back an empty house, but that the researcher would feel 'pretty' in the same situation.

Impeded/logical imagination can be seen through a tendency to focus on the physical context of emotion rather than on the affective feel of emotion. Students, for example, sometimes described the physical features of drawings rather than the emotions they are meant to convey, so a drawing of a sad face with tear-drops is recognised as feeling 'crying' rather than feeling 'sad'.

Presented with a situation that is causally conditioned by what is experienced by another, some students responded with what might happen to them (an event) rather than what they might feel (an emotion). For example, if their mother is sick, the ideas that they cannot go shopping with her, or she has to go to the hospital, come first, rather than the emotions of sadness or concern. These answers also suggest a degree of associational imagination.

Fluent/associational imagination is also demonstrated in responses to questions that are based on an association triggered by just one part of a question. For example, some students answered 'Sad' to the question, 'When do you feel happy?' because sadness was associated with happiness as an opposite. Shifting emotional perspectives is further discussed in Section 5.3.5 *Imagination in Emotion*.

5.2.3.3 Shifting Conversational Perspectives

Finally, imagination allows for movement between the perspectives of people engaged in conversation. This appeared in the data regarding the issues of self reference and question/answer responses (Figure 5.7).

Figure 5.7 **Function 3 – shifting conversational perspectives**

Self reference. During conversation people usually move from another's use of their name to use of the first person pronoun, 'I' in response. This movement shows understanding the difference between 'myself' as perceived externally by another and 'myself' as perceived internally by the self. Fluent/logical imagination is demonstrated by an ease in this shift, when, for example, a student with ASD was asked, 'Who do you love?' and without hesitation replied, 'Me.' Impeded/logical imagination is demonstrated by the use of one's own name for self-reference, indicating that one's self image remains in the other's perspective, so that one's self reference comes from the other. For example, some students with ASD were asked 'Who do you like?' and 'Who is your friend?' and replied that they liked themselves, and were their own friend. But instead of saying 'me' or 'myself' they responded with their own name.

Question/answer responses. Fluent/logical imagination was demonstrated by a facility in conversation. Impeded/logical imagination was shown by a pattern of making statements with questions and of making questions with statements. Some students made statements that ended in a raised tone, giving the appearance of a question, and made questions by using statements. In these cases, a difficulty in shifting perspectives from one party of conversation to another is demonstrated by one party speaking from the place of the other rather than speaking from their own perspective. For example, wanting to ask if they could go to the classroom to join in activities taking place there, students said 'Sewing' and 'Glue things'. These are statements that appear to come from an authoritative other (e.g., a teacher), making a statement or giving permission or even giving an order, rather than coming from the self wanting to join a particular activity. Shifting conversational perspectives is further discussed in Section 5.4 *Results of Interaction between Imagination and Mental States*.

This section has discussed the functions of imagination, which are related to shifting perspectives within visual perception, emotion and conversation. The next section discusses the interactions between imagination and mental states. A particular focus is placed on how the spectra of imagination is manifested in various mental states.

5.3 Interactions between Imagination and Mental States

This section examines the findings that show how imagination relates to the other mental states that emerged in the course of this study. These mental states are: Thinking; memory; anticipation; visual perception; sensory responses; emotion; desire; and affection. This examination is framed by thinking and emotion, as these demonstrate the spectra of imagination most clearly.

5.3.1 Imagination within Thinking

In this study imagination and thinking were found to be closely interrelated, as shown in Figure 5.8. Fluent/logical imagination, for example, was found underlying logical thinking, as it makes possible the movement of perspectives along causal, normative trajectories that allows the understanding of mental representations, both one's own and those of others. Associational imagination underlies thinking in association, as the shifts in perspectives that underlie thinking move in trajectories characterised by association rather than logic.

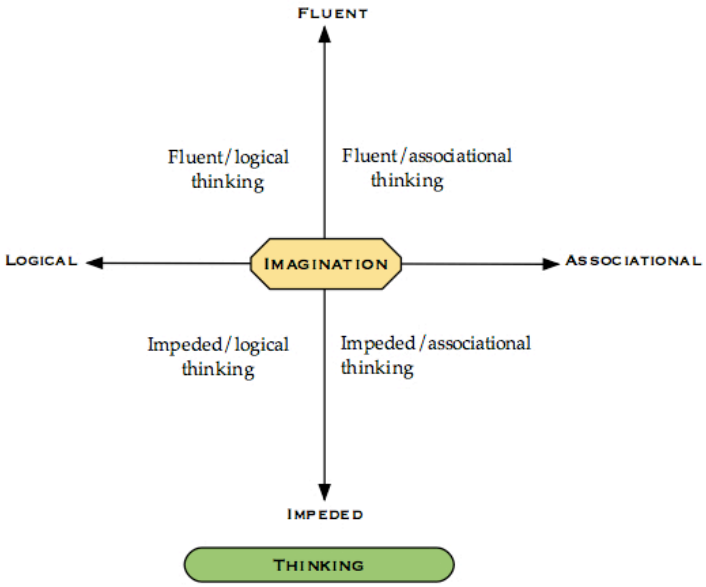


Figure 5.8 **Imagination in thinking**

This section examines the workings of logical and associational imagination as they influence the workings of thinking. First, logical imagination within thinking is examined in the context of false belief tasks, followed by the patterns of associational thinking.

5.3.1.1 Fluent/Logical Imagination within Thinking

Logical imagination within thinking is central to performance in false belief tasks, which in turn have been central to the study of Theory-of-Mind. As shown in Chapter 3 *Theory-of-Mind*, false belief tasks have been a litmus test for Theory-of-Mind understanding ever since Pylyshyn (1978) and Dennett (1978) argued that the demonstration of Theory-of-Mind required not just that a subject believes *x*, but that s/he understands her belief about *x* by recognising it as false. This section examines the relationship between imagination and logical thinking in the context of three false belief tasks. These are: A changed contents task to examine the subject's understanding of their own false belief; and a changed contents task and a changed location task to examine the subject's understanding of the false belief of another.

Knowing What I Thought. In the first false belief task, focusing on the understanding of one's own false belief, students were presented with an unopened biscuit box containing a pencil rather than biscuits. After being asked to identify the contents of the box, they opened it. They were then asked to say what is *really* inside the box. The final question was what they thought was in the box *before* they opened it.

Before opening the biscuit box, most students predicted there were biscuits inside. After opening the box, most students recognised the box contained a pencil. A total of 13 out of 20 students said they thought the box contained biscuits before they opened it. These students recognised that their previous belief was different from present reality; they were able to remember their previous belief. This can be understood as an aspect of logical imagination. A sequence of mental images takes them from their present perception to their previous understanding, and this sequence is logical in its causal regularity. This regularity gives it a shared quality. It makes sense, and is seen to make sense.

Knowing What Another Thinks. In the second changed contents task the same order of events was followed as above, but this time the materials used were a biscuit box containing an eraser, and the questions related to what the student thought *another* person would believe in this situation.

Half the students answered that another person, going through this process, would think that the box contained a biscuit, even through they, the students, knew the box really contained an eraser. In other words, these students understood what another person would think.

The third task was one of changed location. Students had already made drawings of themselves and a friend. These drawings were placed nearby, so the student could imagine he was accompanied by his friend. The student then placed a biscuit in a box, imagining he did so with his friend. The friend's picture was removed, the student imagining that his friend was leaving to go to the bathroom. During his friend's absence, the student moved the biscuit from one box to another. When his friend returned (indicated by the return of the picture) to look for the biscuit, the student was asked in which box his friend would look.

Of the 20 students, eight understood that their friend would think the biscuit remained in the box where it was originally placed. This again shows the students understood what another would think in a given situation.

In the above examples, by demonstrating an understanding of their own false belief regarding the contents of the box, or how others would have a false belief, students with ASD demonstrated Theory-of-Mind, the ability to impute mental states to themselves and others.

Able to answer 'Why?' Students who understood the false belief of another in the changed location task were asked 'Why?' questions regarding this task. The ability to answer 'Why?' questions demonstrates thinking supported by logical imagination because they involve imagining a logical sequence of events, and without this sequence they cannot be answered. But in this instance, no student could answer why their friend thought the biscuit was in the original box, even though it was not. They knew the relevant answer, but could not conceptualise or verbalise the causal sequence that brought them to that conclusion.

Although students could not answer 'Why?' questions regarding false belief, seven students could answer these questions regarding emotion. Patrick, for example, after complaining about his mother was asked why he did not like her. He replied that it was because she was not nice to his dad. This answer indicates the ability to make a logical connection between a previous situation and his presently experienced inner state. Students

answered the same question regarding the emotion of others (e.g., 'Why does your mum feel good?'), and their ability to answer them appropriately demonstrated the same shift of logical imagination, this time from their own experienced situation to the imagined situation of another.

5.3.1.2 Impeded/Logical Imagination within Thinking

Just as facility in false belief tasks demonstrate fluency in logical thinking, and so imply the influence of fluent/logical imagination, so too difficulty in false belief tasks can demonstrate difficulties in logical thinking, implying the influence of impeded/logical imagination. In this section, impeded/logical imagination in thinking among students with ASD is examined in the context of the same false belief tasks that were discussed in Section 5.3.1.1.

Not Knowing What I Thought. In the first task, students were asked to predict the contents of a closed biscuit box which actually contained a pencil. After they opened it and saw the pencil, they were asked what was in the box. All students could answer these questions. They were then asked what they previously thought was inside. Here, six students said that previously they thought the box contained a pencil.

These six students could not recognise the difference between what they could see in the present and what they thought in the past. They could not recognise their own false belief, which implies they could not make the imaginative shift from present to past, and hold that image in their minds along with present sensory experience.

Not Knowing What Another Thinks. In the second task, students were asked to predict the contents of a closed biscuit box which was seen, after opening it, to actually contain an eraser. This time the questions were not about what the students themselves thought was inside the box, but what their friend would think is inside the box. In this task, eight students said they thought their friend would think the biscuit box contained an eraser, while two students did not answer.

The students who said their friend would think the biscuit box contains an eraser could not recognise the false belief of another, that their friend would have a belief different from their own. This also implies a difficulty to make an imaginative shift from themselves and their own situation to another and their situation.

In the third false belief task, students were asked to place a biscuit in a box, imagining they were doing so with their friend. They were then told their friend leaves the room to go to the bathroom, symbolised by the interviewer removing the drawing of their friend. Students then moved the biscuit to another box. Told that their friend returns to look for the biscuit, they were asked in which box their friend would look.

Some eight students selected the original box, indicating they knew their friend would not know the biscuit's location had changed in their absence. Of the remaining 12 students, six selected the new box, and three seemed confused and indicated first one box and then the other. The remaining students gave an answer that cannot be regarded as wrong, but nor was it appropriate to the task, for they suggested the biscuit(s) could be found in the supermarket, or by going shopping, or in the classroom. Their focus was on the general question of where biscuits can be found, rather than being limited by the context of the question within this specific task. This indicated thinking in association, as will be explained more fully in Section 5.3.1.3.

The answers of these 12 students indicate that they did not recognise that a belief held by another in the past can be different from a belief held by the same person when the situation has changed. Logical thinking was impeded, apparently through a difficulty in imagination, the ability to make a mental shift through time, from present to past, and across space, from themselves to their friend, within the context of the given task.

Conceptualising False Belief. Most students were questioned further about their response to the changed location task. Did their friend, for example, see them transfer the biscuit from one box to another? What did they think of when they talked about their friend's belief? Did their friend know they transferred the biscuit? No student could explain how their friend came to think the biscuit was in the box, whether the right box or the wrong box. This difficulty in verbalising a process of thought indicates a weakness in logical thinking, even in those cases where logical imagination functioned successfully. Students who could make the shift in imagination to understand how the world appears to another did not know *how* they understood this.

In conclusion, impeded logical thinking accompanies difficulty in false belief. Students who demonstrated this difficulty could not make the imaginational shift between past and present to recognise their own false belief, or the shift between themselves and another to recognise another's false belief. Or, if they could make this shift, evidenced by

the answers they provided, they could not verbalise it, and so could not conceptually understand, and therefore explain, what they know. Theory-of-Mind itself was working, but Theory-of-Mind understanding, or communication about it, was weak. The next section will examine the role of thinking in association in false belief.

5.3.1.3 Thinking in Association

Thinking in association was found to have a strong influence on the workings of Theory-of-Mind in students with ASD. Theory-of-Mind is found in the ability to understand human behaviour by imputing mental states to oneself and others. The capacity to do this is closely linked to imagination, as imagination allows the movement from one viewpoint to another, which in turn makes it possible to represent one's own mental states and those of others. Imagination can be seen to operate along spectra, one of which lies between the poles of logical and associational.

Logical imagination follows patterns of causation in which events follow each other in consistent, predictable sequences, allowing them to be shared with others, and so be understood. Associational imagination, in contrast, follows unique, unpredictable sequences, which are not immediately evident to others. Where associational imagination is dominant, Theory-of-Mind is not apparent.

Students in this study demonstrated a predominance of thinking in association. This kind of thinking involves a number of processes (Figure 5.9). It begins with selective attention, focusing on a particular element of the information provided, which stimulates a trajectory of association. However, given the hidden nature of these trajectories, the question of validation arises. How can an observer know the specific trajectories of association occurring in someone's mind? Any conclusion can only be an inference. This issue is discussed in detail in Chapter 8 *Discussion*.

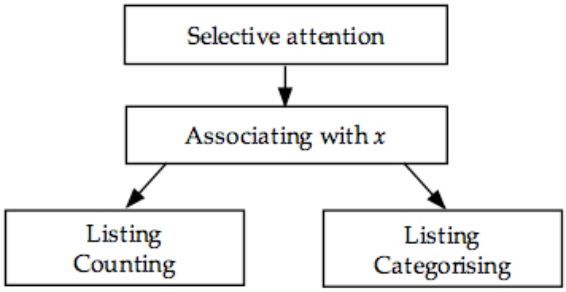


Figure 5.9 **Process of thinking in association**

Selective attention was seen to begin in four ways among the students in this study; selecting partial information, selecting the last word, selecting the predominant aspect and repetition. While distinct from each other, they are not mutually exclusive.

Selecting partial information. Sometimes students selected one aspect of the information contained in an object, event or sentence, and focused on that alone. This single element held the attention and provided a departure point for a particular association, which developed into a trajectory of thought.

For example, Michael was shown the muffin drawing and asked whether he likes muffins. He answered, 'Almond muffin.' He was asked if this meant he likes almond muffins. He then said, 'Chocolate muffin' and continued to list types of muffin.

When Bob was shown the elephant drawing he immediately said, 'Teacher, because the elephant is an animal, Daijin Bed, Simons Bed and Ace Bed.' Daijin Bed is a bed company which advertises their beds with an image of a bouncing elephant, and the drawing of the elephant apparently reminded Bob of the Daijin Bed advertisement. This company was then associated in his mind with other bed companies.

Paul was asked whether he likes to be alone or to be with friends. His answer was 'Ice cream'. Paul's teacher explained that he likes ice cream. When he was asked to draw himself, he wrote 'ice cream' on the paper instead. It would appear that in the question about liking his friends the word 'like' reminded him of ice cream.

Selecting the last word. Sometimes the trajectory of association takes off from the last word spoken. David, for example, was asked how he would feel if he was forbidden to use the computer. Would he feel good, angry, sad or frightened? He replied, 'Frightened.' He was then asked how his friend would feel, but this time reversing the possibilities – frightened, sad, angry or good? He replied, 'Good.'

Similarly with Nicholas. During a discussion on shopping, he was asked how he would feel if he wanted to go shopping with his mother but could not because his mother said no. He was reluctant to name his feeling, so the interviewer asked him if he would feel good, angry, sad or frightened. He answered, 'Frightened.' Then the interviewer changed the order of possibilities, and asked if he would feel frightened, sad, angry or good. He replied, 'Good.' The same pattern was found with other students.

Selecting the predominant aspect. The third pattern of selective attention observed among students with ASD was demonstrated by Michael and Paul. Michael was shown a drawing illustrating a pencil being taken away by a friend. Before he could be asked how he would feel in that situation, he said, 'A pencil.' The pencil in the drawing took his attention. Paul was shown four drawings of faces conveying the emotions of happiness, sorrow, anger and fear. Asked 'How does this friend feel?' of the face displaying sorrow, Paul answered 'An eye', 'Sick', 'Tear' and 'Sick' (again). Particular physical features of the drawing took his attention, rather than the emotion represented.

Repetition. The last pattern of selective attention is repetition. Paul demonstrated this throughout his interviews. Paul said he likes bread, and was asked how he feels when his mum buys him yummy bread. Paul answered, 'Stomach-ache.' The question was repeated, and he again replied, 'Stomach-ache.' Paul was later shown a drawing illustrating a boy lying on a bed. Before he could be asked how he feels when he cannot go shopping with mum because he is sick, Paul said 'Bed, stomach-ache.' Apart from stomach-ache, he repeated 'Stop eating', 'Sad' and 'No more ice cream'.

5.3.1.4 Trajectories of Associational Thinking

As seen above, the trajectory of thought that begins with selective attention often takes the form of some kind of list. This may be simple counting. Daniel was asked what he wants to have, and replied 'Three.' He was asked 'three of what?' and listed 'train', 'car' and 'bus'. In a more complex example, Joshua was asked what he dislikes and replied 'Kaebong' which is a brand name of biscuits. He was then asked, 'You don't like Kaebong, what else don't you like?' He replied, 'Like it', listed three more brand names of biscuits and then counted 'One, two, three, four … four!' In this conversation, 'dislike' apparently reminded him of 'like'. 'Like' then reminded him of a biscuit brand name he likes. This name reminded him of more names. Then he counted how many brand names of biscuits he listed. Joshua showed the same pattern with his friends and with food he dislikes.

Categorising is a form of listing which occurs more frequently than counting. Bob's response to the elephant drawing with a list of bed company names is one example. George listed the names of his friends in answer to the question, 'What does Sam (his previously named friend) do for you?' George focused on the name of his friend which was associated with other names, and which in turn led to a list of the names of his other friends. Michael

was asked how he would feel when he loses his mother in a supermarket. He answered 'Mart' and then listed the names of supermarkets.

5.3.1.5 Persistence

Thinking in association begins with selective attention and then continues along a particular trajectory, often characterised by persistence to the point of obsession. It was demonstrated in this study by students clinging to ideas of completion, insisting on giving the right answers, holding to routines and repeating the same behaviours.

Clinging to completion was illustrated by Edward, Ian and Joshua. They had difficulty in expressing their preferences regarding sensory experience, and the interviewer suggested they skip over these questions. But they were determined to complete the interview booklet, and insisted on going back to finish the relevant self-completion statements.

Edward, John and Joshua showed a strong desire to provide the 'right' answers for the self-completion statements in the interview booklet, even though there is no 'right' or 'wrong' response for this kind of statement. They expected the interview booklet to have an answer sheet at the back, and kept trying to find it, although there was none.

Bob and Michael demonstrated a determination to hold to routine. In his diary, Bob records an unvarying routine he follows each day after school. Michael insisted on the same pen in each interview session. The last pattern of persistence is repetition of behaviours. Some students repeatedly practised echolalia, humming, flapping one's hand, sniffing and spitting on tissues.

5.3.1.6 Contradiction or Similarity

A majority of students demonstrated thinking in association as part of their ordinary conversation. Association can work by associating with something contradictory, or with something similar.

Association can be triggered by a contradiction, when students are reminded of something through hearing the opposite. For example, Brett was asked when he is happy. He replied, 'Sad.' He was then asked when he is sad. He replied, 'Happy.' When Fred was asked what he is reminded of by 'crying', he first replied, 'Good' and then added, 'Bad.'

Association with the similar occurs much more frequently than association with the contradictory. This is being reminded of something similar to what was mentioned in a question. For example, Chris was asked when he is angry. He answered, ‘Goblin’s horns’ (도깨비뿔), raising his index fingers on the sides of his forehead. In Republic of Korea, the horns of a goblin indicate anger.

Joshua was asked how he feels when his mum is sick. He answered ‘Injector’ which he associated with ‘sick’. He was also asked how his teacher feels when he wanders around and shouts during study time. Then Joshua shouted, ‘Come back, Jeff, Come back’, mimicking his teacher’s voice. Jeff is one of Joshua’s classmates who sometimes run away from class in study time.

5.3.1.7 False Belief and Thinking in Association

As discussed above, thinking in association was a feature of false belief tasks. The more irrelevant answers during these tasks tended to be associational in terms of the thinking they expressed. Thinking in association generated two distinctive patterns of answer, absence and focusing on adjunct issues.

Absence. Some students took as relevant a situation different from that indicated by the context. They focused, for example, on the simple absence of an object rather than the context that gave meaning to its absence.

In the changed contents tasks students predicted the presence of biscuits in an unopened biscuit box which, unknown to them, actually contained a pencil. When the box was opened and they were asked to say what was in it, seven students initially answered either ‘Nothing’ or ‘Disappeared’. Then, after the interviewer persisted with the question, these students were able to identify the pencil. In the second changed contents task, where the question was what would their friend think was in the biscuit box, two students also initially answered either ‘Nothing’ or ‘Disappeared’.

In the changed location task, students were asked to put a biscuit in a box, imagining they did so with their friend. Their friend left the room and the students transferred the biscuit into another box. Their friend returned and looked for the biscuit. Students were then asked which biscuit box their friend looks into. Tom answered, ‘It isn’t there.’

Adjunct focus. Some students directed attention to features and topics that are prompted by a question, but in a way contrary to the question's design. Brett, for example, focused on the adjunct features of a question when he was asked the name of a biscuit, and replied with the number of biscuits in a box. Similarly, when Edward was asked the same question, he answered with the number, colour and wrapping materials of the biscuits, before providing their name.

Focusing on a different topic was seen in Nicholas's response when he was asked where his friend is going to look to find the biscuits. He gave his friend's name, then that of his sibling. Chris answered the same question by saying that his friend is looking in a classroom to find the biscuit. Joshua preferred the bathroom, while Kevin and Nicholas said in a supermarket.

In conclusion, thinking among students with ASD can be seen to operate along the spectra of imagination, logical/associational and fluent/impeded. Fluent imagination is found in the movement between perspectives that allows students to be aware of their own mental representations, evidenced by the completion of false belief tasks. The limits of their understanding were revealed by the inability of those students who could give the relevant answer in false belief tasks to explain how this came about. When imagination is more limited, students' thinking becomes characterised by patterns of association, which make false belief tasks difficult or impossible. This indicates the inability to create and sustain mental representations – to experience mental states – in ways that can be readily shared with others.

5.3.2 Imagination in Memory and Anticipation

Imagination influences not only thinking but also memory and anticipation. The basic function of imagination is to shift perspectives, through space or time. The movements from the self to another and back again are through space, while the movements within the self from present to past or from present to future are through time. The movement from present to past allows memory, while the movement from present to future allows anticipation. Students in this study were usually more fluent in shifting perspectives through time. This section begins by examining the relationship between imagination and the movement within the self from present to past, which is memory, and then continues to the movement from present to future, which is anticipation (Figure 5.10).

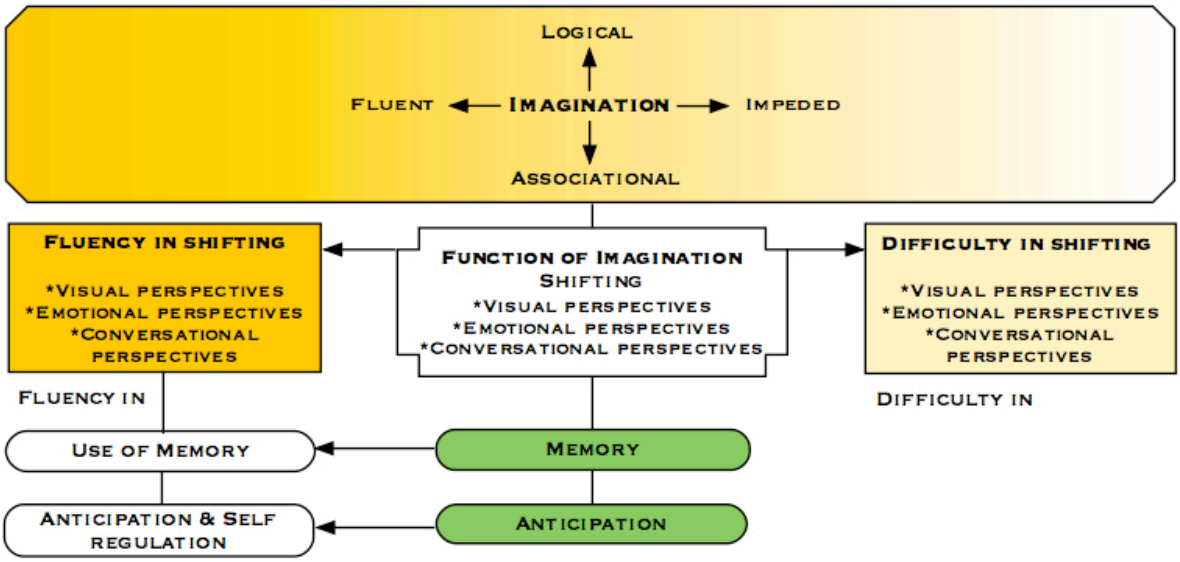


Figure 5.10 **Memory and anticipation**

5.3.2.1 Memory

Memory was found to interact with both logical and associational imagination. While impeded/logical imagination was not found, fluent/logical imagination was demonstrated by students' facility in remembering what happened in previous interviews. Associational imagination emerged in answers that did not appear relevant to the details of the question asked, but seemed to be stimulated by other experiences.

Some students could remember what was discussed between them and the interviewer and refer to these topics in later interviews, which indicates the workings of logical imagination, the ability to shift perspectives through time in consistent, causal patterns. For example, in one interview Paul was asked what he wants to do for a sick friend. Later, asked what friends do for him, he answered, 'Friend is sick.'

Stories of the past that were characterised by fluency in logical imagination were often characterised by strong emotional flavours. For example, Kevin spoke about his feeling for a girl friend he knew from church. He recalled his happiness when she was present at the services, and his sadness when she was absent. Fred and John were able to recall instances when they were very angry.

The porous nature of the boundary between logical and associational imagination was illustrated by Chris, who in response to a question about when he felt sad told a story

of standing on a pedestrian crossing with his mother and crying. While this memory seems predominantly logical, Chris also said the word 'crying' reminded him of a sad memory, in which both he and his friend were crying. As he spoke, his voice was trembling. The link to this story indicated associational imagination.

Other stories showed a mixture of logical and associational imagination. Nicholas was asked how he would feel if he lost his mother in a supermarket, and answered, 'Cheju Island.' This response indicated associational imagination, for he then spoke about how his mother visited Cheju Island for work. He felt sad while mother was away, and this response indicated logical imagination.

Some stories of the past seem predominantly associational in their imagination. Patrick, when asked about good feelings, talked about what happened to him when he saw a dermatologist. Asked who his friends are, he spoke about bumping against the table.

The porous nature of the boundary between logical and associational imagination found in these examples indicate that the movement between logical and associational lies along a continuum within the spectrum. Sometimes memories indicate predominantly logical imagination, sometimes they indicate predominantly associational imagination, and sometimes they are mixed, so that it is difficult to say with complete confidence which is decisive. However, in all instances, imagination is core.

5.3.2.2 Anticipation

Anticipation requires the shift in perspective granted by logical imagination, the capacity to create a causally based mental image of the future. This allows for the exercise of Theory-of-Mind, the ability to impute mental states to oneself and others that will arise in the future.

Students with ASD demonstrated anticipation in the way they expected certain results to come from their corresponding behaviours. For example, Nicholas and Tom showed that they understood the consequences of their behaviour. Nicholas said that if he fights with his friend, his teacher will make him sit with his hands raised. Tom said that if he shouts at study time he has to be scolded by his teacher, because his behaviour causes his teacher to feel bad.

Sections 5.3.1 and 5.3.2 examined the role of imagination in the cognitive activities of students with ASD, beginning with thinking and proceeding to memory and

anticipation. The next section will examine the role of imagination in physical perception, first looking at visual perception, and then at the ways students with ASD respond to the five physical senses.

5.3.3 Imagination in Visual Perception

Theory-of-Mind entails the ability to impute mental states to the self and others. Imagination underpins Theory-of-Mind as it enables the shift in perspective that allows a person to understand themselves and others beyond the limitations of immediate experience. Theory-of-Mind, in other words, is found in the recognition of other perspectives, and imagination allows the movement between these perspectives. In this section, evidence for Theory-of-Mind is sought in the workings of visual perception, in the capacity to understand how the same object is seen differently when viewed from different perspectives (Figure 5.11).

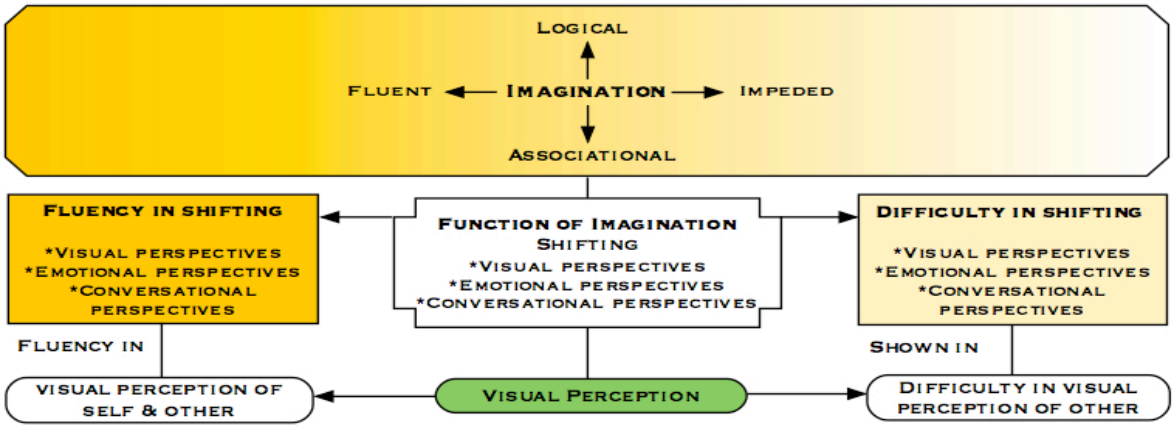


Figure 5.11 **Imagination in visual perception**

Visual perception was examined using two tasks, the muffin and kettle task and the elephant task. In the muffin and kettle task, students were shown drawings of these two objects and asked to recognise them. The two drawings were then placed back to back in the view of the students, and held in front of them. They were then asked what they saw and what the interviewer, sitting opposite, saw. Out of 20 students, 18 answered correctly, demonstrating Theory-of-Mind in their ability to impute a particular visual perception to another.

With the elephant drawing, students were first asked to recognise the elephant. The drawing was placed on a table between the student and the interviewer. Students were asked whether the elephant was upside down or right side up. They were then asked whether the elephant was upside down or right side up from the perspective of the interviewer. These tasks are designed to test the ability to recognise that the same object appears differently under different circumstances.

Of the 20 students with ASD, 14 could recognise right side up, and of these 13 could distinguish between right side up and upside down. However, it was a different story when they were asked what the interviewer sitting opposite could see. Only eight students could understand that if the elephant was right side up to them it was upside down to the interviewer, and vice versa.

5.3.3.1 Visual Perception and the Spectra of Imagination

These assessments of visual perception concerned the ability to make shifts in visual perspectives, within oneself and between different persons. The spectrum of logical/associational imagination is seen in the degree to which students could spontaneously imagine how objects appear from different perspectives. The spectrum of fluent/impeded imagination is seen in the degree of ease and difficulty with which imagination can perform these tasks.

Impeded imagination was evident in the inability of some students to understand the difference in visual perspective held by another. In the kettle and muffin task, for example, George was one of two students who could not understand that when he saw the kettle the interviewer saw the muffin, and vice versa. George was then asked to come around and stand behind the interviewer to see the drawing from the interviewer's perspective. He was then asked to go back to his seat and say which drawing the interviewer would see. He kept silence for a while, and then was able to name the drawing seen by the interviewer. Impeded logical imagination was demonstrated in the elephant task by five students who could differentiate between upside down and right side up, but could not differentiate these directions from the perspective of another.

Associational imagination in visual perception was indicated by the workings of selective attention, as shown in the following examples. The muffin and kettle drawings were recognised by Paul as a 'top' (indicating the toy), apparently because both objects have round tops. Michael kept answering 'elephant' when asked if the elephant drawing

was right side up or upside down, as he was focused on the drawing itself, rather than on how it appeared to him.

Selective attention sends visual perception off on a unique trajectory, not logically associated with the task. Just as general agreement in perception (e.g., 18 out of 20 students agreeing that when the student sees the kettle the interviewer sees the muffin, and vice versa) indicates the presence of logical imagination, so unique or unexpected answers indicate the presence of associational imagination.

In the area of visual perception, Theory-of-Mind is most easily seen in the understanding of how an object appears to another, underpinned by the workings of imagination. The next section will examine the relationships between imagination and sensory responses.

5.3.4 Imagination in Sensory Responses

One category of mental states associated with imagination are the affective responses to the objects of the five physical senses. These responses are intimately connected to sensory perception. Sensory distortions and extremes in sensory sensitivity are common in the ASD population. Chapter 4 *Methodology* mentioned examples provided by the autobiographical literature provided by people with ASD. Brøsen (2005), for example, wrote of her extreme sensitivity to touch, and Lawson (1998) of her sensitivity to touch and sounds.

Theory-of-Mind is found in the ability to impute mental states to oneself and others. Imputing a mental state to oneself entails having a clear experience of it. Theory-of-Mind in sensory responses is found in a sense of clarity regarding one's likes and dislikes that characterise responses to sensory perception. This clarity allows conversation regarding sensory responses, and conversation requires the workings of imagination – imagining how an experience is, was or will be, for oneself and others. Fluency in conversation indicates fluency in imagination (Figure 5.12). Impeded conversation (e.g., repeating the same thing rather than flowing with different questions) indicates impediments in logical imagination or fluency in associational imagination.

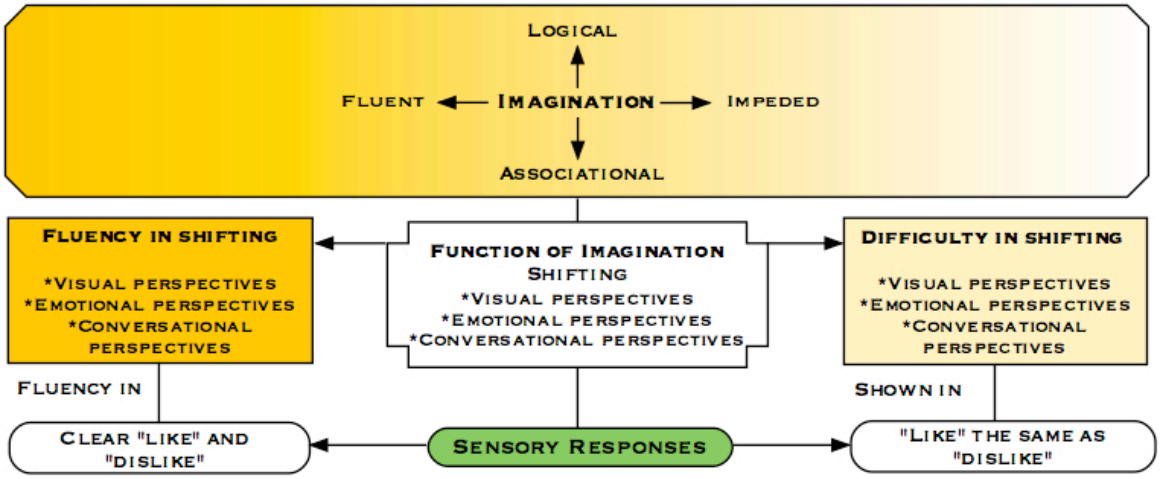


Figure 5.12 **Imagination in sensory responses**

Students with ASD were questioned regarding their experience of sensory stimuli by asking them what they liked or disliked about them. While some students were clear about their likes and dislikes, 11 students repeated the same answers to different questions, indicating fluent/associational imagination. For example, Bob was asked which taste he likes, and later on which taste he dislikes. He answered ‘Shellfish’ to both questions, and both answers seemed genuine. An interview with his teacher revealed he hates the taste of shellfish. The question, ‘Which taste do you dislike?’ seemed to trigger selective attention on the word ‘taste’ which in turn was associated with ‘shellfish’. So the trajectory of imagination was not conditioned by the logic of the question, but by a particular association contained within it.

Brett provided another example of associational imagination. He was asked, ‘Which taste do you hate?’ and answered, ‘Good taste.’ In Korean, ‘hate’ and ‘good’ are opposites. Brett apparently associated the word ‘taste’ with ‘good’. Or, perhaps he associated ‘hate’ with its opposite, ‘good’. In either case, his response seemed to arise from association rather than the logic of the question. Brett demonstrated the same pattern of association when questioned about his likes and dislikes regarding sounds and smells.

The sense perceptions that tended to stimulate the strongest responses were sound and touch. Shouting was the auditory perception most frequently mentioned by students as being disliked. One student could clarify that it is other people’s shouting he does not like, and two students could not specify whose shouting they were referring to, but could explain what the sound of shouting does to them – it makes them feel ‘bad’ and ‘sad’.

Touch in a variety of forms – holding hands, hugging, sitting on a sofa and kissing, for example – was mentioned by half of the students as liked, but some students also expressed strong aversion to certain types of touch, including holding hands, and slippery sensations such as those provided by soap, lotion and sea vegetable soup.

Students were also asked about their general feelings of like and dislike. After touch, the second most frequently mentioned category of pleasant feeling was related to things. For example, students said they liked the feeling of subway platforms, flowers, chewing gum, lotion, video, radio and books. Relating feeling to things indicates the working of associational imagination.

The capacity to discuss one's sensory responses implies imagination moving through time, based on the memory of what had previously been liked or disliked. While some students demonstrated fluent/logical imagination in their conversation about sensory responses, others showed associational imagination. In the following section the spectra of imagination in emotion will be discussed.

5.3.5 Imagination in Emotion

This chapter has been examining the relationship between imagination and a variety of mental states expressed by students with ASD. Thinking was the first mental state examined, as this is very close to imagination. It was followed by memory, anticipation, visual perception and sensory responses. Now affective mental states will be examined, beginning with emotion, and then proceeding to desire and affection.

The experience of emotion among students with ASD was found to be associated with the spectra of imagination (Figure 5.13). As discussed earlier in Section 5.2.3, fluent/logical imagination can be found underlying students' clear recognition of their own emotions and those of others. Impeded/logical imagination can be found in the difficulty some students have in identifying and understanding emotions, both their own and those of others. Asked about their emotional state, some students first responded with an emotion irrelevant to the context of the question, and subsequently changed their answer to one more relevant. For example, Brett was asked how he would feel if his pen was taken away. 'Good' was the first answer. After he and the interviewer acted out the taking of a pen, he changed his answer to 'Bad'.

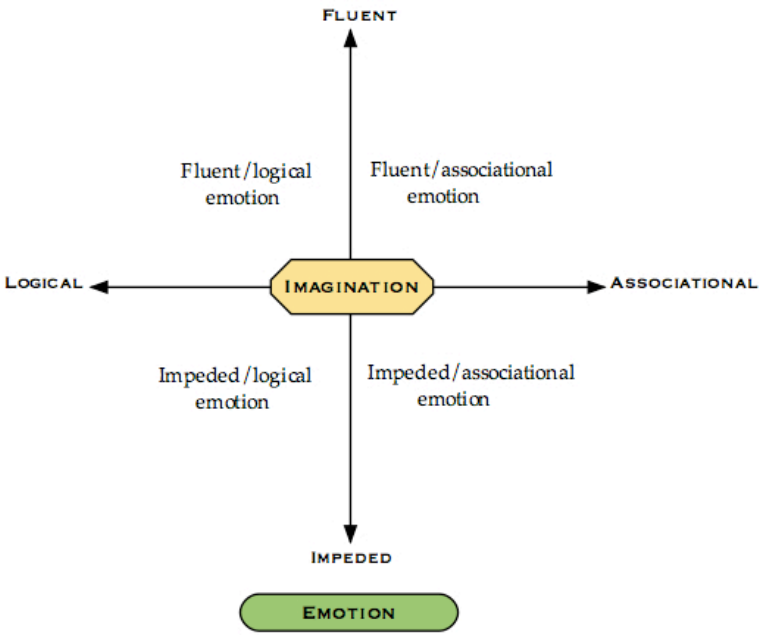


Figure 5.13 **Imagination in emotion**

Fluent/associational imagination was indicated by expressions of emotion arising from association rather than the logic of the conversation. For example, a student asked how he felt when his mother is sick replied, 'Good', apparently associating 'mother' with 'good feeling'. Associational imagination was also indicated by the expression of emotion in physical terms, as when students said 'Feel smile' to express happiness and 'Feel hit' to express anger. The interplay of logical and associational imagination was seen in particular in students' capacity for sympathy and empathy, which will be examined in Section 5.3.5.5.

Imagination in emotion is bound up with Theory-of-Mind. When emotions can be fluently recognised, Theory-of-Mind is facilitated; when emotions cannot be recognised, Theory-of-Mind is limited. The work of imagination in emotion is further discussed in the following sections.

5.3.5.1 Conversations about Emotions

People with ASD tend not to show emotions, but how do they experience them? In this study, students with ASD were drawn into conversations about emotion in order to learn how they experience their own emotions and understand those of others. Conversation was initiated by showing each student simple drawings of faces depicting four fundamental emotions, happiness, sorrow, anger and fear. For each drawing, the student was asked

questions such as, ‘How does this friend feel?’ and then ‘Who is happy?’ or ‘Who is sad?’ This process established agreement on the meaning of each drawing, using the vocabulary of the students themselves.

Students were then shown four drawings depicting scenarios that call for an emotional response, allowing emotions to be identified within a context. Anger was illustrated by a drawing of a friend stealing one’s pen. Fear was illustrated by a picture of returning home at night to an empty and dark house. Sorrow was illustrated by a picture of being left at home sick in bed while mother goes shopping alone. And happiness was illustrated by sitting in front of a table with small cakes as treats.

In each case the emotional scene was set by pointing to the central figure in the drawing and asking, ‘How would you feel in this situation?’ This stimulated the identification of an emotion. Then the central figure in the drawing was indicated, and the questions changed to how others would feel in the same situation. The student would be asked, ‘Who is your friend?’ followed by, ‘Does your friend like muffins/to go shopping’, and ‘How would your friend feel (in this situation)?’

As discussed in Chapter 4 *Methodology*, the drawings served to engage the student, establishing communication and rapport with the interviewer. Students built confidence, aided by the fact that the interviewer gave positive feedback for every answer. Then the support provided by the drawings was removed and they were replaced by the self-completion statements contained in the interview booklets. This made more sophisticated conversation possible, while staying within a context dictated by the students themselves. Examples of questions asked were, ‘If your friend hit you, how would you feel?’ and ‘When you are alone/with friends, how do you feel?’ Responses could be written or spoken, depending on what the student wanted. Within this structure, students demonstrated the spectra of imagination in emotion, as discussed in the following sections.

5.3.5.2 Emotion and Fluent/Logical Imagination

Logical imagination can be inferred from students’ fluency in their expression of various emotions within themselves and in others, and in their capacity to understand the causality of their own emotions and those of others. Students used a wide variety of words to express their own emotions in imagined situations. They used more words, and more varied and sophisticated words, to describe unpleasant emotions than those they used to express pleasant emotions (Table 5.1). This fluency in expression presupposes fluency in

imagination, for imagination allows the shifts in perspective between one's presently experienced situation and others that exist only as mental states (Section 5.2.2). With fluency in these movements, one's own emotion and that of another can be recognised. Without fluency in these movements, recognition of emotion is limited.

Table 5.1 ***Emotions of Self and Other Expressed by Students with ASD***

Emotion	Self	Other
Pleasant	Excited, fun, glad, good, happy, love.	Glad, good, refreshed.
Unpleasant	Angry, bad, cross, distressed, frightened, hard, not good, sick of it, sick, sad, sulky, tired, unpleasant.	Angry, bad, concerned, distressed, frightened, sick, sad, sulky, unpleasant.

The patterns of these data suggest that students with ASD found it easier to express their own emotions rather than those of others, indicating that it is easier for students to move imagined emotional perspectives through time within oneself than through space between persons. In addition, students demonstrated fluent imagination within unpleasant feelings by expressing unpleasant emotions more frequently and fluently than pleasant ones.

Students with ASD expressed a wide range of emotions, but with less verbal facility than might be expected from their peers without ASD. Also, the range of situations or events provided by students in their self-completion statements are relatively restricted for boys in their late teens – home, school, and church, rather than the wider world. But the emotions themselves, and the situations that trigger them, seem universal. The next section discusses students' understanding of their own emotions.

5.3.5.3 Understanding One's Own Emotions

Understanding emotion in the context of Theory-of-Mind entails understanding the causality of emotion. Understanding behaviour through reference to mental states, which is an aspect of Theory-of-Mind, requires the ability to understand the causal links between mental states and actions, in both oneself and others. This in turn involves the workings of logical imagination, the ability to shift perspective through time (e.g., remembering, anticipating and imagining one's own emotional responses) and space (e.g., imagining how emotions work in others).

As discussed in Section 5.3.5.2, students with ASD demonstrated that it is easier to shift emotional perspectives through time than space. In other words, it is easier to understand subjectivity than inter-subjectivity in emotions. The simplest understanding of emotion was demonstrated when students gave an immediate cause for their emotion. For example, a student would feel angry if his pen was taken, a scenario provided by one of the drawings. In this study, this kind of causal relationship is called a single step causal sequence, where a cause is understood to trigger its effect immediately.

More complex causal sequences were also expressed. For example, a student would feel angry if he: (1) behaved badly, and so (2) was scolded by his mother or a teacher. This is classified as a two step causal sequence, as is the report of a student who said he would feel sulky if (1) he asked his mother to go shopping with him, and (2) was refused. Only one three step causal sequence was expressed: A student would feel frightened if he (1) was sick, so (2) had to stay at home, and (3) was therefore prevented from going shopping.

The most complex causal sequences were provided in the self completion statements of those students who were most verbally fluent. This suggests a link between fluency in language, fluency in logical imagination and the capacity to understand emotion. However, it leaves unanswered the question of whether students with less linguistic ability had a more complex understanding of emotion, but were unable to communicate it.

Students whose expression was characterised by associational imagination could still speak of their own emotions, but with a very limited vocabulary. For example, Joshua communicated his anger by: Demonstrating it in body language; naming his teacher; naming his teacher's position – 'computer teacher;' and saying 'Anger!;' 'Hate!' While he could not verbalise the reasons for his distress, he had no difficulty in feeling and demonstrating his emotion.

5.3.5.4 Understanding the Emotions of Others

Recognition of the emotions of others began with the drawings of faces depicting the fundamental emotions of happiness, sorrow, anger and fear. Out of 20 students, 19 recognised happiness and anger, while fear was recognised by 15 students and sorrow by 14 students.

Students tended to recognise the emotions of others on the basis of their own emotion in the same situations – in other words, they projected their emotions onto others. Students said they would feel good, for example, when given nice sweets or when their soccer team wins, and said their friends or family members would feel good in the same situations.

As discussed in Section 5.3.5.2, students with ASD expressed an understanding of the emotions of others less often and less fluently than they did their own emotions. Nevertheless, students with good verbal abilities were able to convey relatively complex scenarios regarding the emotions of others. For example, George explained how his classroom teacher does not like George swearing. The teacher heard George swear during break time (1), and therefore felt bad (2). Similarly, Kevin said that his Sunday school teacher wants him to sing hymns during service. Kevin feels bored and does not sing (1), and so his Sunday school teacher feels bad (2).

5.3.5.5 Understanding Empathy

Section 5.2.3 introduced the twin issues of sympathy and empathy. Just as false belief entails Theory-of-Mind at a cognitive level, so sympathy and empathy entail Theory-of-Mind at an emotional or affective level. As discussed in Section 5.2.3, here *sympathy* refers to students' capacity to recognise the feelings of others, while *empathy* refers to students' capacity to share a feeling.

Empathy requires the ability to imagine what it would be like to be another, sharing their world from a perspective which is not one's own. Empathy can be seen working in two directions. 'Empathy of self' refers to one's recognition that one feels *x* because of what the other feels, so it moves from the self to the other. 'Empathy of other' refers to one's recognition that the other feels *x* because of what one feels, so it moves from the other to the self.

In this study, 19 of the 20 students expressed empathy of self, for a relative (e.g., parent or siblings) or a friend. The remaining student expressed associational thinking throughout the interviews. In all these cases, the questions related to people who were undergoing unpleasant emotions, for example, for their mother when she is sad. The feeling expressed, in other words, was 'I feel sad because *x* feels sad' rather than 'I feel

happy because *x* feels happy'. These students expressed empathy 41 times throughout the study. This high number suggests a trend, rather than coincidence.

A similar, although not so pronounced, trend can be seen in expressions of empathy of other. Some 14 students recognised the empathy of other when they (the students) were having a difficult time, and they did so 18 times. Those who recognised the empathy of other when they were having a good time was smaller – 12 students – and they expressed this recognition only 13 times.

Combining these data with the finding that students used more words, and more nuanced words, to describe unpleasant emotions than those they used to describe pleasant emotions (Section 5.3.5.2), it appears that students with ASD tend to be more sensitive to unpleasant emotions than to pleasant emotions. However, this analysis is suggestive rather than definitive, in part because students were not asked the alternative question regarding empathy of self – if they felt happy when the other was happy.

5.3.5.6 Emotion and Impeded/Logical Imagination

Impeded logical imagination was demonstrated by students when they took some time to imagine their own emotion. For example, when Brett was asked how he would feel if his pen was taken away, he first answered, 'Good' but after he and the interviewer role-played the situation, he changed his answer to 'Bad'. When asked how he would feel if his mother was sick, he also said, 'Good.' Asked again, his answer was silence. Asked a third time, he said, 'Frightened.' In these instances, logical imagination was able to function, but slowly and with difficulty. This shows a movement along the spectrum from impeded/logical towards fluent/logical imagination.

Impeded/logical imagination was also found in instances where no emotion was expressed. Some students would not be able to express emotion within its context, and instead their answers would move from one association to another. This pattern indicates the weakness of logical imagination. For example, asked how he feels when his mother is sick, Edward said, 'Headache.' Michael and Paul replied to questions concerning emotions by repeating part of the questions. Asked how he feels when eating sweets, Michael answered, 'Ate sweets.' Paul replied, 'Bread, stomach-ache' when asked how he feels when his mother buys him bread he likes.

This section has examined the expressions of emotion characterised by logical imagination, beginning with fluent/logical imagination, culminating with an understanding of empathy, and proceeding to impediments in logical imagination and the influence of associational imagination. Now the role of associational imagination will be examined.

5.3.5.7 Emotion and Fluent Associational Imagination

One continuum of the spectra of imagination proceeds from fluent to impeded imagination. The boundary between logical imagination and associational imagination is not exact; specific examples might be placed on either side of the border. One indication of the emergence of associational imagination can be seen in the expressions of emotions by students with ASD that are different from the emotions typically developing people would be expected to experience in the same situation. This comes out in difficulties with sympathy and empathy, and in focusing on physical features rather than emotion.

Difficulty in sympathy. Difficulties in recognising the emotions of others – in other words, in sympathy – was one way in which associational imagination appeared. Difficulty in sympathy appeared in two ways, understanding one's own emotions but not those of others, and difficulties in understanding the emotions of others.

The pattern of understanding one's own emotions but not those of others was shown by five students. For example, Brett said he felt 'frightened' at night going back to an empty house, but that the interviewer would feel 'pretty' in the same situation. Daniel said he wanted to go to an amusement park and felt 'good' when he went, but told the interviewer she would feel 'good' if she could not go, even if she wanted to. Joshua said his friend would feel 'good' if Joshua hits him, but Joshua himself would feel 'bad' if his friend hits Joshua.

The second pattern, difficulties in understanding the emotions of others, was found in six interviews. For example, Brett said that when he is sick his mother feels 'good' and when he is happy she feels 'bad'. Chris could not name his teacher's feeling when Chris shouts during study time, but repeated the events, such as being asked to leave the classroom, running and being punished. Ian said that when he shouts in study time his teacher feels 'good'. Ron said that when he behaves badly at study time by making noise and provoking his classmates his teacher feels 'good'.

Difficulty in empathy. Difficulties in experiencing and understanding empathy were another indication of the strength of associational imagination. Examples of difficulty in empathy of other include Brett, who said his mother 'cries' when he is happy, Jerry, who said his mother feels 'distressed' when he is happy, and Nicholas, who said his mother feels 'sad' when he is happy. Ron said his mother feels 'good' when he is sick.

As associational imagination becomes more dominant it becomes more fluent, which can be seen in the way that students expressed it spontaneously, with no time gap or apparent effort. It was also shown in physical emotion.

Physical emotion. Fluent associational imagination in emotion was demonstrated in the way students quickly attended to the physical features related to emotion rather than to the emotion itself. Beginning with the four drawings that illustrated the fundamental emotions of happiness, sorrow, anger and fear, some students recognised the happy face as 'smile feeling', the sad face as 'crying feeling' and the angry face as 'angry feeling'. (The drawing of the frightened face was not recognised as 'fear' because to these students the wrinkles on the face signified age.)

Further, students expressed their own emotions through the physical aspects of emotion. Edward, for example, said he feels 'pretty' when his mother buys him a treat. Joshua and Nicholas answered 'smile' to the question, 'How are you?' This pattern was found in recognising the emotions of others. Some students expressed the happiness of others as 'smile'. 'Tremble' and 'hit' indicated unpleasant feeling.

5.3.5.8 Conclusion

Along the spectra of imagination, fluent/logical imagination was seen in ease in shifting perspectives, as shown by fluently expressed emotion (Section 5.3.5.2). Fluent/logical imagination was also found in understanding the causality of emotion (Section 5.3.5.3), recognising the emotions of others (Section 5.3.5.4) and in experiencing empathy and recognising it from others (Section 5.3.5.5).

Impeded/logical imagination was seen in difficulties in shifting perspectives expressed as delayed or no responses in conversations about emotions (Section 5.3.5.6). Fluent/associational imagination was seen in the expression of unexpected or irrelevant emotions, or of the physical aspects of emotion rather than the emotions themselves, or in

trajectories of associations that seem disconnected from the context of the emotion being discussed (Section 5.3.5.7).

In general, students with ASD tended to be more sensitive to unpleasant emotions than pleasant ones, and more nuanced in their expression. They also found it easier to recognise their own emotions rather than those of others, and tended to project their own feelings into others. This indicates that the shift in perspective across time, within subjectivity, was easier for students with ASD than that across space, within inter-subjectivity.

The next section will continue to examine the relationship between imagination and other affective mental states, by looking at desire and affection.

5.3.6 Imagination in Desire and Affection

Theory-of-Mind concerns the understanding of mental states such as desire and affection, and imagination enables the shift in perspectives that allows a person to recognise their own desire and affection and that of others. In this study, reports of desire and affection were characterised only by fluent/logical imagination. No instance of associational imagination within desire and affection was discerned among students with ASD (Figure 5.14). What students liked was clear and familiar to them, indicating they could employ logical imagination without difficulty.

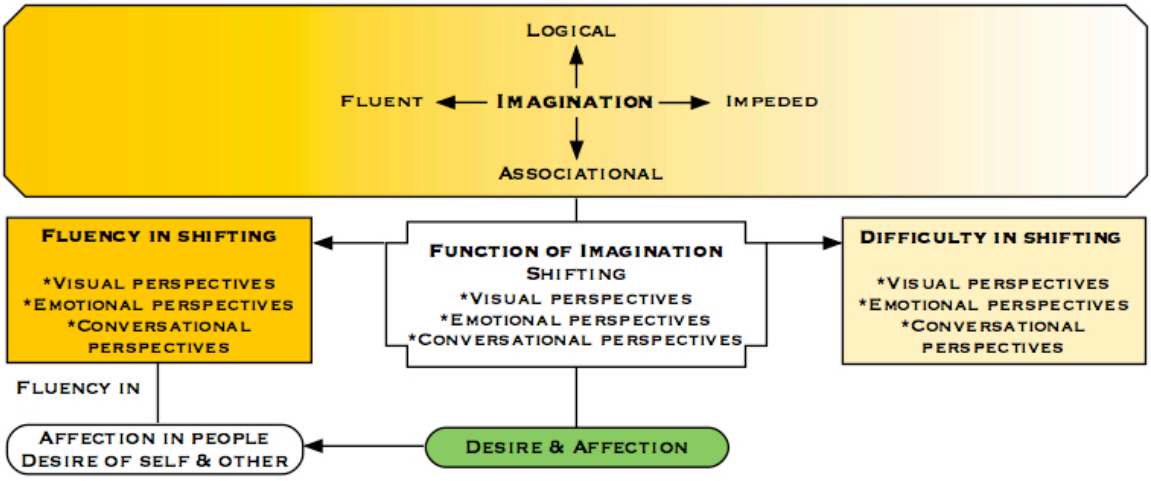


Figure 5.14 **Imagination in desire and affection**

Imagination and Desire. Students with ASD expressed desires without difficulty, both their own and those of others. Desire was understood in terms of its fulfilment, as students recognised the emotions that were generated from fulfilled and unfulfilled desire. However, students with ASD did demonstrate a wider variety of expressions of their own desires compared with those of others, and a better understanding of the relationship between emotion and their own desires compared to that between emotion and the desires of others.

The majority of students could explain their desires in terms of activities, places and possessions. When they were asked to draw themselves and their friends, they preferred to draw things rather than people, indicating a greater sense of ease with inanimate objects. For example, Fred insisted on drawing the subway rather than his friend, and Ron asked permission to write math formulae instead of drawing his friend.

Imagination and Affection. Students were straightforward in their demonstrations of affection, showing affection towards themselves, their families, friends and teachers. Half of the students chose friends as people they like the most, while seven students chose family and six chose teachers. Some three students chose themselves as who they liked the most. Among family members, students felt closest to their mothers. Affection was expressed verbally and non-verbally. Non-verbal ways of expressing affection include petting the head, a high-five and holding hands.

This completes the examination of imagination on spectra in the mental states of thinking, memory, anticipation, visual perception, sensory responses, emotion, desire and affection that emerged in this study as components of Theory-of-Mind. While fluent/logical imagination enabled the shift of perspectives within these mental states and facilitated the experience and understanding of them, impeded logical/imagination or fluent/associational imagination caused difficulties in the shift of perspectives. These difficulties can subsequently create social problems in students with ASD by causing misunderstandings and leaving them in isolation.

Students with ASD consistently demonstrated greater fluency in logical imagination across time, within subjectivity, than across space, within inter-subjectivity. They demonstrated only fluent/logical imagination in anticipation, desire and affection, and the full spectra of imagination in thinking, visual perception, sensory responses and

emotion. These relationships between imagination and mental states shape the everyday experience of students with ASD, and they will be examined in the next section.

5.4 Results of Interactions between Imagination and Mental States

This chapter has shown how imagination emerged as a core category in grounded theory analysis of the subjective experiences of students with ASD, and has examined its role in facilitating Theory-of-Mind. Imagination was seen in the crossing of boundaries, allowing a shift of perspectives from one viewpoint to another. The movements of imagination opened up the workings of Theory-of-Mind, for as Theory-of-Mind is found in the recognition of mental states it requires the capacity to change perspectives so that mental states, both one's own and those of others, can become objects of perception. The interactions between imagination and mental states were seen to affect the experience of students with ASD in terms of the nature of the self, its relationships to others, and communication. They are discussed in the following sections.

5.4.1 Self and Other

'Self' and 'other' are concepts that exist in mutual dependence. A sense of self can only be maintained within a border, a point where self ends and other begins; and conversely, a sense of other requires a point where other ends and self begins. Self, in other words, does not exist in isolation, but as self-with-others. The movement from a purely subjective sense of self to an inter-subjective sense of self-with-others entails the workings of imagination along the spectrum from logical to associational, in both cognitive and affective mental states. The more fluent these workings, the more sophisticated the Theory-of-Mind understanding.

This section begins by examining how students with ASD express a sense of self, from a simple sense of identity to perceptions of themselves and of others. It proceeds to examine how they express their responses to others, and from there looks at issues in the communication of students with ASD.

5.4.1.1 Identity

Theory-of-Mind can be seen at a basic level in the capacity to perceive oneself, to have a sense of identity. Identity is complex, created from a range of factors. Students with ASD

expressed some basic building blocks of identity, beginning with age. All students were aware of their chronological age except for Patrick, who said he was 12 years old when actually he was almost 17. Patrick also said he was a woman.

Students could recognise their feelings. They were requested to draw themselves and were then asked how they feel in that drawing. Most students said they felt 'good' while Joshua and Nicholas said they felt 'smile'. Paul said he felt 'sad' and Michael said he felt 'cry'. The use of 'smile' and 'cry', as discussed above, indicates thinking in association, but even then the understanding of feeling was clearly expressed.

Identity also rests on a sense of continuity over time, which allows a perception of the self functioning in the future. Students could speak of the future in terms of desire, what they wanted to do, and expressed a range of ambitions. In terms of their emotional future, 17 students said they wished to have friends in the future. This indicates the workings of imagination, moving an image of oneself through time.

5.4.1.2 Perceptions of Self

How do I perceive myself? Self image requires a reflexive capacity to see the self as an object of perception. Students expressed a variety of feelings about themselves. For example, students reported liking, loving, needing, and even, in the case of one student, hating themselves. These were clear and straightforward expressions of logical imagination.

Examples of expressions characterised by associational imagination include Ron, who was asked which sound he dislikes and answered, 'Ron'. David was asked what he thinks of, and answered in a singing tone, 'David~.' Asked which feeling he likes, he also answered 'David'. He then explained that 'feeling of David' is 'monthly oriental chess magazine'. Fred was asked which feeling is good and answered 'good feeling'. When asked what is a good feeling he said, 'Fred' and 'Subway'.

Some students showed complex responses. Conversation on emotions began with students being shown four drawings of faces showing the emotions of happiness, anger, sorrow and fear. They were then asked 'Who is happy? … angry? … sad? … afraid?' Instead of pointing to the drawing of the angry face, three students identified themselves as angry. One of them also identified himself as sad. So while expressing positive emotions in

conversation – for example, answering 'I feel good' when asked – these students spontaneously projected themselves into the angry and, in one case, the sad drawings.

The interviewer, acknowledging their feeling, then asked if any among the four drawings were angry or sad. The three students pointed to the correct drawing, indicating their projection of their own feelings into the drawings did not mean they lacked a sense of other and could not complete the task. Rather, the spontaneity of this response indicates that students were expressing their real feelings.

How do I think others perceive me? As well as expressing how they perceived themselves, some students with ASD expressed how they thought others perceived them. The perception of how I think others perceive me requires a more complex movement of imagination than simply how I perceive myself, and so Theory-of-Mind is correspondingly more sophisticated. About half of the students thought of themselves as likeable.

How do I feel about being alone? A total of 11 students said they felt good when they were alone, while nine students expressed negative feelings – 'bad', 'frightened' and 'sad'. Half of the students said they prefer to be alone, and this number included four students who expressed negative feelings about being alone. These responses contradicted each other, and all responses seemed genuine. Each expression could represent the students' feeling at that time, and in a broader context indicate that sometimes they like to be alone, and sometimes not.

How do I feel about being with friends? Of 20 students, 19 responded that they feel good when they are with their friends, and 16 said they prefer to be with their friends. The same apparent contradictions were found as with their feeling about being alone. Some three students expressed being both 'good' when they are with their friends, and either 'angry', 'bad' or 'sad'. Similarly, eight students who said they prefer to be alone also said they prefer to be with friends. Again, these responses seemed genuine, reflecting the feeling of students at that moment.

Do I like others? Half of the students said they like their friends and a majority said they are close to their friends.

What do I do for others? Things that students reported they do for their friends included 'praising', 'giving presents', 'forgiving' and 'washing up the dishes'. For a sick friend, students said that they would do such things as 'being a friend', 'healing', 'helping

out' and 'giving treatment'. All these answers reflect logical imagination, but some answers indicated associational imagination, such as 'Asiana Airlines'. Patrick said he wanted to help his mother and father, helping his mother like 'the shape of a circle' and his father like 'the shape of a heart'.

5.4.1.3 Perceptions of Others

The perception of others entails the capacity of imagination to shift perspectives from self to other, and this in turn reflects a wider application of Theory-of-Mind. In this study the perception of others was investigated in a number of ways, beginning with the people students spoke of other than themselves.

Speaking of ... The people students spoke about most frequently other than themselves were family members and friends. The most frequently mentioned family member was mother, followed by father and siblings. Extended family members such as grandmother, grandfather, aunt and uncle were mentioned occasionally. Classroom teachers were spoken of by eight students. Daniel talked about an apparently imaginary companion, a soldier with whom he would like to go to an amusement park with. He also spoke of God as his friend.

I need help from … Students were asked whose help they needed. Their answers fell into three categories, people, things and abstract concepts. The people students felt they needed help from included relatives, friends, teachers, themselves, and no-one. The things students felt they needed help from included the subway and KTF (a mobile phone company). The abstract concepts mentioned were 'love' mentioned by one student and 'help of tomorrow' mentioned by another.

Students said they needed help in such everyday activities as 'folding washed clothes', 'opening and closing the door', 'studying Chinese characters' and 'cooking instant noodles'.

Who are my friends? A majority of students gave their own names when asked to identify their friend. Some gave members of their family as their friend, always including their mother in this category. A majority thought of classmates as their friends (Table 5.2). Some students gave the names of things as their friends, and one student named God.

Table 5.2 ***Friends of Students***

Friends	Self	Family	Classmate	Teacher	Other
Bob	√	Mum, dad, sister, grand mum	√		
Brett	√		√		
Chris	√		√		Apartment
Daniel	√	Mum, dad, brother			God
David	√	Mum, brother			
Edward	√	Mum		√	'Very very good'
Fred			√		
George	√		√		
Ian	√		√		
Jerry			√		
John			√		
Joshua	√		√		
Kevin			√		
Michael					Brand name of instant noodles
Nicholas			√	√	
Patrick	√	Mum, dad, brother	√		
Paul	√				'Face', 'Tear'
Peter			√		
Ron	√				
Tom	√	Mum, brother			

Some answers indicated associational imagination. When Edward was asked, 'Who is your friend?' he answered, 'Very very good', describing rather than naming his friend. When Paul was asked, he answered, 'Face.' And when asked to draw his friend's face he said, 'Tear.'

How old are my friends? Students were asked to identify their friends, and then to draw themselves and one friend. Of those students who identified either a classmate or a sibling as a friend, seven were able to discuss their age. These seven seemed to be more accurate in their understanding of the ages of their classmate friends than of their sibling friends.

What do friends do for me? Asked what their friends do for them, students gave a variety of answers, including 'turning on the air conditioner', 'praising', 'getting medicine', 'cooking' and 'forgiving'. Some answers suggested associational imagination, such as 'a hospital'.

What do we do together? Students mentioned a variety of activities they do with their friends, including such things as singing at school karaoke, watching TV and playing game machines.

What is friendship? Reciprocity was spoken of as a feature of friendship by seven students. Some examples follow. Bob said his friend, a class mate, turns the air conditioner on for him, and he in turn greets his friend. Chris said his friend, George, does 'a precious part' for him, and Chris does 'a kept part' in return. George said his friend 'brings a milk pack' to him, and he does 'Cheon, Moo-Song' to his friend. (Cheon, Moo-Song is the name of a Korean actor. George knew that, but could not specify what 'doing Cheon, Moo-Song' means.) Two of these answers – 'a precious part' and 'doing Cheon, Moo-Song' – have a private quality to them, and suggest thinking in association.

5.4.1.4 Responses to Others

Students with ASD can have complex emotional responses to the people around them. Some students, for example, report liking and disliking, loving and hating, the same person. The people who evoked these responses included family and teachers. David said he both loves and hates his mother. Ian said he loves his classroom teacher, but also hates him. Patrick said he likes his father, mother and sister, but he dislikes his mother because she was angry with his father. Patrick was the only student who was able to give a reason for his response, thus demonstrating fluency in logical imagination. A similar pattern was found in the question of whether students prefer to be alone or with friends. Some students expressed both preferences, often at different times.

5.4.2 Communication

This chapter has analysed the role of imagination in forming the Theory-of-Mind of students with ASD. Imagination has been found to play an underground but vital role in the workings of the components of Theory-of-Mind, as outlined in Figure 5.2. This section will examine how imagination affects the communication of students with ASD, as summarised in Figure 5.15.

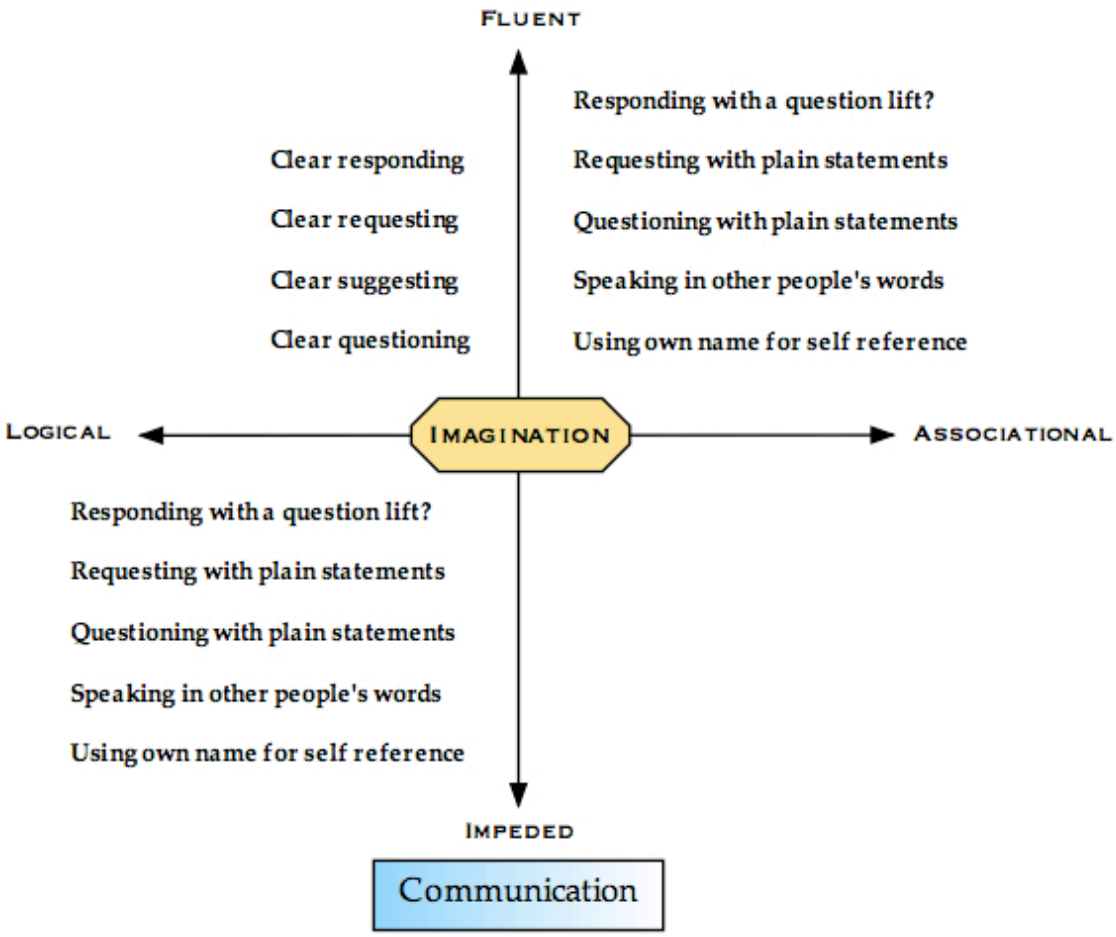


Figure 5.15 **Imagination in communication**

Fluent/logical imagination gives rise to clarity in communication. It can be seen in ease of communication and shared meaning. In this study, examples of communication characterised by fluent/logical imagination are responding, requesting, suggesting and questioning. It is not clear whether difficulties in communication were caused by impeded/logical or by fluent/associational imagination, but it is clear difficulties in communication are characterised by imagination that is more individual and less logical in its trajectories.

In conversation between two parties, for example, the participants are called upon to move back and forth between their perspectives. Students with ASD whose imagination is impeded demonstrated a difficulty in making that shift, by making statements with questions, making questions with statements, and using their own names for self reference rather than the first person pronoun.

5.4.2.1 Logical Imagination and Communication

Fluent/logical imagination can be seen in the ease and clarity with which students with ASD responded, requested, suggested and questioned. Students communicated their emotion in the way they responded to situations. For example, they would respond with 'No' to express dislike or rejection, or to deny the truth of what was being said. Daniel was asked what the expression 'Going to school' reminds him of. He remained silent for a while. The interviewer told him that is fine. He replied, 'No, that's not fine.' Edward said he hates teachers. He was asked whether that includes the interviewer. He replied, 'No.'

Requesting could indicate clarity in expressing desire. Edward was asked to draw his friend, and he in turn asked the interviewer to draw his friend. John asked the interviewer several times, 'Let's go to Kangnam Mart.' Suggesting could also communicate desire. John suggested taking a break and resuming the interview later. Patrick suggested a number of games using the hands, such as scissors-paper-stone.

Questioning was used to communicate interest. Students asked questions about the people and things they really liked, such as the subway, the school bus, a beloved teacher, and girlfriends. Some eight students were able to spontaneously maintain conversation about these topics through a process of questions and answers. Some students could anticipate questions being asked and answered them before they were completed.

In one instance a student used a question to seek agreement. As he filled out a self-completion statement about how he would feel if he lost his mother in a supermarket, Fred sought the agreement of the interviewer by asking, 'I feel bad if I lose mum in a supermarket, don't I?' While Fred does not actually live with his mother (revealed later during an interview with his teacher), he was able to put himself in that situation and seek the researcher's agreement. No other student did this. Seeking agreement shows the ability to take the perspective of another and respond to it from one's own perspective.

5.4.2.2 Impeded/Logical or Fluent/Associational Imagination and Communication

The ability to imagine the perspectives of others is central to the flow of conversation, but when logical imagination is impeded, or imagination works in association, this becomes problematic. Predominantly associational imagination was indicated by students with ASD making statements with questions, making questions with statements, and using their own names for self reference rather than the first person pronoun. These patterns demonstrate a limited ability to shift perspective to another's viewpoint.

Making statements with questions. One pattern was for students to make a statement that ended in a raised tone, creating the impression of a question. For example, Chris was asked, 'Is this elephant drawing right side up? Or upside down?' Chris answered 'Right side up?' emphasising the last word with a rising tone. Two points need to be made here. The first is that in Australian English, the practice of ending a statement with the raised tone associated with a question is common, and cannot be taken to indicate associational imagination. But in the Korean language, this practice is unknown. Secondly, while Chris' answer could be taken in isolation as seeking confirmation, making statements with the raised tone of a question was characteristic of his communication, and this pattern was shared by a majority of students with ASD. In another example, Kevin was asked whether he has a person he hates, and answered 'Hate teacher Lee?'

This practice indicates a difficulty in shifting perspectives, because it answers a question by taking part of what was said by the other and responding from that perspective – the perspective of the other – rather than creating one's own statement.

Making questions with statements. Students with ASD were also found to make questions with statements. A common form of this practice is making requests with statements. For example, when John wanted to touch the crayons, he said, 'Touch crayons.' Statements like this take the role of someone making a statement or even giving an order, rather than asking from the perspective of the speaker. It indicates desire without expressing self reference. For example, when Michael wanted to use the same pen he used during a previous interview, he said 'Pen' and when he expressed his desire to eat a biscuit, he said, 'Lotte Cancho', the name of the biscuit.

A variation of making questions with statements is making questions with negative statements. For example, during the false belief tasks Fred was presented with the biscuits being used and was asked whether he likes them. He confirmed he did and then said, 'Shouldn't eat biscuits.' The interviewer asked, 'Why not?' Fred replied, 'I'll eat them.' 'Shouldn't eat biscuits' was his way of expressing his desire to eat the biscuits. This kind of statement sounded like a repetition of something he was told by someone else, and therefore what he might expect in the present situation. In making a request by repeating this admonition, Fred seems to be communicating from that unseen other's perspective, rather than from his own desire.

Using one's own name for self reference. Conversation requires a movement between the sense of self as perceived externally by another and internally by oneself. This is expressed by alternate use of one's name by the other party in the conversation and the first person pronoun by oneself. Fluent/logical imagination is demonstrated by a fluency in this shift, when, for example, a student with ASD is asked, 'Who do you love?' and without hesitation replies, 'Me.' Associational imagination is demonstrated by the use of one's own name for self-reference, indicating that one's self image remains in the other's perspective, so that one's self reference comes from the other. For example, a student with ASD is asked, 'Who do you like?' and 'Who is your friend?' and replies that he likes himself and is his own friend. But instead of saying 'me' or 'myself', he responds with his own name. This was another common pattern, and was seen among eight students who demonstrated it 28 times.

In conclusion, imagination was seen to influence patterns of communication. Logical imagination was associated with clarity and ease in communication, seen here in responding, requesting, suggesting and questioning. Impeded/logical imagination or associational imagination resulted in difficulties in communication, and in particular in making the shift between perspectives that is characteristic of conversation. This was demonstrated in the practices of making statements with questions, making questions with statements, and students using their own names for self reference rather than the first person pronoun.

5.5 Conclusion

This chapter has investigated the Theory-of-Mind of 20 secondary and post secondary school students with ASD as subjectively experienced, using grounded theory analysis. It began with three research questions: (1) How do students with ASD experience their own minds and internal worlds?; (2) How do students with ASD understand the minds of others and the external world?; and (3) How is the experience of one's own mind and internal world connected to the understanding of the minds of others and the external world?

The investigation of Theory-of-Mind as subjectively experienced revealed that imagination plays a key role in understanding one's own mind and the minds of others. Imagination across time (i.e., within oneself) allows the experience of one's own mind, and imagination across space (i.e., between persons) allows an understanding of the minds of

others. Imagination also facilitates the shift in visual, emotional and conversational perspectives that enables the movement between one's own experience and that of others. Imagination makes it possible for a person to understand the self and others in situations other than that which is being directly experienced in the immediate present.

Students expressed their experience of Theory-of-Mind through a number of mental states that emerged in this study as components of Theory-of-Mind: Thinking; memory; anticipation; visual perception; sensory responses; emotion; and desire and affection. Thinking was found to be particularly close to the workings of imagination, so that fluency in logical thinking was found to accompany fluency in all the components of Theory-of-Mind, while fluency in associational thinking was found to accompany difficulties in all these components.

The workings of imagination were examined in more detail through these mental states. Imagination was seen to be a continuum functioning along spectra. One spectrum lies between the poles of logical imagination and associational imagination, while another spectrum lies between the poles of fluent and impeded imagination.

This study did not find any instances of fluent/associational imagination among the mental states of anticipation, desire and affection. In contrast, the full spectra of imagination were found working within thinking, visual perception, sensory responses and emotion. In thinking, visual perception and emotion, students demonstrated more fluency in logical imagination across time subjectively, within themselves, than inter-subjectively, between persons. Regarding emotion, students demonstrated fluent imagination within unpleasant feelings by expressing unpleasant emotions more frequently and fluently than pleasant ones.

The workings of imagination within these mental states were found in students' perception of self and others and their communication styles. Fluent/logical imagination was characterised by clear perceptions of self and other, and communication that allows the sharing of experience with others. Impeded/logical or fluent/associational imagination were characterised by a private quality, and consequent difficulties in communicating with others.

While this chapter has investigated Theory-of-Mind as subjectively experienced, the next chapter discusses the relationships between subjectively experienced Theory-of-Mind and objectively measured IQ and social competence.

CHAPTER 6
THEORY-OF-MIND COMPONENTS AND CONTINUUM

6.1 Introduction

This chapter will investigate the relationships between the components of Theory-of-Mind and the spectra of imagination on the one hand, and IQ and social competence on the other. It will do this firstly by uncovering the relationships between Theory-of-Mind components, to see whether imagination functions in the way indicated by grounded theory analysis. Secondly, this chapter will uncover the relationships between subjectively experienced Theory-of-Mind and objective measurements of IQ and social competence, using the Korean-Wechsler Adult Intelligence Scale (K-WAIS) to measure IQ and the Korean Vineland Social Maturity Scale (KVSMS) to measure social competence. The result will be a view of the Theory-of-Mind of the students with ASD participating in this study which encompasses both subjective experience and objective measurement.

Figure 6.1 shows the organisation of this chapter. Section 6.2 *Data Transformation* discusses the selection of mental states for the data transformation process and the methods used to transform qualitative into quantitative data. Section 6.3 *Frequencies of IQ, Social Competence and Theory-of-Mind* presents the transformed data in the form of frequency distributions of psychological tests and the components of Theory-of-Mind. Section 6.4 *Relationships between IQ, Social Competence and Theory-of-Mind* interprets the data, examining the relationships between IQ, social competence and the components of Theory-of-Mind *between* individuals and *within* individuals. The chapter concludes with Section 6.5 *Conclusion*.

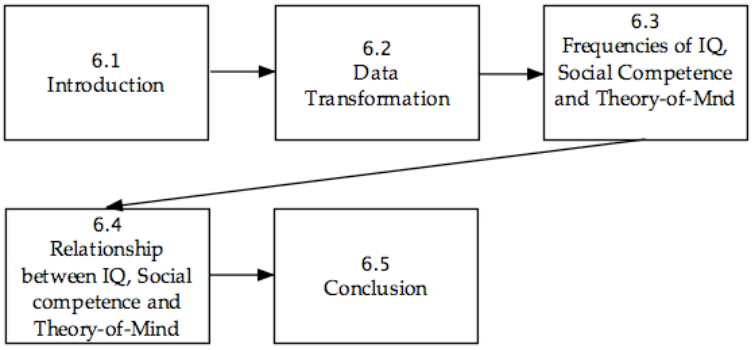


Figure 6.1 **Structure of chapter six**

6.2 Data Transformation

6.2.1 The Role of Imagination

Chapter 5 *Theory-of-Mind as Subjectively Experienced by Students with ASD* analysed Theory-of-Mind through qualitative data using a grounded theory approach. This analysis showed that imagination plays a central role in Theory-of-Mind. Imagination was discovered to function as a continuum within two spectra, logical/associational and fluent/impeded. Imagination enables a person to shift perspectives through time (i.e., within oneself, and so subjectively) and space (i.e., between individuals, and so inter-subjectively). Imagination was seen to underlie the other components of Theory-of-Mind revealed through grounded theory analysis – thinking, memory, anticipation, visual perception, sensory responses, emotion, desire and affection – and could only be seen as it worked within them.

For example, the statement 'I felt happy when …' requires a movement of the imagination back through the past, to adopt a viewpoint experienced by oneself at that time. The statement 'My friend believes that …', typical of false belief tasks, requires a movement of the imagination through space to adopt the viewpoint of another. Table 6.1 summarises the workings of imagination within the mental states experienced by students with ASD.

The data transformation process, characteristic of mixed methods research, faces two challenges to its validity. The first concerns the distortion that would arise from selecting weak results from the qualitative study to inform the quantitative study. This is overcome by confining transformation to the most significant results of the qualitative study (Creswell & Clark, 2007), which in this context means selecting for transformation only the components of Theory-of-Mind within which the full spectra of imagination was found working. These are thinking (which entails false belief), visual perception, sensory responses (which entails thinking in association) and emotion (which entails empathy) (Figure 5.2). The other Theory-of-Mind components (i.e., memory, anticipation, desire and affection) either did not show the full spectra of imagination, or, in the case of memory, only weakly. These were excluded from transformation.

Table 6.1 ***Imagination Working within Mental States***

Imagination	Inter-subjective imagination (across space)		Subjective imagination (across time)	
Shifting perspectives	I	Other	Past	Present
Emotion	Empathy of self for other	Empathy of other for me		
Sensory Responses			Things related to five senses I liked	Talking about things related to five senses I liked
Thinking (False belief with changed location)	I think	What other thinks regarding changed location of a biscuit		
Thinking (False belief of self with changed contents)			I thought there is a biscuit in a biscuit box	I see there is a pencil in a biscuit box after opening the box
Thinking (False belief of other with changed contents)	I think	Other sees there is an eraser in a biscuit box after opening the box	I thought	I see
Visual perception with muffin and kettle task	I see a muffin drawing	Other sees a kettle drawing		
Visual perception with elephant task	I see an elephant drawing presented upside down	Other sees an elephant drawing presented right side up		

The second validity challenge to the data transformation process concerns transparency (Creswell & Clark, 2007). Transparency is central also to grounded theory analysis, for in qualitative study findings and method are very closely linked. This study began with themes from a survey of autobiographies written by people with ASD. These themes structured the in-depth interviews of students with ASD, which provided the qualitative data that were subjected to grounded theory analysis (Section 4.7.4 *Qualitative Data Analysis* in Chapter 4). The resulting categories were then transformed into numeric codes for quantitative analysis (Section 4.7.5 *Quantitative Data Analysis* in Chapter 4). The process of coding the categories, transforming qualitative into quantitative data, is described below, in order to make it transparent to the reader. (Refer to Table 4.18, *Matrix of Qualitative Data Transformation*.)

6.2.2 Data Coding

Thinking. Students' responses from false belief tasks were classified as *right* or *wrong* within the context of the task performed. Provision of both answers was classified *both*, and silence was classified as *no answer*.

Visual Perception. Students' responses from visual perception tasks were classified as *right* or *wrong*, depending on whether or not they could understand that people see differently from different perspectives. Provision of both answers was classified *both*, and silence was classified as *no answer*.

Emotion. Qualitative data regarding emotion was coded on the basis of questions designed to reveal empathy. *Empathy of self* was classified on the basis of the response to the question, 'How do you feel when mum is sick?' Answers that indicated a negative feeling were classified as *clear demonstration*, while answers indicating a positive feeling and answers unrelated to emotion were classified as *no demonstration*. If both types of answer were provided for the same question, they were classified as *unclear demonstration*. *Empathy of other* was classified on the basis of the response to the question, 'How does mum feel when you are sick?' Answers that indicated a negative feeling were classified as *clear demonstration*, while answers indicating a positive feeling and unrelated answers were classified as *no demonstration*. As in empathy of self, if both types of answer were provided they were classified as *unclear demonstration*.

Sensory responses. Coding qualitative data from questions on sensory responses presented particular problems. The questions looked for clear demonstrations of like and dislike, but some answers could not be quantified because of the influence of thinking in association. When, for example, a student answers that he both likes and dislikes something, this statement contains no clear sense of what is meant, although it does indicate the influence of thinking in association. Qualitative data from sensory responses were therefore treated differently, as explained below.

Thinking in association. Answers to questions that indicate thinking in association have their own distinctive character. For example, when discussing emotion with the aid of facial drawings, a student was asked, 'How do you feel now?' The student answered, 'Good.' The student was then asked, 'Why?' 'Because drawing a face.' Both these answers indicate the functioning of logical imagination. But then the student asked the interviewer, 'Doesn't Chun, Jih-Hyun (a famous Korean actress) have a head? Doesn't she?' This

response was not logically related to the question, but appeared to come from an association with the drawing he was talking about immediately before.

Answers based on thinking in association also arose in conversations on sensory responses. For example, a student was asked, 'Which smell do you like?' and answered 'Shit!' Asked later, 'Which smell you dislike?' he gave the same answer. This pattern was found frequently throughout interviews with students, and was not confined to any one mental state.

Answers based on thinking in association created particular problems in coding sensory responses. While the data for thinking (i.e., false belief), visual perception and emotion (i.e., empathy), consisted of answers possessing definite meaning, answers influenced by thinking in association that constituted data for sensory responses did not, and so could not be quantified. For example, in examining visual perception, a student either understands how perception changes with visual perspective, or he does not. But when a student answers that he both likes and dislikes a particular smell there is no clear sense of what is meant.

These answers do show, however, that thinking in association is demonstrated. As thinking in association was so central to the data from sensory responses, these data, along with qualitative data from the other mental states of thinking, visual perception and emotion, were subsumed into a new category, *thinking in association*. This was classified using three codes. Code 1, *dominant demonstration*, indicated this category appeared more than 10 times in interview transcripts. Code 2, *occasional demonstration*, indicated it appeared fewer than 10 times, and Code 3, *No demonstration*, indicated it did not appear at all. All qualitative data were reviewed for thinking in association.

6.3 Frequencies of IQ, Social Competence and Theory-of-Mind

Data transformation resulted in a series of numeric codes detailing the full range of students' abilities and difficulties in using imagination throughout the Theory-of-Mind components. The frequencies of these quantitative data, along with IQ (measuring the intelligence of students with ASD using K-WAIS) and social competence scores (measuring their social skills using KVSMS) were then explored by conducting frequency analysis to discover the correlations between them, thus giving a broad picture of Theory-of-Mind among this population.

6.3.1 Frequencies of K-WAIS

Tables 6.2 and 6.3 show IQ and VIQ scores of 20 male students (CA mean 17:2, ranged from 15:4 to 19:10) evaluated through K-WAIS. As shown in Table 6.2, standardised IQ scores ranged between below 45 to 77. The highest IQ score, 77, was shown by one student. A total of 12 students showed IQ scores below 45, and seven showed IQ scores between 49 and 56. As in Happé's (1995) study, this study credited any scores below an IQ and verbal IQ floor score of 45 with score of 44. Raw scores, however, show a wider range of IQ score distributions – between 41 and 100. A total of five students show raw IQ scores between 71 to 100, and the same number of students showed their raw IQ scores in the 60s, 50s and 40s respectively.

Table 6.2 ***Frequencies of IQ Scores***

Standardised IQ Score (SIQ)			**Raw IQ Score (IQ)**		
Stan. Score	**Frequency**	**Percent**	**Raw Score**	**Frequency**	**Percent**
77	1	5.0	91-100	1	5.0
56	1	5.0	81-90	2	10.0
55	2	10.0	71-80	2	10.0
52	1	5.0	61-70	5	25.0
51	1	5.0	51-60	5	25.0
50	1	5.0	41-50	5	25.0
49	1	5.0	Total	20	100.0
Below 45	12	60.0			
Total	20	100.0			

Table 6.3 shows standardised and raw VIQ scores. Like IQ scores, standardised VIQ scores show a more limited range of distributions than raw VIQ scores. With standardised VIQ, 15 students demonstrated VIQ below 45. Among the other five students, while four students demonstrated VIQ between 46 and 53, one student showed VIQ 71, the highest score. Raw VIQ scores ranged from 10 to 50. A total of 15 students showed raw VIQ below 30, seven in the 10s and eight in the 20s, while five students showed scores above 30. Of these, four showed raw VIQ between 30 and 34, and one showed between 46 and 50.

Table 6.3 ***Frequencies of VIQ Scores***

Standardised VIQ Score (SVIQ)			Raw VIQ Score (VIQ)		
Stan. Score	**Frequency**	**Percent**	**Raw Score**	**Frequency**	**Percent**
71	1	5.0	46-50	1	5.0
53	2	10.0	30-34	4	20.0
47	1	5.0	25-29	5	25.0
46	1	5.0	20-24	3	15.0
Below 45	15	75.0	15-19	5	25.0
Total	20	100.0	10-14	2	10.0
			Total	20	100.0

6.3.2 Frequencies of Korean Vineland Social Maturity Scale

KVSMS was used to measure social competence, presented in terms of social age (Table 6.4). The highest social age, between 17.1 and 18, was attained by a single student. The lowest social age, between 5.1 and 6, was attained by three students. The social age of 10-years-old constitutes a border, with half of the students showing a social age above it and the other half below.

Table 6.4 ***Frequencies of Social Age Measured by KVSMS***

		Frequency	**Percent**
Valid	17.1-18	1	5.0
	16.1-17	1	5.0
	13.1-14	2	10.0
	12.1-13	2	10.0
	11.1-12	3	15.0
	10.1-11	1	5.0
	9.1-10	1	5.0
	8.1-9	1	5.0
	7.1-8	3	15.0
	6.1-7	2	10.0
	5.1-6	3	15.0
	Total	20	100.0

6.3.3 Frequencies of Visual Perception

Visual perception of self and other was studied using the muffin and kettle task and the elephant task (Section 5.3.3 in Chapter 5). The muffin and kettle task tests whether students understand that people see different things from different positions. The elephant task examines whether students understand that people see the same thing differently from different positions.

In the muffin and kettle task, all students recognised the drawing as seen from their own perspective, and 18 students understood which drawing was seen by another from their perspective (Table 6.5). In the elephant task, 14 students could recognise right side up and 13 students could recognise upside down from their own perspective (Table 6.6), while only eight students understood how someone looking from a different perspective would recognise both directions (Table 6.7).

Table 6.5 ***Frequencies of Visual Perception with Muffin and Kettle Task***

Visual perception of other with a muffin and kettle task (VPOMK)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Right	18	90.0	90.0	90.0
	Wrong	2	10.0	10.0	100.0
	Total	20	100.0	100.0	

Table 6.6 ***Frequencies of Visual Perception with Elephant Task***

Visual perception of self with an elephant task (VPSE)					
		Right side up (VPSER)		**Upside down (VPSEU)**	
		Frequency	**Percent**	**Frequency**	**Percent**
Valid	Right	14	70.0	13	65.0
	Wrong	6	30.0	7	35.0
	Total	20	100.0	20	100.0

Table 6.7 ***Frequencies of Visual Perception of Other with Elephant Task***

Visual perception of other with an elephant task (VPOE)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Right	8	40.0	40.0	40.0
	Wrong	12	60.0	60.0	100.0
	Total	20	100.0	100.0	

The fact that more students understood visual perception from the perspective of self and other with the muffin and kettle task than with the elephant task indicates understanding that people see different things from different perspectives is easier than understanding that people see the same thing differently from different perspectives.

6.3.4 Frequencies of False Belief

False belief was examined using two changed contents tasks and a changed location task (Section 5.3.1 in Chapter 5). The first changed contents task examined students' understanding of their own previous false belief, and the second examined their understanding of another's false belief. The changed location task also examined another's false belief.

In the first changed contents task, 13 students answered relevantly, while in the second, 10 answered relevantly (Table 6.8), indicating that, within this task, understanding another's false belief is more difficult than understanding one's own false belief.

Table 6.8 ***Frequencies of False Belief in Changed Content Tasks***

False belief with changed contents (FBC)						
		Self (FBSC)			**Other (FBOC)**	
		Frequency	**Percent**		**Frequency**	**Percent**
Valid	Clear demon.	13	65.0	Clear demon.	10	50.0
	No demon.	6	30.0	No demon.	9	45.0
	Unclear demon.	1	5.0	Unclear demon.	1	5.0
	Total	20	100.0		20	100.0

In the changed location task only eight students gave the relevant answer (Table 6.9), indicating that understanding another's false belief through changed location is more difficult than understanding another's false belief through changed contents – at least according to the frequencies in this study.

Table 6.9 ***Frequencies of False Belief in Changed Location Task***

False belief of other with changed location (FBOL)			
		Frequency	**Percent**
Valid	Clear demon.	8	40.0
	No demon.	9	45.0
	Unclear demon.	3	15.0
	Total	20	100.0

6.3.5 Frequencies of Empathy

Empathy was considered in two aspects, empathy of self (i.e., the student's feeling of empathy for another) and empathy of other (i.e., the student's recognition of another's empathy for him). A total of 14 students demonstrated empathy of self, and 13 students demonstrated empathy of other (Table 6.10). A total of two students provided no demonstration of empathy, while four students provided unclear answers regarding empathy of self, and five students provided unclear answers regarding empathy of other.

Table 6.10 ***Frequencies of Empathy***

Empathy					
		Self (ES)		**Other (EO)**	
		Frequency	**Percent**	**Frequency**	**Percent**
Valid	Clear demon.	14	70.0	13	65.0
	No demon.	2	10.0	2	10.0
	Unclear demon.	4	20.0	5	25.0
	Total	20	100.0	20	100.0

6.3.6 Frequencies of Thinking in Association

Thinking in association is a major component of Theory-of-Mind. It was classified using three codes, *dominant demonstration*, indicating this pattern of conversation appeared more than 10 times in interview transcripts, *occasional demonstration*, indicating it appeared fewer than 10 times, and *no demonstration*, indicated it did not appear at all. As shown in Table 6.11, thinking in association was dominant for 12 out of 20 students. A total of seven students showed this pattern occasionally, while only one student did not show thinking in association at all.

Table 6.11 ***Frequencies of Thinking in Association***

Thinking in association (AT)			
		Frequency	**Percent**
Valid	Dominant demon.	12	60.0
	Occasional demon.	7	35.0
	No demon.	1	5.0
	Total	20	100.0

6.4 Relationships between IQ, Social Competence and Theory-of-Mind

6.4.1 Issues in Comparison

6.4.1.1 Raw or Standardised Scores?

This section discusses the relationships between IQ, social competence and the components of Theory-of-Mind. These relationships were analysed using raw IQ and VIQ scores rather than standardised IQ and VIQ scores, for two reasons. Firstly, the K-WAIS scale does not provide norms for people with ASD. K-WAIS IQ scores have been standardised only according to age, gender, location and educational background (염태호, 박영숙, 오경자, 김정규 & 이영호, 1992), which indicates that standardised IQ scores in this study would involve comparing the cognitive performance of a population with ASD with a typically developing population of the same age.

Secondly, standardised IQ scores do not differentiate cognitive abilities in students who demonstrate IQ below 45, the lowest standardised score. However, the majority of students in this study fall into this category, as 12 out of 20 students showed a standardised IQ below 45, and 15 out of 20 students showed a standardised VIQ below 45. These students did, however, demonstrate wide differences in raw IQ scores.

Students showed a range of individual differences regarding their ability to use logical imagination within mental states, but standardised IQ and VIQ scores cannot show any corresponding individual differences for those students who showed a standardised score below 45. The raw IQ and VIQ scores, which do show the individual differences among students, were therefore used for correlation coefficient tests.

This study uses the Korean Vineland Social Maturity Scale (KVSMS) to measure social competence in terms of social age (SA). The raw scores of this scale were standardised into measures of SA, based on 1,980 subjects in Republic of Korea aged from birth to thirty years (김승국 & 김옥기, 1995). Unlike K-WAIS, this scale is sensitive enough to show the individual differences between students with ASD by means of SA, and was developed for people with intellectual and developmental difficulties. This study therefore uses SA as measured by KVSMS for comparison with components of Theory-of-Mind.

6.4.1.2 Testing Normality

The relationships between IQ, social competence and components of Theory-of-Mind were tested using Pearson's product-moment correlation coefficient and Spearman's rank correlation coefficient tests, depending on the type of variable. While both correlation coefficient tests are designed to reveal relationships between two variables, Pearson's product-moment correlation coefficient test is designed for interval variables (Coakes & Steed, 2003) and Spearman's rank correlation coefficient test is used for non-normally distributed interval variables and ranked ordinal variables (de Vaus, 2002).

This study contains both interval variables (IQ, VIQ and SA scores) and ranked ordinal variables (components of Theory-of-Mind). For interval variables, the Shapiro-Wilk test was conducted to identify normal distributions of IQ, VIQ and SA scores. For ordinal variables, Spearman's rank correlation coefficient test was conducted to reveal the relationships between the variables. The Shapiro-Wilk test was selected because it is designed for a sample size of less than one hundred (n=20 in this study) (Coakes & Steed, 2003). The results of the Shapiro-Wilk test are shown in Table 6.12.

Field (2000) advises that if the test is not significant ($p > 0.05$), the distribution is normal. According to the Shapiro-Wilk normality test, the significance level is greater than 0.05 in VIQ and SA (0.2 and 0.66 for VIQ, 0.197 and 0.171 for SA). Normality of the two variables is therefore assumed.

Table 6.12 ***Normality Test***

	Shapiro-Wilk		
	Statistic	**df**	**Sig.**
VIQ	.911	20	.066
IQ	.902	20	.045
SA	.932	20	.171

Note. a. Lilliefors Significance Correction.
*. This is a lower bound of the true significance.

Spearman's rank correlation coefficient test was used to find the relationships between IQ, SA and components of Theory-of-Mind, except for the relationship between VIQ and SA. For this, Pearson's product-moment correlation coefficient test was used. The values of the correlation coefficient range between -1 and +1. A positive value indicates that variables are positively correlated, for example higher IQ scores and higher SA scores. A negative value indicates a negative relationship between two variables, for example higher IQ scores and lower SA scores.

The size of the correlation coefficient values, shown as Spearman's rank correlation coefficient, indicates the strength of the relationship. de Vaus (2002) states that in the social sciences, a correlation of 0.30 might be regarded as relatively strong. He regards 0.30-0.49 as moderate to substantial, 0.5-0.69 as substantial to very strong, and 0.7-0.89 as a very strong relationship. Cohen (1988) also sees a correlation of 0.30-0.5 as moderate and 0.5 as large. de Vaus (2002), however, advises care in interpreting the strength of the correlation coefficient, as the meaning of strong or moderate is relative and somewhat subjective.

The correlation coefficient needs to be interpreted along with its associational significance value. The significance of the p value is that it shows whether a correlation is statistically significant (Coakes & Steed, 2003). Social scientists usually accept any p

value below 0.05 as being statistically meaningful (Field, 2000). Also to be kept in mind is that correlation gives us only an association of variables. It does not indicate a causal relationship between variables.

The relationships between IQ, social competence and the components of Theory-of-Mind are discussed in the following sections. Beginning with the question of how IQ and social competence are related to the components of Theory-of-Mind (Sections 6.4.1 – 6.4.5), this study moves on to investigate the relationships within the components of Theory-of-Mind (Sections 6.4.6 – 6.4.10). In doing so, this study focuses on the understanding of one's own Theory-of-Mind (e.g., own visual perception) and the Theory-of-Mind of others (e.g., visual perception of other), as well as the relationships between thinking in association and the other components of Theory-of-Mind.

6.4.2 Relationship between IQ and Social Competence

The relationship between VIQ and social competence as shown by social age (SA) was tested through Pearson's product-moment correlation coefficient once their normal distribution was examined. The Pearson product-moment correlation coefficient of r is 0.576 between VIQ and SA ($p < .01$). This indicates a positively high association between the two variables.

However, Spearman's rank correlation coefficient was used for relationship between IQ and SA because IQ scores were not normally distributed. IQ and SA show a positively moderate relationship ($r=.475$, $p < .05$), which means SA is more strongly associated with verbal IQ than total IQ, including performance IQ.

6.4.3 IQ and Social Competence in Relation to Visual Perception

IQ, VIQ and SA were analysed in relation to their association with visual perception. In the elephant task, IQ and VIQ showed strong positive relationships with visual perception of self and other (Table 6.13). IQ and visual perception of self regarding the perception of right side up and upside down show a strong positive relationship ($r =.678$ and .698 respectively, $p < .01$). A very strong positive relationship exists between IQ and visual perception of other ($r =.725$, $p < .01$). Thus, higher IQ scores are associated with better understanding of visual perception of self and other.

Table 6.13 ***IQ and Social Competence with Visual Perception***

			VPOMK	VPSER	VPSEU	VPOE
Spearman's coefficient	IQ	Correlation Coefficient	-.148	.678**	.698**	.725**
		Sig. (1-tailed)	.267	.001	.000	.000
		N	20	20	20	20
	VIQ	Correlation Coefficient	-.074	.790**	.694**	.748**
		Sig. (1-tailed)	.379	.000	.000	.000
		N	20	20	20	20
	SA	Correlation Coefficient	.203	.247	.064	.641**
		Sig. (1-tailed)	.195	.147	.394	.001
		N	20	20	20	20

Note. **. Correlation is significant at the 0.01 level (1-tailed).
*. Correlation is significant at the 0.05 level (1-tailed).

The relationship between VIQ and visual perception of self and other was very strong. VIQ was correlated to visual perception of self in recognising the elephant drawing as right side up ($r=.790$, $p < .01$), and correlated to visual perception of other in recognising both right side up and upside down ($r=.748$, $p <.01$). These results contrast with those in the muffin and kettle tasks, where VIQ did not demonstrate a meaningful relationship with visual perception.

SA showed a strong positive correlation with visual perception in only one of the four visual perception tasks, that part of the elephant task which tested visual perception of other ($r=.641$, $p < .01$). This indicates that social competence is not correlated to understanding one's own visual perception, but only to understanding the visual perception of others.

While in the elephant task, IQ, VIQ and SA were positively related to a significant degree, in the muffin and kettle task no significant relationship was found between IQ and SA on the one hand, and visual perception on the other. This indicates that the understanding that people see the same thing differently from different positions, evaluated by the elephant task, is related to IQ and social competence, while the understanding that people see different things from different positions, evaluated by the muffin and kettle task, is not related to IQ and social competence.

6.4.4 IQ and Social Competence in Relation to False Belief

IQ, VIQ and SA were analysed in relation to their association with false belief. None of these variables demonstrated a positive relationship with any of the false belief tasks (Table 6.14).

Table 6.14 ***IQ and Social Competence with False Belief***

			FBSC	FBOC	FBOL
Spearman's coefficient	IQ	Correlation Coefficient	-.156	-.391*	.111
		Sig. (1-tailed)	.256	.044	.321
		N	20	20	20
	VIQ	Correlation Coefficient	-.275	-.541**	.303
		Sig. (1-tailed)	.121	.007	.097
		N	20	20	20
	SA	Correlation Coefficient	-.136	-.410*	-.160
		Sig. (1-tailed)	.284	.036	.250
		N	20	20	20

Note. **. Correlation is significant at the 0.01 level (1-tailed).
*. Correlation is significant at the 0.05 level (1-tailed).

Instead, false belief of other in the changed content task demonstrated a moderate negative relationship with IQ ($r = -.391$, $p < .05$), a strong negative relationship with VIQ ($r = -.541$, $p < .01$) and a moderate negative relationship with SA ($r = -.410$, $p < .05$). This result will be discussed further in Chapter 8 *Discussion*.

6.4.5 IQ and Social Competence in Relation to Empathy

IQ, VIQ and SA were analysed in relation to their association with empathy, and a positive relationship between cognitive abilities and empathy was demonstrated (Table 6.15). IQ and VIQ showed substantial relationships with empathy of self ($r=.573$ and .639 respectively, $p <.01$) and other ($r=.489$, $p <.05$ and $r=.620$, $p <.01$). These results also indicated that VIQ is more strongly related to empathy than IQ.

Table 6.15 ***IQ and Social Competence with Empathy***

			ES	EO
Spearman's coefficient	IQ	Correlation Coefficient	.573**	.489*
		Sig. (1-tailed)	.004	.014
		N	20	20
	VIQ	Correlation Coefficient	.639**	.620**
		Sig. (1-tailed)	.001	.002
		N	20	20
	SA	Correlation Coefficient	.135	.195
		Sig. (1-tailed)	.285	.205
		N	20	20

Note. **. Correlation is significant at the 0.01 level (1-tailed).
*. Correlation is significant at the 0.05 level (1-tailed).

6.4.6 IQ and Social Competence in Relation to Thinking in Association

IQ, VIQ and SA were analysed in terms of their relationship with thinking in association. A negative relationship was found between cognitive abilities and thinking in association (Table 6.16). IQ and VIQ showed a strong negative relationship with thinking in association ($r=-.592$ and $-.599$ respectively, $p < .01$). This indicates that higher IQ and VIQ scores are associated with less reliance on thinking in association. Again, social competence did not demonstrate a significant relationship with thinking in association.

Table 6.16 ***IQ and Social Competence with Thinking in Association***

			IQ	VIQ	SA
Spearman's coefficient	AT	Correlation Coefficient	-.592**	-.599**	-.190
		Sig. (1-tailed)	.003	.003	.212
		N	20	20	20

Note. **. Correlation is significant at the 0.01 level (1-tailed).
*. Correlation is significant at the 0.05 level (1-tailed).

6.4.7 Relationships between Components of Theory-of-Mind

Empathy, false belief, visual perception and thinking in association were analysed in order to uncover the relationships between them (Table 6.17). Spearman's rank correlation coefficient demonstrated a positive relationship between visual perception and empathy, and a negative relationship between visual perception and empathy on the one hand and thinking in association on the other.

Table 6.17 ***Relationships between Empathy, False Belief and Visual Perception***

			FBSC	FBOC	FBOL	ES	EO
Spearman's coefficient	VPOMK	Correlation Coefficient	-.242	-.325	-.205	-.215	.137
		Sig. (2-tailed)	.304	.174	.387	.362	.564
		N	20	19	20	20	20
	VPSER	Correlation Coefficient	.000	-.191	.196	.728**	.606**
		Sig. (2-tailed)	1.000	.434	.408	.000	.005
		N	20	19	20	20	20
	VPSEU	Correlation Coefficient	-.076	-.069	.297	.632**	.507*
		Sig. (2-tailed)	.750	.779	.204	.003	.023
		N	20	19	20	20	20
	VPOE	Correlation Coefficient	-.222	-.368	.039	.285	.357
		Sig. (2-tailed)	.347	.121	.872	.222	.122
		N	20	19	20	20	20
	FBSC	Correlation Coefficient	1.000	.795**	.360	.047	-.030
		Sig. (2-tailed)	.	.000	.119	.845	.901
		N	20	19	20	20	20
	FBOC	Correlation Coefficient	.795**	1.000	.574*	-.141	-.236
		Sig. (2-tailed)	.000	.	.010	.565	.330
		N	19	19	19	19	19
	FBOL	Correlation Coefficient	.360	.574*	1.000	.129	.119
		Sig. (2-tailed)	.119	.010	.	.588	.617
		N	20	19	20	20	20

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Neither false belief and visual perception, nor false belief and empathy, show significant relationships. Indeed, false belief seems to be independent within the components of Theory-of-Mind. A discussion of the significance of the independence of false belief is found in Section 8.3.2 of Chapter 8.

Looking at visual perception in more detail, understanding the direction of right side up from one's own perspective is positively and strongly related to empathy of self and other (r=.728 and .606 respectively, p <.01). Understanding the direction of upside down from one's own perspective is also positively related to empathy from self and other (r=.632 and .507, p <.01 and .05 respectively). However, understanding visual perception of other did not demonstrate a strong relationship with empathy. This indicates that a better understanding of one's own visual perspective is associated with the experience of empathy, one's own and that of others.

6.4.8 Relationships between Thinking in Association and Components of Theory-of-Mind

Components of Theory-of-Mind (of Self). The relationships between thinking in association and the understanding of visual perception of self, false belief of self and empathy of self, were discovered to be negative (Table 6.18). For example, thinking in association and visual perception of self regarding right side up and upside down were negatively correlated (r= -.5.27, p <.05 and r= -.591, p <.01 respectively). Furthermore, a significant negative relationship was also found between thinking in association and empathy (r= -.520, p <.05).

Table 6.18 ***Relationships between Thinking in Association and Components of Theory-of-Mind (of Self)***

			VPSER	VPSEU	FBSC	ES
Spearman's coefficient	AT	Correlation Coefficient	-.527*	-.591**	-.029	-.520*
		Sig. (2-tailed)	.017	.006	.903	.019
		N	20	20	20	20

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

This indicates that thinking in association has a strong negative relationship with the capacity to understand visual perception and empathy of self. In other words, students with

more thinking in association tend to show less understanding of visual perception from one's own perspective and empathy of self for other. However, the relationship between thinking in association and false belief of self, while negative, is not significant.

Components of Theory-of-Mind (of other). The relationships between thinking in association and visual perception of other, false belief of other and empathy of other are presented in Table 6.19. A strong negative relationship was found between thinking in association and the understanding of visual perception from the perspective of others (r=-.596, p <.01), indicating that the more thinking in association dominates, the less understanding there will be of the visual perception of others. A negative relationship was also found between thinking in association and clear demonstrations of the recognition of empathy from others (r= -.580, p <.01), indicating that the more thinking in association there is, the less likely it is that empathy of other will be recognised.

Table 6.19 ***Relationships between Thinking in Association and Components of Theory-of-Mind (of Other)***

			VPOMK	VPOE	FBOC	FBOL	EO
Spearman's coefficient	AT	Correlation Coefficient	.050	-.596**	.102	-.289	-.580**
		Sig. (2-tailed)	.833	.006	.677	.216	.007
		N	20	20	20	20	20

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

6.4.9 Relationships within Components of Theory-of-Mind

Within the components of Theory-of-Mind showing the full spectrum of imagination (i.e., false belief, visual perception and empathy) a positive relationship was found between the understanding of self and that of other. This indicates that a better understanding of one's own mind is associated with a better understanding of the minds of others.

False belief. Table 6.20 shows the relationships within false belief tasks in terms of false belief of self (one's own false belief) and false belief of other. A strong positive relationship was found within the changed contents task between understanding false belief of self and that of other (r=.795, p <.01). However, looking at the relationship between the changed contents and changed location false belief tasks, an understanding of false belief

of self in the changed contents task is not strongly related to an understanding of the false belief of other in the changed location task. A substantial relationship is found only between the understanding of false belief of other in the changed contents task and the changed location task (r=.574, p <.05).

These results may indicate that it is easier to move logical imagination across space when the task is familiar than when it is unfamiliar. For example, in the changed contents task, having recognised one's own previous false belief it may be easier to recognise the false belief of another if the materials remain the same.

Table 6.20 ***Relationships within False Belief***

			FBSC	FBOC	FBOL
Spearman's coefficient	FBSC	Correlation Coefficient	1.000	.795**	.360
		Sig. (2-tailed)	.	.000	.119
		N	20	19	20
	FBOC	Correlation Coefficient	.795**	1.000	.574*
		Sig. (2-tailed)	.000	.	.010
		N	19	19	19
	FBOL	Correlation Coefficient	.360	.574*	1.000
		Sig. (2-tailed)	.119	.010	.
		N	20	19	20

Note. **. Correlation is significant at the 0.01 level (2-tailed).

Visual perception. Table 6.21 shows the relationships within visual perception. Visual perception of self in terms of understanding the directions of right side up and upside down shows a strong positive association (r=.892, p <.01). This indicates that a better understanding of right side up is strongly associated with a better understanding of upside down.

One's own understanding of right side up and upside down is also substantially related to understanding the visual perception of others (r=.535, p <.05 and r=.599, p <.01), indicating that an understanding of upside down and right side up from one's own perspective is strongly associated with understanding those directions from the perspective of others. In the muffin and kettle task, visual perception of other showed no significant relationship with other types of visual perception.

Table 6.21 ***Relationships within Visual Perception***

			VPOMK	VPSER	VPSEU	VPOE
Spearman's coefficient	VPOMK	Correlation Coefficient	1.000	-.218	-.245	.272
		Sig. (2-tailed)	.	.355	.299	.246
		N	20	20	20	20
	VPSER	Correlation Coefficient	-.218	1.000	.892**	.535*
		Sig. (2-tailed)	.355	.	.000	.015
		N	20	20	20	20
	VPSEU	Correlation Coefficient	-.245	.892**	1.000	.599**
		Sig. (2-tailed)	.299	.000	.	.005
		N	20	20	20	20
	VPOE	Correlation Coefficient	.272	.535*	.599**	1.000
		Sig. (2-tailed)	.246	.015	.005	.
		N	20	20	20	20

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Empathy. Table 6.22 shows the relationships between empathy of self and empathy of other. Experiencing empathy and recognising empathy from others are very strongly related (r=.872, p <.01), indicating a clear association between them.

Table 6.22 ***Relationships within Empathy***

			ES	EO
Spearman's coefficient	ES	Correlation Coefficient	1.000	.872**
		Sig. (2-tailed)	.	.000
		N	20	20
	EO	Correlation Coefficient	.872**	1.000
		Sig. (2-tailed)	.000	.
		N	20	20

Note. **. Correlation is significant at the 0.01 level (2-tailed).

Sections 6.4.1 to 6.4.8 examined the relationships between Theory-of-Mind components, IQ and social competence *between* individuals. The next section looks at the relationships between Theory-of-Mind components, IQ and social competence *within* individuals.

6.4.10 Patterns of Theory-of-Mind Understanding

This section examines the patterns of Theory-of-Mind understanding found within students with ASD, based on their capacity to demonstrate logical imagination regarding the components of Theory-of-Mind. These patterns are presented in Table 6.23. The classification scheme shown here has been discussed in Section 6.2.

Within the 20 students with ASD, 18 can be classified as belonging to one of four groups on the basis of their ability to demonstrate logical imagination in relation to Theory-of-Mind components of false belief, visual perception and empathy.

Group 1. Fluent/logical imagination within all Theory-of-Mind components was demonstrated by five students (i.e., Daniel, George, Patrick, Chris and Peter). Logical imagination was demonstrated for both perspectives (that of self and other), with two exceptions. Firstly, Daniel, George, Patrick and Chris could not demonstrate fluent/logical imagination within visual perception of other. Secondly, Chris demonstrated fluent/logical imagination within all Theory-of-Mind components only for self and not for other. Only Peter demonstrated fluent logical/imagination within all Theory-of-Mind components for both self and other. Four of the five students demonstrated degrees of thinking in association, from occasional (e.g., Daniel and George) to dominant (e.g., Patrick and Chris). Only Peter did not demonstrate thinking in association at all.

Group 2. Fluent/logical imagination within empathy (i.e., emotion) and visual perception, and impeded/logical imagination within false belief tasks (i.e., thinking), were demonstrated by seven students (e.g., Bob, David, Ian, Jerry, John, Kevin and Tom). All members of this group demonstrated degrees of thinking in association, either occasionally (i.e., Bob, Jerry, John, Kevin and Tom) or dominantly (i.e., David and Ian).

Group 3. Fluent/logical imagination within false belief tasks (i.e., thinking) and impeded/logical imagination within empathy (i.e., emotion) were demonstrated by four students (e.g., Edward, Michael, Paul and Ron). Students in this group (i.e., Michael, Paul and Ron) also demonstrated impeded/logical imagination within visual perception, while the remaining student (e.g., Edward) did not. All students demonstrated dominant thinking in association.

Table 6.23 ***Patterns of Theory-of-Mind Understanding***

Name	VPSER[1]	VPSEU[2]	VPOE[3]	FBSC[4]	FBOC[5]	FBOL[6]	ES[7]	EO[8]	AT[9]	Raw IQ	Raw VIQ	Std. IQ	SC (age)
Group 1													
Chris	Yes	Yes	No	Yes	Yes	Yes/No	Clear	Unclear	Domin.	62	25	< 45	7.33
Daniel	Yes	Yes	No	Yes	Yes	Yes	Clear	Clear	Occa.	45	16	< 45	5.90
George	Yes	Yes	No	Yes	Yes	Yes	Clear	Clear	Occa.	64	26	< 45	8.00
Patrick	Yes	Yes	No	Yes	Yes	Yes	Clear	Clear	Domin.	58	22	< 45	5.90
Peter	Yes	Yes	Yes	Yes	Yes	Yes	Clear	Clear	No demon	82	28	55	8.83
Group 2													
Bob	Yes	Yes	Yes	Yes	No	No	Clear	Clear	Occa.	79	29	52	12.5
David	Yes	Yes	No	No	No	No	Clear	Clear	Domin.	69	23	50	6.00
Ian	Yes	Yes	Yes	No	No	No	Clear	Clear	Domin.	76	32	56	13.40
Jerry	Yes	Yes	Yes	No	No	Yes	Clear	Clear	Occa.	100	46	77	16.50
John	Yes	Yes	Yes	Yes/No	No	Yes	Clear	Clear	Occa.	64	30	< 45	11.50
Kevin	Yes	Yes	Yes	No	No	No	Clear	Clear	Occa.	67	32	49	13.20
Tom	Yes	Yes	Yes	Yes	No answer	No	Clear	Clear	Occa.	82	32	55	11.75
Group 3													
Edward	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Domin.	60	22	51	12.50
Michael	No	No	No	Yes	Yes	No answer	No demon.	No demon.	Domin.	52	15	< 45	11.75
Paul	No	No	No	Yes	Yes	No	Unlear	Unclear	Domin.	51	14	< 45	10.80
Ron	No	No	No	Yes	Yes	Yes	No demon.	No demon.	Domin.	48	19	< 45	7.00

Name	VPSER[1]	VPSEU[2]	VPOE[3]	FBSC[4]	FBOC[5]	FBOL[6]	ES[7]	EO[8]	AT[9]	Raw IQ	Raw VIQ	Std. IQ	SC (age)
Group 4													
Brett	No	No	No	No	No	No	Unclear	Unclear	Domin.	42	16	< 45	6.25
Joshua	No	No	No	No	No answer	No	Unclear	Unclear	Domin.	43	15	< 45	7.08
No group													
Fred	Yes	No	No	Yes	No	No	Clear	Clear	Domin.	59	29	< 45	17.75
Nicholas	No	No	No	Yes	Yes	Yes/No	Clear	Clear	Domin.	46	14	< 45	9.75

Note.

1 Visual perception of self with an elephant task, right side up.
2 Visual perception of self with an elephant task, upside down.
3 Visual perception of other with an elephant task.
4 False belief of self with a changed contents task.
5 False belief of other with a changed contents task.
6 False belief of other with a changed location task.
7 Empathy of self.
8 Empathy of other.
9 Thinking in association.

Group 4. Impeded/logical imagination throughout all Theory-of-Mind components was demonstrated by two students (i.e., Brett and Joshua). They all demonstrated dominant thinking in association.

The majority of students in Group 2 had higher IQ. In the total population of 20, only 8 had standardised IQ scores over 45 and six of these are in Group 2, the group that demonstrated fluent/logical imagination in regard to empathy and visual perception. However, social competence did not show any association with components of Theory-of-Mind.

These groups could not cover all 20 students with ASD as two students demonstrated patterns in logical imagination that did not fit into any of them. Nicholas, for example, demonstrated fluent/logical imagination within false belief tasks (i.e., thinking) and empathy (i.e., emotion), but not within visual perception.

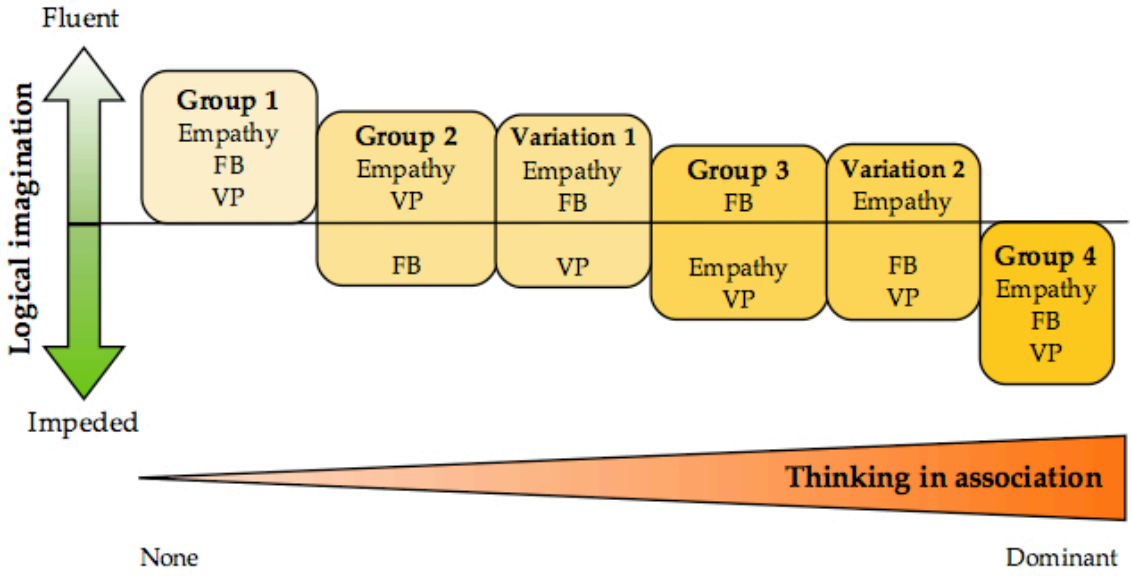
The 20 students with ASD as a whole are characterised by wide variations in their demonstration of logical imagination in relation to the three components of Theory-of-Mind. This indicates that individuals with ASD tend to demonstrate logical imagination more or less fluently within some components of Theory-of-Mind but not in others. In particular, among the students in this study, fluent/logical imagination within false belief tasks does not go together with fluent/logical imagination within empathy.

6.4.11 Theory-of-Mind Continuum Model

This study has uncovered patterns of Theory-of-Mind understanding among students with ASD, as discussed above. These patterns concern the various kinds of relationships found between imagination and thinking, the core and near-core categories that emerged from grounded theory analysis. In particular, these patterns describe the relationships found along the spectrum of fluent/impeded logical imagination as it intersects with that of associational imagination (Figure 5.3). Together, these relationships create a continuum model of Theory-of-Mind.

Figure 6.2 maps the four groups discussed above along a line showing the progressive influence of thinking in association. Added to the four groups are the two students who did not fit into them, shown as ‘Variation 1’ and ‘Variation 2’. The horizontal line plots the degree of thinking in association, from Group 1, least influenced by thinking in association, to Group 4, most influenced by thinking in association. The

vertical axis of the chart shows the degree of fluency in logical imagination, again with Group 1 and Group 4 at opposite ends of the spectrum, and the other groups and variations in between.



Note. FB = False Belief; VP = Visual Perception

Figure 6.2 **Theory-of-Mind Continuum Model**

Students in Group 1 demonstrated fluent/logical imagination in all components of Theory-of-Mind, and are characterised by more logical thinking than thinking in association. Students in Group 2 and Variation 1 (i.e., Nicholas) demonstrated fluent/logical imagination in two components of Theory-of-Mind, and are characterised by more thinking in association than members of Group 1. Students in Group 2 demonstrated fluent/logical imagination in empathy and visual perception but not false belief, while Variation 1 demonstrated fluent/logical imagination in empathy and false belief, but not visual perception.

Students in Group 3 and Variation 2 (i.e., Fred) demonstrated fluent/logical thinking in only one component of Theory-of-Mind and impeded/logical thinking in the remaining two components. They are characterised by a greater degree of thinking in association than students in Group 2 and Variation 1. Members of Group 3 demonstrated fluent/logical imagination only in false belief, while Variation 2 (i.e., Nicholas) demonstrated fluent logical imagination only in empathy. Finally, students in Group 4

demonstrated impeded/ logical imagination in all components of Theory-of-Mind, and are characterised by dominant thinking in association.

The members of each group are united in sharing common pattern, but within each group individual differences can be found. In Group 1, for example, while one student demonstrated logical imagination within visual perception from the perspectives of both self and other, three students could not demonstrate it from perspective of another. However, this variation is relatively minor in comparison to the differences found between students in Groups 1 and 4. These differences found within each group, and the variety of Theory-of-Mind experiences they indicate, show why a continuum model is closer to the lived experience of Theory-of-Mind than a relatively simple binary or specific deficit approach.

In addition to the variations *within* groups, the boundaries *between* groups are not absolute. The two variations show the difficulty of fitting individuals into fixed categories of Theory-of-Mind. Also, some students sit astride group boundaries. Paul, for example, is placed in Group 3 because he demonstrated fluent/logical imagination in false belief, but he did so only within the changed contents task and not within the changed location tasks. These subtle variations in Theory-of-Mind capacities between individuals and groups again indicate that the continuum model of Theory-of-Mind is closer to the lived experience of students with ASD than a binary approach.

6.5 Conclusion

This chapter has examined the relationships between IQ, social competence and the components of Theory-of-Mind between and within individuals. The qualitative data gained from Study 1 were transformed into quantitative data, which were then analysed using descriptive statistics, frequency distributions and correlations.

The relationships between IQ, social competence and components of Theory-of-Mind found *between* students demonstrated a positive relationship between IQ on the one hand and empathy and visual perception on the other. A negative relationship was found between IQ and false belief of other in the changed contents task, and again between IQ and thinking in association. Social competence did not demonstrate a significant relationship with any Theory-of-Mind components except visual perception of other and false belief of other in the changed contents task.

Among the components of Theory-of-Mind, while false belief was independent, a positive relationship was found between visual perception and empathy. Furthermore, thinking in association demonstrated a negative relationship with empathy and visual perception, but it did not show a significant relationship with false belief. Throughout the components of Theory-of-Mind, understanding one's own mental state has a strong positive relationship to understanding the mental states of others.

Comparison between IQ, social competence and components of Theory-of-Mind *within* individuals demonstrated four discrete patterns of fluency in logical imagination in empathy, false belief and visual perception, along with two variations. These patterns in turn generated a Theory-of-Mind continuum that can show and explain subtle differences in Theory-of-Mind understanding found in students with ASD.

CHAPTER 7

OUTSIDE-IN: THEORY-IN-MIND OF STUDENTS WITH ASD AS OBJECTIVELY UNDERSTOOD BY THEIR TEACHERS

7.1 Introduction

This chapter examines Theory-of-Mind of students with ASD as objectively understood by their teachers. A continuation of Chapters Five and Six, which discussed the Theory-of-Mind of students with ASD as subjectively experienced by the students themselves, this chapter takes an outside-in, rather than an inside-out, approach to Theory-of-Mind.

The present study is the first attempt to investigate the Theory-of-Mind of students with ASD as objectively understood by their teachers. As explained in Chapter 4 *Methodology*, teachers' understanding of their students' Theory-of-Mind was studied using a grounded theory approach and a mixed methods research design. Qualitative data, from teachers in-depth interviews, document review and open-ended questions in the Teacher Questionnaire, were analysed using grounded theory analysis. The results of this analysis are presented in Section 7.2 (Figure 7.1). Quantitative data, from closed statements in the Teacher Questionnaire, were analysed using frequency distributions and percentages. The results of this analysis are presented in Section 7.3. The two sets of data, qualitative and quantitative, are compared and integrated in Section 7.4, triangulating the views of teachers regarding the Theory-of-Mind of their students with ASD. This chapter concludes in Section 7.5.

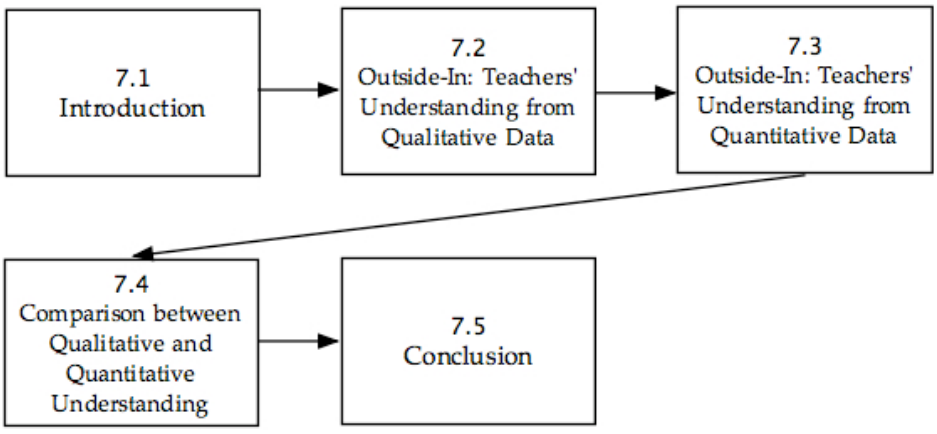


Figure 7.1 **Structure of chapter seven**

7.2 Outside-In: Teachers' Understanding from Qualitative Data

Section 7.2 examines teachers' understanding of their students' Theory-of-Mind found from analysing qualitative data from in-depth interviews, educational documents and open-ended questions of the Teacher Questionnaire. As shown in Figure 7.2, five categories emerged from grounded theory analysis, showing that teachers understood the Theory-of-Mind of their students in terms of: Mental states experienced by students and expressed externally (Section 7.2.2); the ways in which students expressed their experiences of mental states (Section 7.2.3); students' understanding of the mental states of others expressed externally (Section 7.2.4); developmental changes of their students in Theory-of-Mind expressed and observed externally (Section 7.2.5); and the beliefs held and expressed by teachers concerning the Theory-of-Mind of their students (Section 7.2.6).

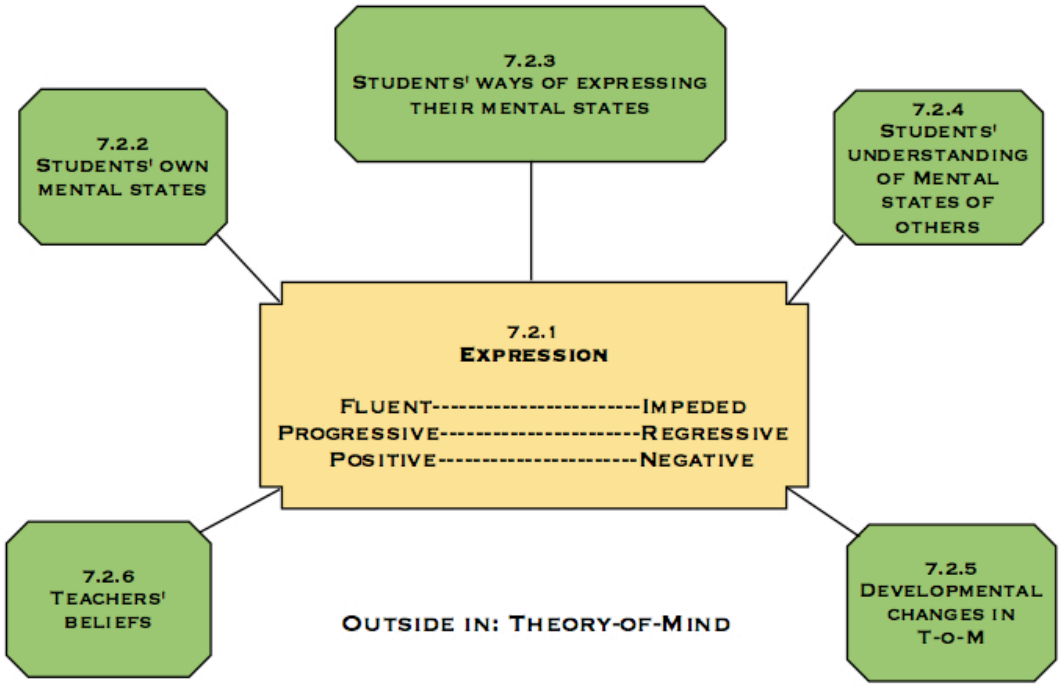


Figure 7.2 **Teachers' understanding of their students' Theory-of-Mind**

7.2.1 The Core Category, 'Expression'

Teachers of students with ASD provided a variety of qualitative data, including performance evaluations and anecdotes of their students, discussions of their own difficulties, and their opinions regarding ASD. During substantive coding the researcher began to see that regardless of the variety of observations and opinions that were expressed

by teachers, what was common to all the data was that the teachers were talking about their experiences – they were *expressing* their observations, understandings and feelings. Further, what the teachers were expressing to the researcher was based, in turn, on what their students *expressed* to them. In brief, the unifying factor in the qualitative data from the teachers was *expression*. This became the core category, and although it took time for it to become apparent, once it did so it held the other categories together and allowed meaning to emerge.

The core category *expression* refers to the outer communication of an inner mental state, invisible in its own nature but rendered visible through its expression. Expression emerges from the interface between the experiences of the students themselves and the perceptions of their teachers about these experiences. Expression was found along three spectra, between fluent/impeded, progressive/regressive and positive/negative (Figure 7.3).

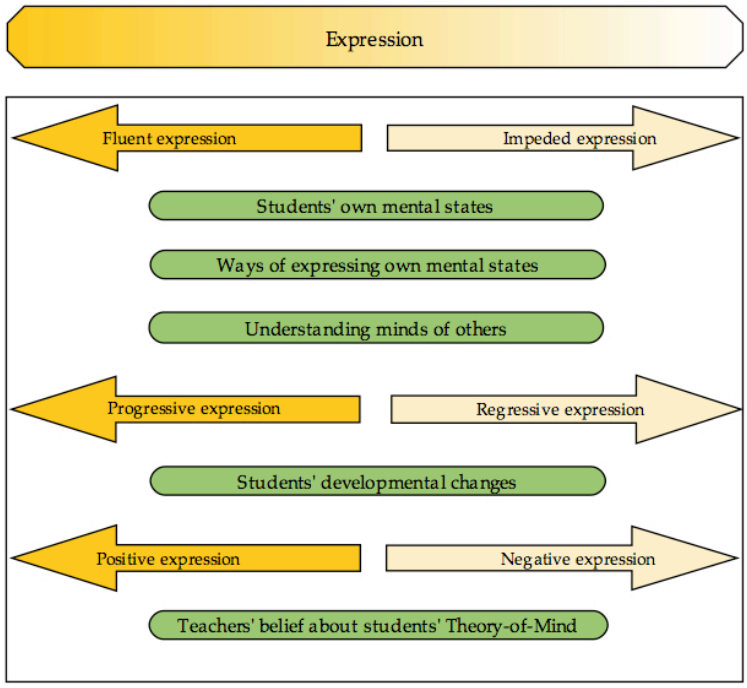


Figure 7.3 **Core category 'Expression'**

Fluent/impeded expression refers to the way in which students expressed their mental states and their understanding of the minds of others, either fluently or with difficulty. Progressive/regressive expression refers to teachers' observations of their students' developmental potential. Positive/negative expression refers to teachers' broad views of

their students with ASD, not confined to developmental potential. This section continues to unpack the core category, *expression*.

7.2.2 Expressing Students' Mental States

Teachers reported their observations of their students' expressions of their own mental states, based on their students' behaviour or their diaries. (The diaries themselves are part of the data used in Chapter 5; in this chapter the data are teachers' reports *about* the diaries.) The mental states observed and reported by teachers can be divided broadly into affective and cognitive, expressed either fluently or with difficulty (Figure 7.4). This section first discusses fluently expressed mental states by students with ASD.

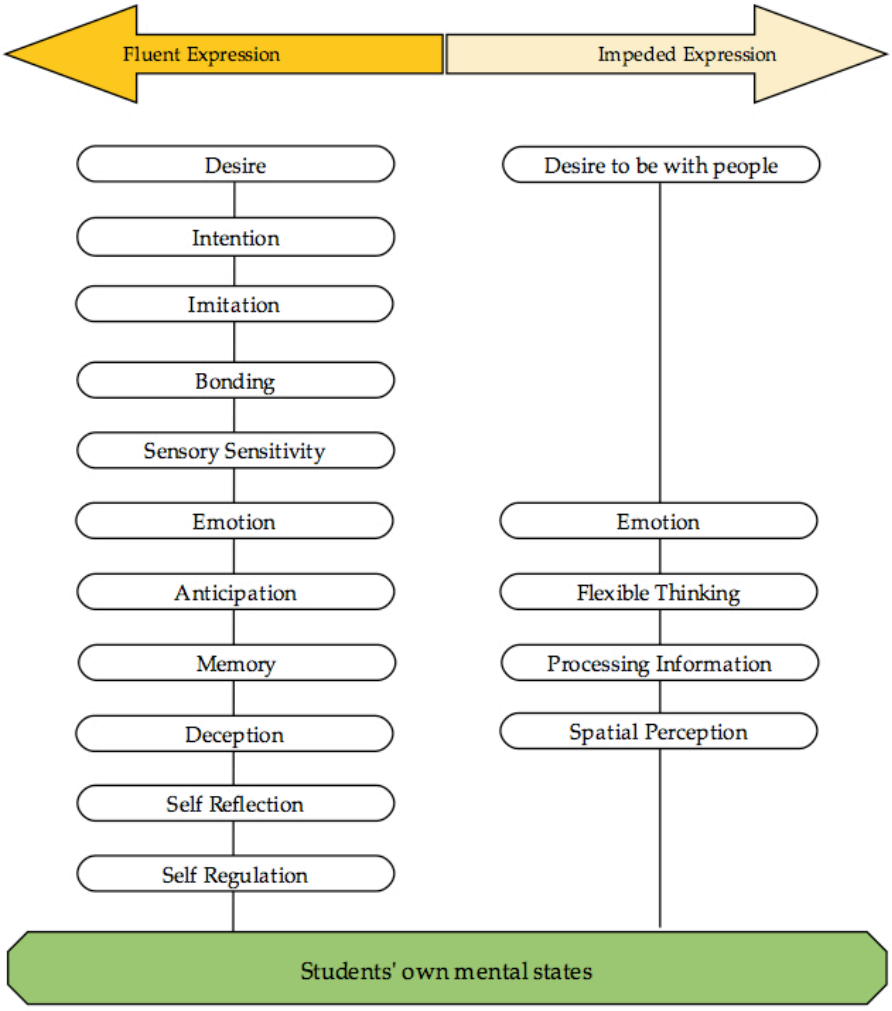


Figure 7.4 **Mental states expressed by students**

7.2.2.1 Affective Mental States with Fluent Expression

Among the fluently expressed affective mental states, desire and emotion were seen as holding the other mental states together. Figure 7.4 lists desire and emotion separately, for while desire always entails emotion, emotion does not necessarily entail desire. The mental states between desire and emotion are intention, imitation, bonding and sensory sensitivity. Intention and imitation were seen to emerge from desire. For example, what students wanted directed their intentions and students imitated what they desired. Bonding was linked to imitation, and through imitation to desire. Sensory sensitivity was seen to be very close to emotion, as it entails affective responses to physical stimuli.

Desire. Desire was one of the most frequently observed mental states. Students expressed a variety of desires, but the desire most frequently mentioned by teachers took the form of obsessive interest. The objects of this interest included computers, vehicles, food, dates, calendars, crayons, watching videos, listening to the radio, and touching ears. One teacher, Cathy, commented that the quality of the obsessive desire is more important than the object of desire. She explained that once her student, Michael, decides to do something, no matter how minor, then even if he is stopped (e.g., if it is inappropriate during a particular time), he will return to it again at the next opportunity.

About half the teachers expressed their students' desire to be understood. For example, Diane, Peter's teacher, spoke about how he tried to explain his behaviour but was unable to communicate as he wanted. He became charged with emotion and asked, 'Teacher, why? Save me, please!'

Teachers observed expressions of the desire to be alone more frequently than the desire to be with friends. The desire to be with others was characterised by impeded expression (Section 7.2.2.3).

Intention. Desire was seen to give rise to intention. For example, Frederick, Edward's teacher, spoke of Edward's desire to be alone, and how he directed his intention to achieve this. Intending to sit alone during lunch, he came to the school cafeteria late in the hope that the table allocated to his class was full. Intending to be alone during break times, at the beginning of break he asked his classmates to leave the classroom, and if they did not he asked his teacher to tell them to leave.

Imitation. Desire was also linked to imitation, as students imitated their peers because they wanted to be like them. For example, George's mother told Jenny, his

teacher, that when George began attending a mainstream junior high school he heard his peers swearing, and began imitating them. Brian, Ian's teacher, spoke of how Ian imitated his peers with ASD, their echolalia, hand-clapping in class, and talking styles.

Bonding. Teachers reported that most students demonstrated care for their classmates. Edward, for example, kept an eye on one of his classmates at school excursions and waited for him when he was left behind. Some teachers wondered whether this kind of behaviour comes from a learned routine, students having previously been asked to look after other classmates, or from spontaneous interest. Jenny commented that regardless of the reason, this kind of behaviour shows that students with ASD are in fact interested in their classmates. She gave the example of her student, Chris, who would urge his classmates to eat and drink what was provided at school lunch, apparently motivated by a sense of their welfare.

Teachers reported that the family members of students with ASD frequently mention students' mother and elder sibling(s) as objects of affection. Students also expressed their affection for their current or previous class teachers.

Sensory Sensitivity. This concerns affective responses to the objects of the five physical senses (Section 5.3.4 in Chapter 5). Extremes in sensory sensitivity are common in the ASD population, and this was noticed by teachers among their students with ASD. Sensitivity in relation to taste was most noticed, followed by sensitivities in relation to touch and sound.

Gustatory sensitivity was expressed though fastidious eating habits. Tactile sensitivity was expressed by fascination (e.g., Bob, who was extremely interested in the ears of his classmates and teachers) and aversion (e.g., Edward, who hated to be touched on the ears). Auditory sensitivity was noticed in terms of responses to shouting, which could include tantrums, crying or facial expressions.

Emotion. Bonding and sensory sensitivity are closely linked to emotion, which was the mental state most frequently observed by teachers. Almost all the students expressed anger, and a majority expressed happiness, sorrow, frustration and fear. Students also expressed contentment, love, enjoyment, laughter and excitement, as well as irritation, disappointment and stress.

Some students expressed a sense of custodianship, for example through judgements of right and wrong behaviour. Tom scolded his classmate when his classmate tore paper

during study time. Tom corrected his classmate's bad behaviour by threatening him, saying, 'I will ring up our teacher' (meaning, I will report you) although his teacher, Felicity, was present in the classroom.

7.2.2.2 Cognitive Mental States with Fluent Expression

The fluently expressed cognitive mental states were anticipation, memory, deception, self reflection and self regulation. Anticipation is closely related to memory because both mental states entail a projection of the self through time – anticipation projects into the future, and memory into the past (Section 5.3.2 in Chapter 5). Anticipation allows deception, which in turn allows self reflection, which in turn allows self regulation.

Anticipation. As Theory-of-Mind entails the ability to link mental states with behaviour it can be demonstrated through the ability of students with ASD to anticipate, to understand the consequences of their behaviour. Like other mental states, anticipation was linked to desire, here the desire to avoid punishment and gain praise.

Bob, for example, would often urinate in the drain hole on the bathroom floor and was told not to do so a number of times by his teacher, Betty. One day Betty followed him to the bathroom and looked in, where he was standing by the drain. He looked at her and said, 'I'm not going to do this. Don't be angry.'

Memory. Anticipation is linked to memory, as anticipation requires moving imagination forward through time, and memory requires moving imagination back to the past. Some students demonstrated an extraordinary memory concerning dates and graphics. Fred showed calendaric memory, for example by quickly predicting what day of the week will fall on 28 December 2050. Jerry showed a strong graphic memory, expressed in his ability to make detailed drawings after a brief look at his subject.

Deception. Anticipation is also closely linked to deception, as anticipation involves understanding causal consequences and deception involves the desire to avoid particular consequences by hiding one's actions. When he was late to class George told his teacher that he had been to the bathroom, when in fact he was in the therapy room to see his favorite teacher.

Self Reflection. Some students expressed self reflection by confessing a wrong. This demonstrates logical imagination in thinking, the capacity to be aware of one's own mental representations. John and Peter confessed their wrong behaviour to their teachers

before being asked to do. After losing their tempers and being violent, Bob and Tom could speak of their misbehaviour.

Self Regulation. Some students demonstrated self regulating behaviour, motivated, for example, by promises they made. Brett, a food lover, had suffered an epileptic attack, and since then kept his promise to his mother to avoid eating after 6 p.m.

Fluency in the expression of mental states indicates the workings of logical imagination, which is central to Theory-of-Mind. As seen in Chapter 5, logical imagination travels along causal trajectories that enable students to understand the relationships between mental states and between mental states and actions. Fluency in expressing anticipation, for example, helps students with ASD navigate a world of social relationships in terms of understanding the consequences of behaviour, while fluency in expressing emotion allows them to communicate their emotions and their bonds with others. The next section looks at mental states characterised by impeded expression.

7.2.2.3 Mental States with Impeded Expression

Mental states with impeded expression refer to what students did not express, or did express, but with difficulty. Regarding *affective mental states*, teachers observed that students showed a lack of interest in peers. Students were much clearer in communicating their desire to be alone than their desire to be with others. When they did show interest in people, they tended to prefer people older than themselves, such as teachers. For example, they were more likely to greet their teachers in the morning than their peers.

Students with ASD found it difficult to express emotion, especially anger. Ian expressed anger through the expression in his eyes and by stuttering. Patrick did so by biting, hitting and kicking the people around him. Nicholas expressed anger by hitting his head against a wall. His teacher said Nicholas knew he should not self harm, but could not help himself.

Regarding *cognitive mental states*, one teacher said flexible thinking is difficult for students with ASD. Students could learn a skill but had difficulty applying it when a slight change was made. Processing verbal information was also difficult. An example given by one teacher concerns how she asked a student to bring a paper from a green file. He got the green file, then stood still holding it, not knowing what to do next.

Some students also had difficulties in expressing spatial perception. Kevin, for example, who according to his teacher had excellent working skills, had difficulty folding a box during working period, despite being shown a number of times.

Impeded expression of mental states indicates impediments in logical imagination, which in turn has implications for Theory-of-Mind, as it hinders experiencing one's own mental states and understanding those of others. Having discussed *what* mental states students expressed to their teachers, whether in a fluent or impeded way, this study now turns to teachers' observation of *how* students expressed their mental states.

7.2.3 How Mental States are Expressed

Teachers reported that their students' mental states were expressed verbally and non-verbally, sometimes fluently and sometimes with difficulty (Figure 7.5). Theory-of-Mind entails the understanding of behaviour on the basis of mental states. The fluent expression of mental states implies the fluent expression of Theory-of-Mind, as in one sense it is Theory-of-Mind itself that is being expressed. Impeded expression of mental states has other implications, including difficulty in expressing Theory-of-Mind or weakness in Theory-of-Mind.

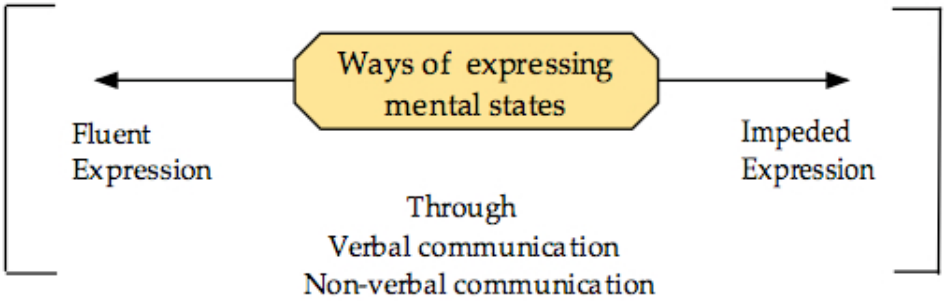


Figure 7.5 **Ways of expressing mental states**

7.2.3.1 Fluent Verbal Communication

Students fluently expressed desire, affection and emotion. Daniel spoke of what he wants to eat and do, and where he likes to go. Desire was also expressed through negative statements. For example, when Bob said, 'Won't touch ears', he meant, 'I want to touch ears.'

A teacher commented that students speak more often of their painful feelings than their pleasant ones. Coarse language conveyed anger or frustration, although not necessarily directed to a person. For example, George had the ritual of filling his glass to the very top, and sometimes he spilt some water. Once when this happened at the school cafeteria, a teacher lectured him. George swore and the teacher punished him, assuming this language was directed towards him. George responded by screaming, jumping up and down, and kicking the door.

Students often repeat questions in order to hear what they want or expect to hear. One teacher, for example, spoke of two of his ex-students who rang him two or three times a month to ask him the same questions, in one instance about the subway and bus routes, and in the other instance about students and teachers at school.

7.2.3.2 Fluent Non-Verbal Communication

Students with ASD were seen to fluently communicate a range of mental states non-verbally. Desire and aversion, for example, were sometimes expressed physically. David and John seized and ate what they wanted without speaking. Daniel would stand still or cover his face with a cloth when asked to do what he wanted to avoid.

Most teachers pointed out that students have strong desires to follow certain routines, and they become very agitated when they cannot. Chris, for example, liked his work to be tidy and threw away paper that contained a writing error, rather than erasing it. Desire was also expressed by obsessive interests in various forms of behaviour, including staring at anything spinning, spitting on tissues, competing during work periods to be the first to finish a project, and with particular types of food.

Affection towards classmates was expressed by a small number of students, through hugging and touching. Affection towards teachers was expressed by giving them a snack, and greeting them.

Students with ASD were also seen to communicate emotions non-verbally. Positive emotions were expressed through smiling, walking to and fro in the classroom, and laughing loudly. Negative emotions were expressed though a variety of behaviours, for example turning one's face away, avoiding eye contact, crying, silence and refusal to go to school. They were expressed at a stronger level in compulsive behaviour, violence and tantrums.

Compulsive behaviour included wiping the bathroom basin while brushing one's teeth and repetitively holding and releasing a door knob. Violent behaviour included hitting other people, taking off people's socks and throwing them out of the school bus, screaming and kicking doors.

Tantrums, reported by half the teachers, also expressed negative emotions. Tantrums were motivated by such events as physical tiredness, miscommunication, exposure to loud sounds, fear and having routines disrupted.

7.2.3.3 Impeded Verbal Communication

Students usually failed to initiate conversation. For example, even though Chris looked sometimes happy and sometimes disturbed he did not express his emotion verbally until his teacher asked, 'So, how do you feel now?' and then he replied with a single word.

It was rare for students with ASD to communicate with their peers, even when teachers deliberately sat verbally fluent students together. Jenny commented that this lack of communication between students with ASD seems to be because they do not normally initiate conversation but respond to it, and it is difficult to stimulate communication between non-initiators.

Usually only situations involving a sense of urgency, such as when they experienced frustration, or when other students misbehaved or were injured, would stimulate verbal communication. Other forms of impeded verbal communication included the use of echolalia, humming and mumbling.

7.2.3.4 Impeded Non-Verbal Communication

Examples of impeded non-verbal communication provided by teachers included a reluctance to make eye contact, lack of interaction with peers, and failing to offer help to peers. Half of the teachers talked about the difficulty their students had in making and maintaining eye contact, reporting that they did so only when asked. While initiating eye contact was difficult for them, maintaining it was even more difficult.

The most interactive behaviour that students demonstrated was copying answers from other students, but even then they copied without communicating. Teachers spoke about the issue of students with ASD looking after their peers. Most doubted that such behaviour was genuine, because they offered help to their fellow students only when asked to do so by a teacher. But when they were asked, they were sincere in fulfilling their role.

Such issues as this show how the degree of fluency or difficulty with which students with ASD express their mental states affects their teachers' perceptions of their Theory-of-Mind. There is an intimate connection between communication and Theory-of-Mind. When teachers saw that mental states are not being fluently communicated, they were likely to assume a weakness or absence in what in this study is called Theory-of-Mind.

7.2.4 Expressing Understanding of Others' Mental States

Teachers reported their observations of how their students with ASD expressed their understanding of the mental states of others. These expressions can also be classified as lying along a spectrum from fluent to impeded. Students were able to fluently express their understanding of the desire and visual perception of others. Some students also clearly demonstrated intentional observation (i.e., deliberately watching what's happening around them) and the ability to read social cues. However, they found some things difficult to understand, for example the emotions of others, and the ability to differentiate between a joke and the literal truth (Figure 7.6). The understanding of the emotions of others was characterised by both fluent and impeded expression, depending on circumstances.

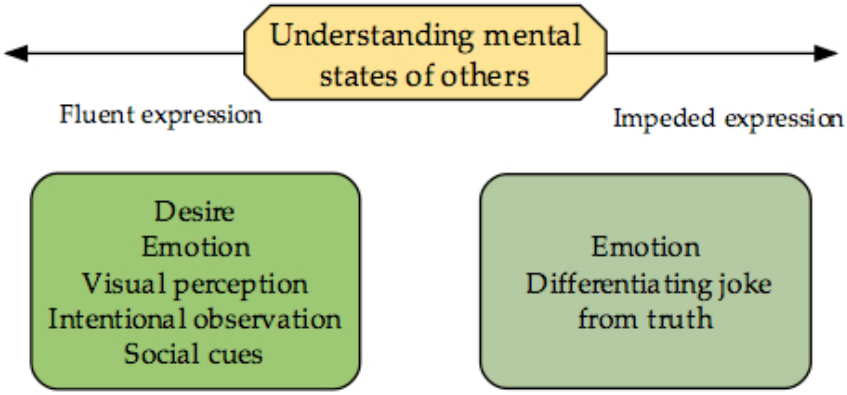


Figure 7.6 **Understanding the mental states of others**

7.2.4.1 Fluent Expressions

Desire. Some teachers believed their students with ASD clearly understood what their teachers wanted from them – for example, paying attention in class and returning to class on time after breaks.

Emotion. Of the 11 teachers, nine reported their students understood their teachers' anger, while one teacher reported that her students also knew when she was happy. Another teacher said that once they got to know each other, her students could differentiate her real anger from pretended anger. Some students were reported as understanding the affection felt for them by their teachers. In contrast to their sensitivity to teachers, fewer than half the teachers claimed that students could recognise the emotions of their peers.

Visual Perspective. An example of the workings of visual perception was given by Edward's teacher, who demonstrated to him a working skill involving the concept of left and right. As the teacher was facing Edward, repeating the demonstration required that he could understand different visual perspectives, and in fact Edward successfully repeated the task. This is similar to the elephant task, where the student is required to recognise the difference in perspective regarding upside down and right side up between two people sitting opposite, except that in this case the task was more complicated, as it also involved recognising left and right.

Intentional Observation. Three teachers said that while their students appeared to be indifferent to others, they actually observed what was happening around them. For example, Chris did not interact with his peers, but when asked by his teacher he knew who among his classmates came to school that day, and who missed the school bus.

Social Cues. Some students expressed their ability to read social cues in particular social situations. Chris, for example, was good at singing rap music. In school karaoke he was given the microphone to sing his part, and then voluntarily handed the microphone back after his turn was over. He read the social cues and responded appropriately.

7.2.4.2 Impeded Expressions

Teachers reported that students with ASD generally showed little interest in the emotions of their peers. They were most likely to demonstrate understanding of more obvious emotions, such as anger, but rarely expressed an understanding of happy emotions and more subtle moods.

Students also had difficulty in differentiating between jokes and literal truth. Brian reported watching an exchange between Kevin, one of his students with ASD, and another teacher when teachers and students were gathered at the bus stop after school. Brian and the second teacher were friends, and this teacher was joking with Brian's student, Kevin.

He laughingly asked Kevin to email him in the evening. Kevin became very serious. He did not have this teacher's email address, was too shy to ask, and was in a quandary about what to do. Also, when Peter's teacher made a joke, he took the words literally and became serious and anxious, and then screamed.

7.2.5 Expressions of Developmental Changes

Teachers have been part of the school lives of their students with ASD over a number of years, and some have been class teachers of particular students for more than a year. As a result, they witnessed the developmental changes undergone by their students, both progressive and regressive (Figure 7.7).

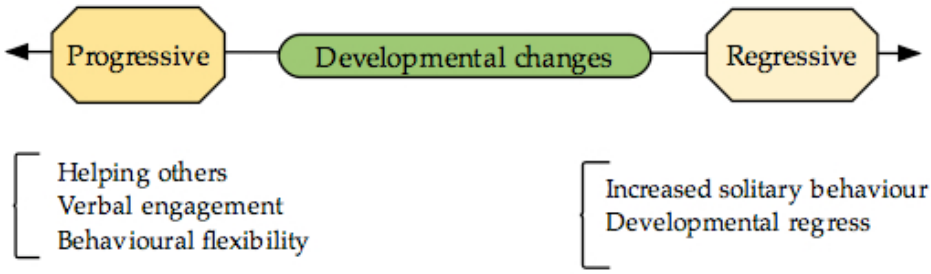


Figure 7.7 **Expressions of developmental changes**

Progressive changes. Progressive changes were expressed through helping others, verbal engagement and behavioural flexibility. These changes indicate improvements in awareness of mental states and their links to behaviour – in other words, improvements in Theory-of-Mind.

Bob was very solitary, but when he was asked by his teacher to help prevent a classmate from running away while the teacher was absent, Bob physically held his classmate, to fulfil his duty. Cathy, his teacher, said that even though he did this only when asked, it constituted a big difference in his social engagement. Edward showed progress in his verbal engagement. He was seen to speak more often and express his desires much more clearly than he had previously.

Behavioural flexibility was another area where progressive changes were noticed. Chris, for example, was obsessive with following and completing his routines. Jenny, his classroom teacher three years previously, commented that at that time he would never have accepted being interviewed because the interviews necessarily disrupted his normal daily

routine. At the time of the study, in contrast, he could even accept his own mistakes, and did not need to finish whatever task was given to him.

Regressive Changes. Some teachers also reported regressive developmental changes in their students. Peter's solitary behaviour had increased since the previous year. Nicholas had regressed developmentally since primary school, and often had difficulty understanding what was said to him and the social situations around him.

7.2.6 Teachers' Beliefs Regarding their Students' Developmental Potential

Teachers expressed a variety of views regarding the developmental potential of their students with ASD. They spoke of the pattern of development they saw in their students, and what they thought was required to maximise the developmental opportunities of their students. A major problem they identified for their students was their difficulties with communication. Some teachers spoke of the continuum of individual differences in Theory-of-Mind among them (Figure 7.8). While the teachers did not use the term, 'Theory-of-Mind' is used here as shorthand for their observations of the expressions of mental states that this study calls the components of Theory-of-Mind.

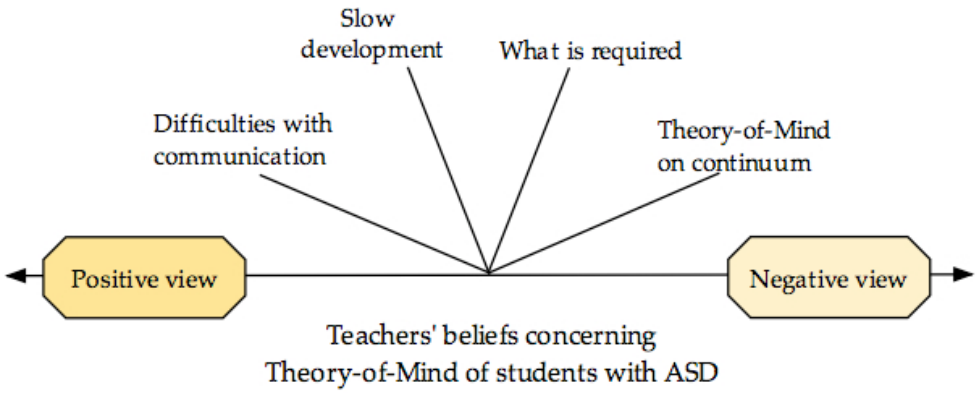


Figure 7.8 **Teachers' beliefs regarding students' developmental possibilities**

Difficulties with Communication. Most teachers believed in the potential for development in their students' Theory-of-Mind. Felicity said, 'Students already have emotional bonds and social relationships, and it is a matter of bringing them out. The reason it looks like students do not have these qualities is because of their indifference or their inability to express them explicitly.'

Lack of expression was highlighted by Betty who commented that ‘expressing an emotional bond is a problem for everyone, regardless of their tendency to ASD’, so learning how to express one’s mind is important for everyone. Jenny said, ‘Students with ASD are not very different from those without ASD. One major difference in students with ASD is the difficulty in finding the right methods to communicate. However, communication problems can be solved with an open mind and genuine interest.’

Brian said, ‘Sharing one’s mind is possible, but it is difficult to develop and express in an environment surrounded by peers with similar disabilities.’ He also said that when he reflected on his relationship with his students with ASD he could see it was essentially one way, confined to him giving orders and his students obeying. He now saw the need to change the dynamic of his relationships with his students.

Slow Development. Half of the teachers characterised the pattern of development and learning for students with ASD as one of slowness. Frederick referred to the development of students with ASD as ‘stillness within movement’. He said, ‘Like the hands of clock, development does not like to happen but it does, steadily and slowly.’ Emma said, ‘It is difficult to estimate how much development students are going to achieve. Development itself is slow, but it is sure.’

What is Required. Teachers pointed out two major factors required to facilitate developmental changes in students. The first was external help, including intensive, active and repetitive education. Betty said it is difficult for students with ASD to develop ways to express themselves unaided, but it would be possible with external help. Jenny agreed, while Diane said teachers require relevant programs in intensive education to allow students to express themselves and learn to be socially connected.

The second factor identified by teachers was a supportive environment, including human resources. Emma, for example, said it is crucial to provide an appropriate living environment, such as a small community, along with programs designed to help students with ASD to communicate with each other. Dennis said of his student Fred that he will need people to coach him in social interaction after he leaves school. Brian said that teachers, including himself, need to change their attitudes towards their students, communicating with them rather than just telling them what to do.

Theory-of-Mind Continuum. Two teachers spoke of the variations in Theory-of-Mind they observed among their students. Jenny compared her two students, Chris and

George. Chris expressed his emotions well, showed an interest in his classmates and helped them out. He also made a breakthrough in terms of his insistence on his routine. George, in contrast, did not express his emotions or show an interest in his peers, but he enjoyed the affection of his teachers and was even able to practice deception, by telling Jenny a naïve lie. Frederick used the metaphor of the light spectrum, with the variety of colours representing the variety of similarities and differences in the minds of students with ASD.

Section 7.2 began with the emergence of 'expression' as the core category that emerged from grounded theory analysis of the qualitative data gathered from teachers concerning the Theory-of-Mind of their students with ASD. It examined the ways in which students express their own mental states and their understanding of the mental states of others, as seen and understood by their teachers. Finally, the varied views expressed by teachers of their students' developmental possibilities were described. The next section goes on to analyse the quantitative data regarding students' Theory-of-Mind that was provided by teachers in a questionnaire.

7.3 Outside-In: Teachers' Understanding from Quantitative Data

7.3.1 Introduction

A questionnaire was used to examine teachers' understanding of the Theory-of-Mind of their students with ASD (Appendices B1 and B2 for English and Korean versions). A new questionnaire was developed for this study because no other instrument was available for the purpose. The process of constructing the Teacher Questionnaire began with the composition of statements designed to gather information about teachers' understanding of their students' Theory-of-Mind (Section 4.4.2 in Chapter 4).

The questionnaire was divided into open questions and closed statements, with the open questions providing part of the qualitative data that was examined in Section 7.2. This section concerns the quantitative data derived from the closed statements in the teacher questionnaire, which was used to triangulate the results of the qualitative data analysis (Section 7.2). The closed statements were statements regarding Theory-of-Mind of students with ASD to which teachers could indicate levels of agreement or disagreement using Likert scales from one to five.

An expert check was conducted as a pilot test and validity check. After administering the questionnaire, exploratory factor analysis was conducted to extract the underlying common factors. Six factors were extracted: (1) experiencing one's own mental states; (2) understanding the mental states of others and one's own mental states concerning others; (3) cognitive and social aspects of mental states; (4) sensory perception; (5) bonds with animals; and (6) information processing and developmental regression of Theory-of-Mind. Of these, the first four were predominant. These components were then used to guide the analysis of the teacher questionnaire, as discussed in the following sections.

After the in-depth interviews the questionnaire was distributed to 12 teachers, 11 from the main study and one from the pilot study. Teachers were given the option of filling out the questionnaire more than once if the level of generalisation entailed in using one questionnaire failed to communicate the diversity they saw in their students. As a result, this study analyses a total of 15 responses to the questionnaire, each of which constitutes a case. It is important during the following analysis to remember that the numbers cited are not those of teachers, of whom there are 12, but of cases, of which there are 15.

The questionnaire was analysed using descriptive statistics, frequency distributions and percentages. The results of the analysis are presented in the following sections, through cross-tabulations and tables. The following six sections discuss the results of the analysis of the teacher questionnaire, organised according to the common components extracted from exploratory factor analysis, and preceded by the demographic profiles of teachers.

7.3.2 Demographic Profiles of Teachers

The majority of teachers participated in this study were female in their 30s, held a Bachelor of Arts degree, and had between 10 and 14 years of teaching experience. Table 7.1 shows age and gender data, and Table 7.2 shows years of teaching and educational background. The numbers in tables refer to cases, not to teachers.

Table 7.1 ***Demographic Background of Teachers***

		Gender		
		Male	**Female**	**Total**
Age	21-29	1	2	3
	30-39	2	9	11
	40-49	0	1	1
	Total	3	12	15

A total of seven teachers had between 10 and 14 years teaching experience, and five teachers had less than four years of teaching experiences (Table 7.2). This means that more than half of the teachers have taught students with disabilities for longer than 10 years. All teachers had a BA with majors in special education, and two teachers had a Masters degree in education, with majors in special education.

Table 7.2 ***Educational Background of Teachers***

		Degree		
		BA	**MEd**	**Total**
Years of teaching	1-4	5	0	5
	5-9	1	1	2
	10-14	7	0	7
	20-24	0	1	1
	Total	13	2	15

7.3.3 First Factor Statements – Experiencing One's Own Mental States

As explained in Section 7.3.1, exploratory factor analysis resulted in six factors being extracted: (1) Experiencing one's own mental states; (2) understanding the mental states of others and one's own mental states concerning others; (3) cognitive and social aspects of mental states; (4) sensory perception; (5) bonds with animals; and (6) information processing and developmental regression of Theory-of-Mind. The following sections present these factors.

The first factor extracted by exploratory factor analysis was drawn from 10 statements from teachers regarding students' own mental states (Table 7.3). Teachers' views on these statements are presented below.

Table 7.3 ***First Factor Statements – Students' Mental States***

Question number	Statement topic
Q 32	I think that students with ASD process information differently from their peers without ASD.
Q 3	I think that students with ASD do not feel sorrow.
Q 4	I think that students with ASD do not feel happiness.
Q 5	I think that students with ASD do not feel anger.
Q 6	I think that students with ASD do not feel fear.
Q 7	I think that students with ASD do not feel loneliness.
Q 8	I think that students with ASD can develop strong emotional bonds with people.
Q 33	I think that for students with ASD, the ability to understand that people act on the basis of mental states, such as intention, desire, emotion, belief and thought, can develop over time.
Q 19	I think that students with ASD are extremely sensitive regarding one or more of the physical senses of seeing, hearing, touching, tasting and smelling.
Q 25	I think that students with ASD can develop a sense of belonging.

Differences in Information Processing. Teachers were asked about their perceptions of differences between the way students with ASD and typically developing children process information. Most cases agreed that students show such differences, although there were some disagreements (Table 7.4).

Table 7.4 ***Individual Differences in Information Processing***

	Students with ASD process information differently	
	Frequency	**Percent**
Strongly agree	3	20.0
Agree	8	53.3
Neutral	0	0
Disagree	2	13.3
Strongly disagree	2	13.3
Total	15	100.0

Feelings. Most cases agreed that students with ASD experience feelings of happiness, sorrow, anger, fear and loneliness (Table 7.5). Three cases were neutral in regard to loneliness.

Table 7.5 ***Students' Feelings***

Students with ASD feel …	**sad**	**happy**	**angry**	**frightened**	**lonely**
	Frequency				
Strongly agree	8	7	6	6	3
Agree	3	4	5	5	6
Neutral	0	0	0	0	3
Disagree	2	2	2	2	2
Strongly disagree	2	2	2	2	1
Total	15	15	15	15	15

Bonds and Theory-of-Mind. Table 7.6 shows teachers' understanding of their students' capacity to develop bonds with people and develop their Theory-of-Mind. While there were some disagreements, a majority of cases agreed that students with ASD could develop these capacities.

Table 7.6 ***Capacity to Develop Bonds and Theory-of-Mind***

	Students with ASD can develop bonds with people		**Students with ASD can develop Theory-of-Mind**	
	Frequency	**Percent**	**Frequency**	**Percent**
Strongly agree	4	26.7	4	26.7
Agree	5	33.3	6	40.0
Neutral	2	13.3	0	0
Disagree	3	20.0	4	26.7
Strongly disagree	1	6.7	1	6.7
Total	15	100.0	15	100.0

Sense of Belonging. Finally, as shown in Table 7.7, most cases were in agreement that students with ASD can develop a sense of belonging.

Table 7.7 ***Capacity to Develop a Sense of Belonging***

	Students with ASD can develop a sense of belonging	
	Frequency	**Percent**
Strongly agree	2	13.3
Agree	7	46.7
Neutral	0	0
Disagree	5	33.3
Strongly disagree	1	6.7
Total	15	100.0

In summary, teachers were generally positive in their assessments of their students' inner lives and capacity to develop further. Discussion will follow at the end of Section 7.3.

7.3.4 Second Factor Statements – Understanding Others

The questionnaire contains 10 statements relating to factor two, the beliefs held by teachers regarding the understanding that students with ASD have of others (Table 7.8). Teachers' views on these statements are presented below.

Table 7.8 ***Second Factor Statements – Understanding Others***

Question number	Statement
Q 16	I think that students with ASD do not understand the desires of others.
Q 17	I think that students with ASD do not understand the beliefs of others.
Q 18	I think that students with ASD do not understand the thoughts of others.
Q 15	I think that students with ASD do not understand the intentions of others.
Q 14	I think that students with ASD do not understand the emotions of others.
Q 2	I think that for students with ASD, the ability to understand that people act on the basis of mental states, such as intention, desire, emotion, belief and thought, does not change over time.
Q 1	I think that students with ASD do understand that people act on the basis of mental states, such as intention, desire, emotion, belief and thought.
Q 12	I think that students with ASD can understand the mental states of others if they can understand their own mental states.
Q 13	I think that students with ASD understand the mental states of others better if they can understand their own mental states.
Q 11	I think that students with ASD want to be understood by other people.

Understanding Mental States of Others. Table 7.9 shows teachers' beliefs concerning the understanding held by their students with ASD regarding the mental states of others, including intention, desire, emotion, belief and thought. The majority of cases agreed that students with ASD do understand these mental states, although compared with the first factor, students' experience of their own mental states, more cases chose neutral.

Table 7.9 ***Understanding the Mental States of Others***

Students with ASD understand others' …	**desire**	**belief**	**thought**	**intention**	**emotion**
	Frequency				
Strongly agree	3	2	2	3	3
Agree	7	6	6	6	7
Neutral	4	6	3	4	5
Disagree	1	1	4	2	0
Strongly disagree	0	0	0	0	0
Total	15	15	15	15	15

Mental States Influence Behaviour. Table 7.10 shows how teachers view the ability of their students with ASD to understand that the behaviour of others is influenced by their mental states, and whether they can develop this ability. Most cases were in agreement that students with ASD do have this understanding, although there were some disagreements and statements of neutrality.

Table 7.10 ***Understanding that Mental States Influence Others' Behaviour***

	Students with ASD can understand that others are influenced by their own mental states		**Students with ASD can develop the capacity to understand that others are influenced by their own mental states**	
	Frequency	**Percent**	**Frequency**	**Percent**
Strongly agree	4	26.7	5	33.3
Agree	4	26.7	6	40.0
Neutral	4	26.7	0	0
Disagree	3	20.0	4	26.7
Strongly disagree	0	0	0	0
Total	15	100.0	15	100.0

Desire to be Understood by Others. Table 7.11 shows teachers' views on the desire of their students with ASD to be understood by others. A variety of views were expressed, with no majority forming.

Table 7.11 ***Desire to be Understood by Others***

	Students with ASD desire to be understood by others	
	Frequency	**Percent**
Strongly agree	3	20.0
Agree	4	26.7
Neutral	2	13.3
Disagree	4	26.7
Strongly disagree	2	13.3
Total	15	100.0

Understanding Mental States of Others. Table 7.12 shows teachers' views on the relationship between the understanding held by their students with ASD of their own mental states and their understanding of the mental states of others. On the question of whether students could understand the mental states of others if they understood their own mental states, six cases were in agreement, five in disagreement, and four were neutral. Meanwhile, eight cases agreed that students would understand the mental states of others better if they understood their own.

Table 7.12 ***Understanding Mental States of Others***

	Students with ASD understand mental states of others if own mental states are understood		Students with ASD understand mental states of others better if own mental states understood	
	Frequency	**Percent**	**Frequency**	**Percent**
Strongly agree	2	13.3	3	20.0
Agree	4	26.7	5	33.3
Neutral	4	26.7	2	13.3
Disagree	4	26.7	5	33.3
Strongly disagree	1	6.7	0	0
Total	15	100.0	15	100.0

To sum up, while there were some disagreements, the majority of cases agreed that students with ASD can understand the mental states of others. Similarly, a majority agreed that students with ASD understand that other people behave on the basis of their own mental states, and a large majority agreed they can continue to develop this capacity in the future. However, only a small majority agreed there is a positive relationship between students' capacity to understand their own mental states and their capacity to understand the mental states of others. Discussion will follow at the end of Section 7.3.

7.3.5 Third Factor Statements – Mental States in Relation to Cognition and Social Function

The third factor extracted from exploratory factor analysis of the Teacher Questionnaire concerns mental states that are related to cognition and social function (Table 7.13). Cognitive mental states concern the link between intention and action, the perception of being different, false belief, and patterns of thinking. Socially related mental states are desire for friendship and eye contact. Teachers' beliefs about these questions are presented below.

Table 7.13 ***Third Factor Statements – Mental States and Cognition and Social Function***

Question number	Statement
Q 29	I think that if students with ASD can understand their intention to engage in a certain behaviour, they can better understand the intentions of others who are engaging in the same behaviour.
Q 28	I think that if students with ASD can understand their intention to engage in a certain behaviour, they can understand the intentions of others engaging in the same behaviour.
Q 24	I think that students with ASD feel different from their peers without ASD.
Q 30	I think that students with ASD think in pictures.
Q 26	I think that students with ASD understand that reality and their beliefs about reality can be different.
Q 27	I think that students with ASD understand that reality and other people's beliefs about reality can be different.
Q 10	I think that students with ASD want to have friends.
Q 23	I think that students with ASD make eye contact.

Link between Intentions and Actions. Table 7.14 shows the relationship between understanding the link between one's own intentions and actions and those of others. A total of 10 cases agreed that students with ASD can understand the link between the intentions and actions of others if they understand the same relationship within themselves, while 11 cases agreed that they could improve their understanding of this relationship in others if they could understand it within themselves.

Table 7.14 ***Intentions and Actions***

	Understanding link between intention and action in self and others		Understanding link between intention and action enables improved understanding of others	
	Frequency	**Percent**	**Frequency**	**Percent**
Agree	10	66.7	11	73.3
Neutral	2	13.3	2	13.3
Disagree	3	20.0	1	6.7
Strongly disagree	0	0	1	6.7
Total	15	100.0	15	100.0

Perception of being Different. While eight cases agreed that students with ASD feel they are different from their peers without ASD, four disagreed and three offered no opinion (Table 7.15). Similarly, five cases did not express an opinion on whether or not students with ASD think in pictures, while six agreed and four disagreed.

Table 7.15 ***Perceptions of Difference and Thinking in Pictures***

	Students with ASD perceive themselves to be different		Students with ASD think in pictures	
	Frequency	**Percent**	**Frequency**	**Percent**
Strongly agree	1	6.7	1	6.7
Agree	7	46.7	5	33.3
Neutral	3	20.0	5	33.3
Disagree	4	26.7	3	20.0
Strongly disagree	0	0	1	6.7
Total	15	100.0	15	100.0

False Belief. Table 7.16 shows how teachers view the understanding held by their students with ASD concerning the difference between beliefs and reality, both in themselves and in others – in other words, false belief, traditionally regarded as the litmus test for Theory-of-Mind. A total of seven cases were in agreement that students with ASD understood false belief within themselves, while five cases agreed they understood it in others. The figures for cases that did not express an opinion are six and seven, respectively.

Table 7.16 ***False Belief of Self and Others***

	Students with ASD understand own false belief		**Students with ASD understand false belief of others**	
	Frequency	**Percent**	**Frequency**	**Percent**
Strongly agree	1	6.7	1	6.7
Agree	6	40.0	4	26.7
Neutral	6	40.0	7	46.7
Disagree	2	13.3	3	20.0
Total	15	100.0	15	100.0

Desire for Friendship and Eye Contact. Table 7.17 shows the views of teachers regarding their students' desire for friendship and their capacity for eye contact with others. Only six cases agreed that students with ASD want to have friends, four disagreed and five expressed no opinion. Like desire for friendship, teachers expressed a variety of views regarding whether their students with ASD can make eye contact. While seven cases agreed students with ASD can make eye contact, six disagreed and two were neutral.

Table 7.17 ***Desire for Friendship and Eye Contact***

	Students with ASD desire for friendship		**Students with ASD make eye contact**	
	Frequency	**Percent**	**Frequency**	**Percent**
Strongly agree	1	6.7	2	13.3
Agree	5	33.3	5	33.3
Neutral	5	33.3	2	13.3
Disagree	3	20.0	4	26.7
Strongly disagree	1	6.7	2	13.3
Total	15	100.0	15	100.0

In summary, with the exception of false belief, the results suggest most teachers believed that their students with ASD have the capacity to understand cognitive mental states. Regarding false belief, even though more cases agreed than disagreed that students with ASD can understand false belief, others were undecided. Discussion will follow at the end of Section 7.3.

7.3.6 Fourth Factor Statements – Sensory Perception

The fourth factor extracted from exploratory factor analysis concerns sensory perception (Table 7.18). A total of three statements made up this factor, involving sensory insensitivity, sensory overload and differences in sensory perception compared to peers without ASD.

Table 7.18 ***Fourth Factor Statements – Sensory Perception***

Question number	Statement
Q 20	I think that students with ASD are extremely insensitive regarding one or more of the physical senses of seeing, hearing, touching, tasting and smelling.
Q 21	I think that students with ASD experience the physical senses of seeing, hearing, touching, tasting and smelling in a mixed or jumbled way.
Q 22	I think that students with ASD process sensory information (seeing, hearing, touching, tasting and smelling) differently from their peers without ASD.

A total of 10 cases agreed that students with ASD experienced sensory overload and had different sensory perception compared to their peers (Table 7.19). A total of five cases agreed that students experience sensory insensitivity, while six disagreed and four were neutral.

In summary, there was equal division regarding whether students with ASD experience insensitivity regarding sensory perception, while the majority belief is that they experience sensory overload and different sensory perception from their peers without ASD.

Table 7.19 ***Sensory Perception***

	Students with ASD experience sensory insensitivity		Students with ASD experience sensory overload		Students with ASD experience have different sensory perception from peers without ASD	
	Frequency	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Strongly agree	2	13.3	3	20.0	1	6.7
Agree	3	20.0	7	46.7	9	60.0
Neutral	4	26.7	3	20.0	3	20.0
Disagree	5	33.3	2	13.3	2	13.3
Strongly disagree	1	6.7	0	0	0	0
Total	15	100.0	15	100.0	15	100.0

7.3.7 Fifth and Sixth Factor Statements – Emotional Bonds, Information Processing and Regression

Of the six factors generated by factor analysis, the major four have been presented above. The final two factors concern the capacity of students with ASD to develop emotional bonds with animals, the differences in their information processing in comparison with their peers without ASD, and the possibility of regression in their understanding of human behaviour based on mental states (Table 7.20).

Table 7.20 ***Fifth and Sixth Factor Statements – Emotional Bonds, Information Processing and Regression***

Factor	Question number	Statement
Factor 5	Q 9	I think students with ASD can develop strong emotional bonds with animals.
Factor 6	Q 31	I think students with ASD process information differently from their peers without ASD.
	Q 34	I think that for students with ASD, the ability to understand that people act on the basis of mental states (such as intention, desire, emotion, belief and thought) can regress over time.

Regarding students' formation of emotional bonds with animals, six cases agreed that students with ASD can develop them, three disagreed and six expressed no opinion (Table 7.21). A total of nine cases agreed that students with ASD process information

differently from their peers without ASD, while nine cases disagreed that their students' understanding of human behaviour based on mental states can regress.

Table 7.21 ***Emotional Bonds, Information Processing and Regression***

	Students with ASD can develop emotional bonds with animals		Students with ASD process information differently		Students with ASD can regress in understanding actions	
	Frequency	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Strongly agree	2	13.3	2	13.3	1	6.7
Agree	4	26.7	7	46.7	3	20.0
Neutral	6	40.0	5	33.3	2	13.3
Disagree	2	13.3	1	6.7	8	53.3
Strongly disagree	1	6.7	0	0	1	6.7
Total	15	100.0	15	100.0	15	100.0

This section has presented the Theory-of-Mind of students with ASD as objectively understood by their teachers, based on the closed statements of the teacher questionnaire. Teachers' responses can be seen as forming two basic patterns. For example, more teachers agreed that their students with ASD could experience their own mental states than agreed they could understand the mental states of others. Teachers showed a wider spread of responses to their students' abilities to understand the minds of others, between agreement and disagreement, including frequent choices of neutral. This pattern of a wider spread of responses combined with frequent choice of neutral indicates a greater level of uncertainty and disagreement in the minds of teachers regarding these aspects of Theory-of-Mind.

The same patterns were shown when teachers' beliefs regarding their students' ability to experience affective mental states, such as the emotions of sadness, anger and happiness (i.e., general agreement) is compared to their belief regarding their students' ability to experience cognitive mental states, such as false belief (i.e., a wide spread of responses and frequent choice of neutral). Finally, these same patterns were shown when teachers' beliefs regarding their students' future potential for Theory-of-Mind development (i.e., general agreement) is compared to their belief regarding their students' current Theory-of-Mind abilities (i.e., a wide spread of responses and frequent choice of neutral).

In brief, teachers were more confident and united regarding their students' experience of their own mental states, of affective mental states, and of their potential for the future, than they were regarding their students' understanding of the mental states of others, their cognitive mental states, and their current Theory-of-Mind abilities.

Section 7.2 has examined the understanding held by teachers of the Theory-of-Mind of their students with ASD disclosed by the qualitative data provided in interviews, document review and open questions in the Teacher Questionnaire. Section 7.3 went on to examine the quantitative data from the closed statements of the Teacher Questionnaire. The following section compares the qualitative and quantitative data to gain an over-all picture of teachers' understanding of their students with ASD.

7.4 Comparison between Teachers' Understanding of Students' Theory-of-Mind drawn from Qualitative and Quantitative Sources

Grounded theory analysis yielded five major categories held together by the core category, 'expression'. The connections between the core category and the other categories drew a picture of students' Theory-of-Mind seen from the perspective of their teachers. This picture showed the mental states that are expressed by students with ASD as well as how they are expressed, along with students' ability to understand the mental states of others. It also provided evidence of the developmental changes undergone by students with ASD, and the directions of these changes.

The core category 'expression' was found along a spectrum between three poles, fluent/impeded, progressive/regressive and positive/negative expression (Figure 7.3). Fluent/impeded expression refers to the way in which students expressed their mental states and their understanding of the minds of others, either fluently or with difficulty. Progressive/regressive expression refers to teachers' observations of their students' developmental potential. Positive/negative expression refers to teachers' broad views of their students with ASD, not confined to developmental potential.

This study found that each spectrum is a continuum, lacking clear, precise boundaries between fluent and impeded, progressive and regressive, positive and negative. Teachers' understanding of their students' Theory-of-Mind tends more towards the fluent/progressive/positive end of the spectrum than the impeded/regressive/negative end.

In other words, teachers observed abilities more frequently than difficulties in the Theory-of-Mind of their students. They also observed progressive changes more frequently than regressive changes. Further, teachers thought the difficulties that students experience in Theory-of-Mind are related to problems in communication, their students develop slowly, and their Theory-of-Mind shows wide variations between individuals.

The quantitative study yielded six factors summarising the 34 closed statements of the Teacher Questionnaire. These six factors were further reduced into four predominant factors, which represent teachers' understanding of their students' Theory-of-Mind. They cover students' experience of their own mental states, their understanding of the mental states of others, the cognitive and social aspects of mental states, and sensory perception.

While there were some disagreements, most cases believed that students with ASD experience their own mental states, understand those of others and can develop this understanding further. A small majority also believed that students with ASD understand both cognitive and social aspects of mental states. The results regarding whether students were insensitive to sensory perception were varied, while there was consensus that students experienced sensory overload.

In general, the qualitative data from teachers of students with ASD provided a greater depth of insight, and with more details, into individual students' Theory-of-Mind than the quantitative data. It did this through examples, stories and interpretations of behaviour. The quantitative results provided a wider view than the qualitative data, and showed the general trends of teachers' understanding regarding their students' Theory-of-Mind.

Teachers' understanding of their students' Theory-of-Mind, found from both qualitative and quantitative data analysis, revealed five common features. Teachers placed more emphasis on: (1) the capabilities rather than the difficulties in Theory-of-Mind of their students; (2) students' experience of their own mental states rather than their understanding of the mental states of others; (3) students' experience of affective mental states (e.g., affection and desire) rather than their experience of cognitive mental states (e.g., false belief and information process); (4) students' experience of solitary mental states (e.g., anger and sadness) rather than mental states with social implications (e.g., desire for friendship and loneliness); and (5) students' potential for progressive development in Theory-of-Mind rather than their potential for regressive development.

7.5 Conclusion

This chapter has examined the Theory-of-Mind of students with ASD as understood from the outside, looking in. It concerns teachers' understanding of the Theory-of-Mind of their students with ASD, based on observations over time. Both qualitative and quantitative data were analysed in accordance with a mixed methods design. This allows for the understanding held by teachers' regarding their students' Theory-of-Mind to be seen from different perspectives.

The qualitative data were collected using in-depth interviews with teachers, educational document reviews and open questions in the Teacher questionnaire. Data collected through these methods were analysed using a grounded theory approach, resulting in five major categories. The quantitative data were collected using 34 closed statements in the Teacher questionnaire, then grouped into factors and analysed using frequency distributions and percentages.

The results of both the qualitative and quantitative studies of teachers' understanding of their students' Theory-of-Mind show that teachers have more confidence in their students' experience of their own mental states, of affective mental states, and of their potential for the future, than their students' understanding of the mental states of others, their cognitive mental states, and their current Theory-of-Mind abilities. Teachers believe that communication is a major factor in students' difficulties with Theory-of-Mind understanding. They also believe that their students' Theory-of-Mind is characterised by slow development and a wide variety of individual differences.

This chapter has taken an outside-in approach to Theory-of-Mind, looking at the experiences of students with ASD from the perspectives of their teachers. To paint a complete picture, this view needs to be compared to the inside-out approach, looking at the experiences of students with ASD from their perspective. This will be discussed in the following chapter, Chapter 8 *Discussion*.

CHAPTER 8
DISCUSSION

8.1 Introduction

The present study proposes a new definition of Theory-of-Mind. Theory-of-Mind is the ability to experience one's own mind and understand the minds of others to the extent necessary to make sense of human behaviour and the world. Imagination on spectra plays an essential role in Theory-of-Mind by allowing shifts in perspective through time (i.e., one's own subjectivity) and space (i.e., inter-subjectivity). Degrees of Theory-of-Mind are characterised by degrees in the ability to use imagination. To the degree logical imagination predominates, experience is objective and sharable. To the degree associational imagination predominates, experience is subjective and private. This chapter seeks to draw together the threads of the present study, showing how this new definition of Theory-of-Mind has emerged from the data.

Reviewing previous Theory-of-Mind studies, this study has drawn attention to four issues (see Chapter 3 *Theory-of-Mind*): False belief has come to be seen as synonymous with Theory-of-Mind; undue emphasis has been placed on understanding the minds of others to 'credit' Theory-of-Mind; more value has been placed on performance in laboratory-designed Theory-of-Mind tasks than on lived experience; and the specific deficit approach to the study of Theory-of-Mind was seen to inadequately reflect the range of performances found within Theory-of-Mind tasks.

People with ASD have also expressed doubts about how Theory-of-Mind has been studied. Bovee (2000), for example, argued that studies of Theory-of-Mind in people with ASD impose upon them an obligation to think in the same way as people without ASD, without respecting their own ways of thinking. Nazeer (2006) questioned the reliability of false belief tasks because of the pressures they put on participants with ASD, creating anxieties that can influence their results.

Reflecting on these issues, this study returned to the roots of Theory-of-Mind study, which can be found in the philosophy of mind. The mind can be studied both subjectively (i.e., via phenomenology) and objectively (i.e., via psychology) (Nagel, 1986). Chalmers (1995), for example, distinguished between the phenomenal and psychological aspects of

mind. The phenomenal aspect of mind is characterised by how mind *feels*, while the psychological aspect is characterised by what mind *does*. The phenomenal aspect, how mind feels, is an essential aspect of mind, yet is difficult to study because of its individual, private nature.

The psychological aspect of mind is studied from outside, inferring the nature of the mind by examining behaviour. This is the approach that has characterised Theory-of-Mind studies. The phenomenal aspect of mind presents difficulties for the social sciences. Chalmers (1995) refers to the 'hard problem' (p. 3) of consciousness, the problem of understanding subjectivity itself in a way that satisfies the demands of objectivity. Chalmers (1999) and Nagel (1974) suggest that this difficulty can be overcome by studying subjective experience using communication supported by imagination, in order to approximate as much as possible an understanding of the subjective feel of experience. The gap between objective analysis and subjective experience can be reduced by imagination and communication, for as Nagel (1974) and Chalmers (1999) point out, although it is impossible to fully understand the experience of another, yet *some* understanding is always, in principle, possible.

On the basis of the issues raised above, and influenced by these philosophers, this study adopted a grounded theory approach as a means of investigating the lived experience of individuals with ASD. A grounded theory approach provides a way of understanding subjective experience through systematic and objective analysis (Charmaz, 2005). It is based on communication, facilitated in this study by giving participants the option of choosing their preferred mode of communication, whether speaking or writing. Their active involvement was elicited by inviting them to help create the materials used in interviews by drawing themselves and their friends and by actively acting out tasks. This research design was supported by the social model of disabilities and self-determination, concepts central to special education.

This study has been guided by five research questions. They are:

1. How do students with ASD experience their own minds and internal worlds?
2. How do students with ASD understand the minds of others and the external world?
3. How is the experience of one's own mind and internal world connected to the understanding of the minds of others and the external world?

4. How do educational professionals construe the Theory-of-Mind understanding of their students with ASD?
5. What are the similarities and differences between teachers' understanding of the Theory-of-Mind of their students with ASD and the subjective experiences of Theory-of-Mind held by those students?

After the overview of research questions and rationale provided by Section 8.1 *Introduction*, Section 8.2 *Inside-Out: Theory-of-Mind as Subjectively Experienced* discusses the implications of this study's findings with respect to the first two research questions (Figure 8.1). Section 8.3 *Theory-of-Mind: Its Continuum and Correlates* begins by examining the relationships between components of Theory-of-Mind within individuals with ASD, from which a *Theory-of-Mind continuum model* is proposed. It then examines students' IQ and social competence, the cognitive and social correlates of Theory-of-Mind, through objective measurements. Together, Sections 8.2 and 8.3 provide a complete picture of the Theory-of-Mind demonstrated by students with ASD in this study.

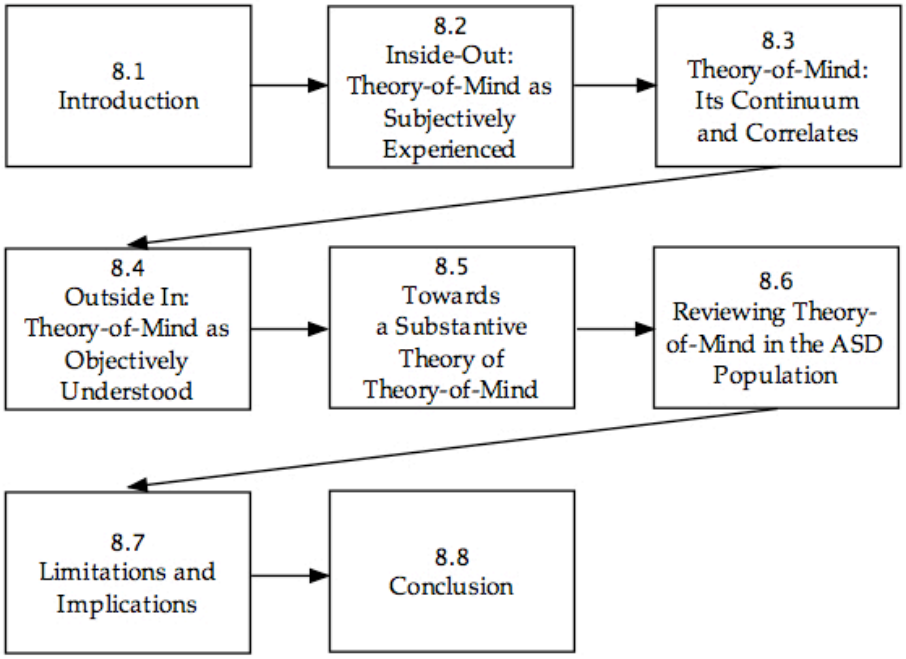


Figure 8.1 **Structure of chapter eight**

Section 8.4 *Outside In: Theory-of-Mind as Objectively Understood* discusses the fourth research question, how teachers understand their students' Theory-of-Mind. This is the outside-in aspect of the study. Section 8.5 *Towards a Substantive Theory of Theory-of-*

Mind addresses the fifth research question, the similarities and differences between Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers. From this emerges a *Typology of Theory-of-Mind*.

Section 8.6 *Reviewing Theory-of-Mind in the ASD Population* discusses the four issues raised at the beginning of this chapter on the basis of the results of this study. Section 8.7 *Limitations and Implications* first addresses the limitations of this study and then explores its implications for research into and evaluation of Theory-of-Mind, along with its potential for educational interventions for individuals with ASD. Section 8.8 *Conclusion* brings the thesis to a close with an overview of the Theory-of-Mind of the ASD population from both the inside-out and outside-in approaches.

8.2 Inside-Out: Theory-of-Mind as Subjectively Experienced

This section discusses the first two research questions, how students with ASD experience their own mind and understand those of others. Theory-of-Mind was found to be enabled by the work of imagination, the ability to shift from one perspective to another (Section 8.2.1). The work of imagination within mental states is shown in the perception of self and others as well as communication styles in students with ASD (Section 8.2.2).

8.2.1 Imagination

As mentioned in Chapter 5 *Theory-of-Mind as Subjectively Experienced by Students with ASD*, imagination was found to play a major role in experiencing one's own mind and understanding the minds of others as it allows an individual to adopt views of the self and others from more than a single perspective. This flexibility is vital to Theory-of-Mind. Imagination is always characterised by *movement*, as it crosses boundaries from one viewpoint to another, allowing shifts in visual, emotional and conversational perspectives. Imagination was found as a continuum along spectra, fluent/impeded and logical/associational. Finally, imagination was seen only when working with other mental states, the components of Theory-of-Mind that were uncovered in this study – thinking, memory, anticipation, visual perception, sensory responses, emotion, desire and affection.

8.2.1.1 Imagination within Thinking

In this study, imagination and thinking were found to be closely interrelated. Logical imagination was found to underlie logical thinking, indicated, for example, by appropriate understanding demonstrated in false belief tasks. Associational imagination was found to underlie thinking in association, indicated, for example, by trajectories of association based on selective attention along with a tendency to cling to sameness, which appeared as attachment to routines.

Thinking dominated by logical imagination follows socially shared trajectories and so tends to be comprehensible to others. Thinking dominated by associational imagination demonstrates a logic confined within the self, and tends to be incomprehensible to others. For example, when one student with ASD was shown the elephant picture during a task investigating visual perception he immediately said, 'Teacher, because an elephant is an animal, Daijin Bed, Simons Bed and Ace Bed.'

This answer can be taken to demonstrate a logic based on association. Daijin Bed company advertises their beds with an image of a bouncing elephant, and the elephant drawing reminded the student of the advertisement. This company was then associated in his mind with other bed companies. The immediacy of his response indicated fluent/associational thinking. From the perspectives of others, this response would make no sense without a knowledge of the Daijin Bed advertisements, while from the student's perspective it makes perfect sense. This illustrates both the privacy of associational thinking and its logic. Beginning with selective attention, where attention is taken by some particular aspect of the information available, associational thinking proceeds along trajectories of association. As in the above example, these trajectories often take the form of lists or categories.

During the course of the present study it was discovered that the concepts of logical and associational thinking that emerged from grounded theory analysis are very similar to two modes of thinking, logical and autistic, which were first introduced by the Swiss psychiatrist Eugen Bleuler to the Weimar Psychoanalytic Congress in 1911 (Harris, 2000). For Bleuler, logical thinking corresponds to reality and autistic thinking is dominated by free association, characterised by pretence, fantasy and wishful thinking. Bleuler regarded both forms of thinking to be universal. He regarded autistic thinking as characteristic of

people with schizophrenia, but he also felt that the difference between autistic thinking in people with schizophrenia and ordinary people is simply one of degree (Bleuler, 1951).

The significance of Bleuler's notions for this study is twofold. Firstly, the role of logical and associational thinking within individuals with ASD that has been uncovered by grounded theory analysis in the course of this study shares remarkable similarities with what Bleuler discovered regarding autism, a term he invented, over a century ago. Secondly, this study has concluded, along with Bleuler, that thinking in association – what Bleuler calls autistic thinking – is not confined to a particular population or disability, but is part of the universal human condition. This has implications for viewing Theory-of-Mind as a continuum rather than a specific deficit.

Imagination within thinking plays an important role in false belief tasks, the most common way for researchers to credit Theory-of-Mind to an individual. This will be discussed in the following section.

8.2.1.2 Imagination and False Belief

This study has found that imagination plays an important role in false belief tasks. Wimmer and Perner (1983) and Baron-Cohen, Leslie and Frith (1985) saw false belief tasks as a measurement of the ability to think about thinking, or Theory-of-Mind, and this study has established that thinking about thinking requires imagination.

This study investigated false belief using three false belief tasks: A changed contents task to examine students' understanding of their own false belief; and a changed contents and changed location task to examine students' understanding of the false belief of another. Details of these tasks are found in Chapters 4 and 5.

Students who demonstrated a recognition of their own false belief had to be able to shift perspective through *time*, from present to past and back again, to remember what they had thought was in the box and compare this mental image to their present perception. Students who demonstrated a recognition of the false belief of another had to be able to shift perspective across *space* to imagine how another person would see this situation, and compare this image to their actual perception.

Where students with ASD did not demonstrate a recognition of false belief, logical imagination was impeded to at least some degree. In the changed location task, for example, some students tried to open the box that now contained the biscuit, saying 'It's

here!' Seen from the context of the task's design, this answer is inappropriate. However, these students may have been responding from another context, in which their imagined friend was standing beside them and they were revealing the location of the biscuit. Their communication, in other words, may have been addressed to their friend rather than to the researcher, and in that context, more private than shared, demonstrated logical imagination.

However, when pressed on where their friend would think the biscuit could be found, students seemed to become embarrassed or confused and began providing answers such as 'Classroom' or 'Supermarket'. If their first answer could be seen as being characterised by logical imagination, even if not in a shared or social context, these succeeding answers indicated a shift to associational imagination. Students may have begun to selectively attend to the word 'biscuit' and associate from there (e.g., 'I had a biscuit in my classroom' or 'I saw biscuits in the supermarket'). Their original logical imagination may have been impeded rather than fluent, in that it could not be maintained under challenge.

The changed contents task also showed examples of the functioning of selective attention, which is the starting point of associational imagination. When asked, 'What did you think was inside this box before?' some students simply said, 'It's not there!' In this instance, they seemed to be attending only to the simple absence of the biscuit instead of to the wider, social context of the task.

These examples show different patterns of imagination which share a difficulty in holding images from the past together with present experience. Of course, this difficulty is not peculiar to people with ASD. Similar results were reported by Apperly, Back, Samson and France (2008) in a study of false belief abilities in adults without ASD. Although these adults did not demonstrate associational imagination, Apperly et al. (2008) reported 20 to 40 percent error rates found in adults without ASD, which they attributed to difficulties in 'holding this information in mind and using it to inform a subsequent judgement' (p. 1093). The difficulties experienced by students with ASD in such tasks can therefore be seen as a matter of degree.

Comparing the results of the present study with others, it can be pointed out that previous Theory-of-Mind studies have focused on the false belief of others, while this study found that the aspect of false belief most frequently understood by students with

ASD was their own. This result may indicate that a picture of false belief understanding within the ASD population that is limited to the false belief of others could be misleading.

IQ provides another point of comparison with previous Theory-of-Mind studies. This study is characterised by the low IQ scores of participants, with mean IQ score 48.65 and mean verbal IQ score 46.50 (Section 8.3 for details). Yet compared to other studies (e.g., Baron-Cohen et al., 1985; Perner et al., 1989), participants in this study performed better in false belief tasks. These results may have been influenced by the way materials were used to stimulate communication.

Previous studies investigating false belief using changed location tasks (e.g., Baron-Cohen et al., 1985; Ozonoff & Miller, 1995; Wellman et al., 2002) used dolls to represent the protagonists, so communication with participants revolved around the dolls. In this study students were actively involved by drawing themselves and a friend as protagonists, and moving the materials around themselves rather than having the researcher do it for them. Communication therefore revolved around the participants and their (imagined) friends rather than dolls. These differences may have made the tasks more interesting, and the communication more meaningful.

In conclusion, Theory-of-Mind entails the ability to experience mental states within oneself and understand them in others, and imagination enables the shifts in perspective that allow a person to understand themselves and others beyond the limitations of immediate experience. In terms of false belief, imagination is found in the ability to shift perspective across time (i.e., within one's own subjectivity) and space (i.e., within a shared realm of inter-subjectivity).

This study has found that students with ASD find it easier to experience mental states themselves than to understand them in others; in other words, their imagination works more privately than socially. Further, when false belief tasks are structured in such a way as to capture the interest and attention of participants, different results are likely to follow.

8.2.1.3 Imagination within Visual Perception

In this study, fluent/logical imagination within visual perception was characterised by ease in shifting visual perspectives between self and other, while impeded/logical and fluent/associational imagination were characterised by an inability to understand how

things appear from the perspectives of others. Visual perception was investigated using two tasks, the kettle and muffin task, and the elephant task (see Chapters 4 and 5 for details). The kettle and muffin task examined whether students could understand that people see different things depending on their location, and the elephant task examined whether students could understand that the same object appears differently when viewed from a different perspective.

In both tasks, more students demonstrated a recognition of the objects from their own perspective than could understand that a person looking from a different perspective would see something different. This result supports Falvell's (1985; 1999; 2004) concept of two levels of visual perception. The first is to understand that another person may not see the same object that one currently sees, and the second is to understand that objects present different appearances when viewed from different locations. The first level of perception is usually achieved by early preschool period children, and the second by preschool children.

In brief, as with the workings of imagination within false belief, this result indicates that in the area of imagination within visual perception it is easier to experience mental states within oneself than to understand them in others. It is further discussed in Section 8.3.

8.2.1.4 Imagination within Sensory Responses

Sensory responses are intimately connected to sensory perception. The ability to discuss one's likes and dislikes regarding sensory stimuli requires imagination to hold a mental image of the sense object and one's response towards it, based on a memory of past experiences. A clear sense of liking and disliking indicates fluent/logical imagination in sensory responses, while responding with the same answer to each question indicates fluent/associational imagination.

The majority of students with ASD demonstrated fluent/associational imagination in sensory responses. For example, asked 'Which smell do you like?' and 'Which smell do you dislike?' some students replied 'Shit!' to both questions. Here, students seemed to selectively focus on the word 'smell' and associate it with the word 'shit' without recognising the wider context revealed by the whole question. This indicates that the dominance of associational imagination, supported by selective attention, impedes the ability to experience and express mental states oneself.

8.2.1.5 Imagination within Emotion

Fluent/logical imagination within emotion was shown in this study by an ease in recognising emotions, one's own and others, in particular experiencing one's own empathy (i.e., *empathy of self*), and recognising the empathy of others for oneself (i.e., *empathy of others*). Fluent/associational imagination within emotion was characterised by selective attention and physical emotion, and difficulties in experiencing empathy and recognising sympathy.

Empathy of self. The expression of empathy demonstrates logical imagination within emotion. When asked, 'How do you feel when mum is sick?' the majority of students demonstrated fluent/logical imagination within empathy by replying with terms such as 'sad', 'bad' or 'cry'. Impeded/logical imagination was demonstrated by students being inconsistent in their answers, as when one student first answered 'Good', then changed to 'Can't go shopping', then changed again to 'Frightened'. Inconsistency in replies indicated a stronger level of associational imagination, as the mind moved in different trajectories depending on private associations invisible to the outside observer.

Empathy of others. Students were also asked about their ability to recognise when others feel empathy for them. When asked, 'How does mum feel when you are sick?' the majority of students provided answers that demonstrated fluent/logical imagination within the empathy of others.

Students with ASD were more likely to recognise the empathy of others when having a difficult rather than a pleasant time. Given that they also expressed unpleasant emotions more frequently and fluently than pleasant ones (Sections 5.3.5.2 and 5.3.5.5 in Chapter 5), this suggests that students with ASD may be more sensitive to unpleasant emotions than pleasant ones.

Associational imagination within emotion was indicated by selective attention and physical emotion. *Selective attention* was indicated when students focused on one aspect of a question which then became a starting point for a trajectory of association. For example, a student said, 'Sad' in response to the question, 'When do you feel happy?' and 'Crying' to the question, 'When do you feel glad?' *Physical emotion* was indicated when students used physical terms such as 'smile' and 'pretty' to express pleasant feeling, and terms such as 'crying', 'sick', 'tremble' and 'hit' to express unpleasant feeling.

As discussed above, this study has shown that students with ASD demonstrated varying levels of ability in understanding emotions, whether from their own perspectives or those of others. A majority of students with ASD demonstrated the experience of empathy and a recognition of empathy from others. Those who had difficulties in this area showed a dominance of associational imagination in their responses. Further, students tended to show more sensitivity to unpleasant emotions than to pleasant ones.

As mentioned at the start of this section, Theory-of-Mind entails the capacity to experience mental states within oneself and understand them in others. This requires imagination, an ability to shift from one perspective to another, and imagination works within emotion to allow an understanding of the affective aspect of one's own mind and those of others. Emotion is therefore an essential aspect of Theory-of-Mind. Hobson (1993) has also drawn attention to the centrality of emotion in studying mind of people with ASD, speaking of it as 'affective contact with others' (p. 61) and 'interpersonal relatedness' (p. 78). Rather than seeing cognitive deficit, and so false belief, to be the central problem of ASD, Hobson (1993) saw it as one of I-Thou relatedness and the development of an interpersonal self. Furthermore, Hobson (1993) believed the affective aspects of mental states, such as emotion, play a major role in interpersonal relatedness for people with ASD.

From the perspective of this study the approaches of both Hobson and the majority of Theory-of-Mind studies are limited because their focus on a single aspect of mind, whether cognitive or affective, unduly simplifies a complex phenomenon. Even within their chosen aspect of mind, whether emotion or false belief, the focus is on its presence or absence within an individual with ASD, rather than attempting to understand *how* that individual experiences mental states.

This study has examined Theory-of-Mind in both its cognitive and affective aspects, and has established that students with ASD show a wide variety of Theory-of-Mind abilities and difficulties in both cognition and affect. The different types of Theory-of-Mind understanding was seen to be were characterised by the workings of imagination along spectra, logical/associational and fluent/impeded, within mental states. The following section goes on to examine how imagination influences the images held by students with ASD of themselves and others, and their modes of communication.

8.2.2 Results of Interactions between Imagination and Mental States

As discussed above, the Theory-of-Mind of students with ASD is characterised by the workings of imagination within mental states, so that the more fluent the workings of imagination, the more sophisticated the Theory-of-Mind understanding. This section examines the concepts of self and other held by students with ASD (Section 8.2.2.1), as these are influenced by Theory-of-Mind. It is followed by examining the ways in which students with ASD reflect their Theory-of-Mind understanding through their communication (Section 8.2.2.2).

8.2.2.1 Self and Other

'Self' and 'other' are concepts that exist in mutual dependence. A sense of self can only be maintained within a border, a point where self ends and other begins; and conversely, a sense of other requires a point where other ends and self begins. Self, in other words, does not exist in isolation, but as self-with-others. The movement from a purely subjective sense of self to an inter-subjective sense of self-with-others entails the workings of imagination along a spectrum from logical to associational, in both cognitive and affective mental states.

The sense of self-with-others demonstrated by students with ASD can be seen in terms of three categories: Identity; self perception; and perceptions of others. Students demonstrated their sense of *identity* firstly by knowing their age and gender. Also, after drawing self-portraits they reported their drawings portrayed predominantly pleasant emotions. They were clear about their images of themselves in the future, expressed through their desires. And they saw themselves as social, expressed in terms of their desire to have friends.

Students' *self perception* was complex. They reported liking, loving, needing and, in the case of one student, hating themselves. Half perceived themselves as likeable by others. Half reporting enjoying being alone, and 19 out of the 20 reported enjoying being with friends.

Students' *perceptions of others* were expressed through their attitudes towards friends. Most named themselves as their best friend, but also described family members, classmates and, in some instances, things (e.g., an apartment) and abstract concepts (e.g., God) as their friends. They also saw friendship in terms of reciprocity. They wanted to do

things for their friends (e.g., giving presents and forgiving) and their friends to do something for them (e.g., cooking and praising). Overall, they showed themselves to be predominately social beings.

However, students often answered questions that implied another – for example, 'Who do you like the most?' – with their own names first, before going on to name others. This may suggest that for students with ASD, the boundary between self and other is indefinite, or it may just indicate thinking in association, being reminded of their own name by the questions. In either case, fluent/logical imagination is lacking, and this is associated with difficulties in Theory-of-Mind.

8.2.2.2 Communication

Fluent/logical imagination gives rise to ease and clarity in communication as it allows a shift in perspectives between parties in conversation and a trajectory of responses which, being logical, can be shared with the other party. Impeded/logical or fluent/associational imagination creates difficulties in communication, as they make it difficult to shift perspectives between parties in conversation, and give rise to a trajectory of responses that is more private and less social in its nature.

Students with ASD whose logical imagination was impeded, or whose imagination was predominantly associational, had difficulties in shifting perspectives between parties in a conversation. This was demonstrated by their tendency to make statements with questions, to make questions with statements, and to use their own names for self reference rather than the first person pronoun. These patterns indicate a limited ability to shift perspective to another's viewpoint.

Making statements with questions indicates a difficulty in shifting perspectives during conversation because it answers a question by taking part of what was said by the other and responding from that perspective – the perspective of the other – rather than creating a statement from one's own perspective. *Making questions with statements* indicates the speaker takes the role of someone else making a statement or even giving an order, rather than asking from one's own perspective. It therefore expresses desire without self reference. And finally, *using one's own name for self reference* indicates that one's self image remains in the other's perspective, so that one's self reference comes from the other rather than from oneself. All these are aspects of an indistinct boundary between self and other, as mentioned in Section 8.2.2.1.

Section 8.2 has discussed the subjective experiences of Theory-of-Mind in 20 students with ASD. This section has attempted to answer the first two research questions: How do students with ASD experience their own minds and internal worlds?; and how do students with ASD understand the minds of others and the external world?

Students with ASD demonstrated a variety of abilities and disabilities in imagination, within thinking, visual perception, sensory responses and emotion. The more fluent the workings of logical imagination, the more sophisticated the Theory-of-Mind understanding. The more impeded the working of logical imagination, the more difficulties found in Theory-of-Mind understanding. The variety of experiences found among students with ASD indicate that for each individual, Theory-of-Mind understanding is a matter of degree rather than a simple binary.

The next section discusses how imagination on spectra are experienced individually within the mental states that make up the components of Theory-of-Mind, and the relationships between these components and IQ and social competence.

8.3 Theory-of-Mind: Its Components and Correlates

The previous section discussed Theory-of-Mind as subjectively experienced. This section aims to answer the third research question, how is the experience of one's own mind and internal world connected to the understanding of the minds of others and the external world? This section first examines individual experiences of the components of Theory-of-Mind (Section 8.3.1) and then moves on to the relationships between them, focusing on the connection between the experience of one's own mental states and the understanding of those of others. Theory-of-Mind will then be discussed in terms of its relationships with IQ (Section 8.3.2) and social competence (Section 8.3.3), the objectively measured cognitive and social correlates of Theory-of-Mind.

This study has criticised as too narrow the approach found in previous Theory-of-Mind studies that focused solely on performance in false belief tasks to 'credit' Theory-of-Mind, a criticism shared by others (e.g., Astington, 2001; Tager-Flusberg, 2001). In the light of this critique, this study aimed to examine all the components of Theory-of-Mind that demonstrated the full spectra of imagination, to uncover their interrelationships and their role in Theory-of-Mind.

8.3.1 Theory-of-Mind Continuum Model

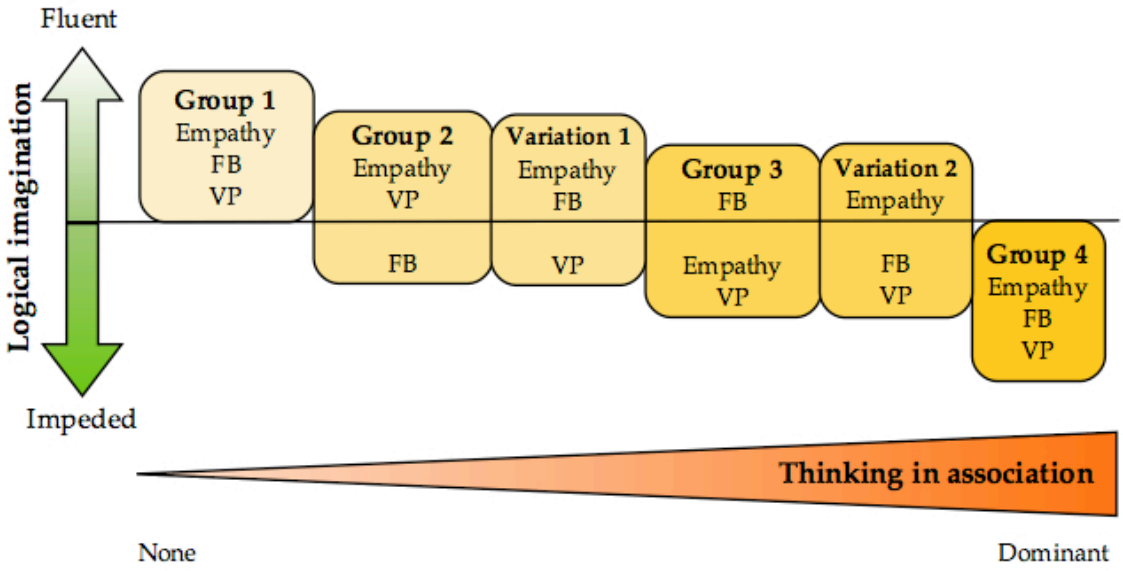
As discussed in Section 8.2, the key element in the experience of one's own mental states and the understanding of those of others – in other words, of Theory-of-Mind – is imagination, which this study found to work along spectra from fluent to impeded and from logical to associational. As discussed in Chapter 5, while these spectra together make eight ideal types of imagination, in the qualitative data associational imagination was found functioning only fluently. The following discussion therefore makes no mention of impeded/associational imagination.

The qualitative data concerning Theory-of-Mind as subjectively experienced were converted into quantitative data in order to uncover the patterns of Theory-of-Mind found throughout the 20 students with ASD participating in this study. Because of the key role of logical imagination, the data to be quantified were restricted to those components of Theory-of-Mind that demonstrated the full spectrum of logical imagination, from fluent to impeded. They were emotion (which entails empathy), thinking (which entails false belief) and visual perception. Mental states within which students demonstrated only fluent/logical imagination (i.e., affection, anticipation and desire) were excluded. (For a full explanation of the quantification process, see Section 6.2.2 in Chapter 6 *Theory-of-Mind: Components and Continuum*.)

In Figure 8.2, the 'logical imagination' axis is negatively associated with the 'thinking in association' line. Those students who were most fluent in logical imagination demonstrated the least thinking in association, and those students who were least fluent in logical imagination demonstrated the most thinking in association. In other words, Theory-of-Mind requires fluent/logical imagination, and those students who do not use fluent/logical imagination tend to think in association.

This raises the issue of the distinction between impeded/logical thinking and thinking in association, which in turn depends on where the boundary between logical and associational imagination can be drawn. This study has found no clear boundary between logical and associational imagination. What is clear is the absence of logical imagination in certain situations. For example, a student with ASD often demonstrated a pattern of response in which being asked a question such as, 'When do you feel happy?' he would answer, 'Sad.' This response was interpreted in this study as associational imagination within thinking, based on selective attention. While this interpretation seemed most

adequate to the researcher it could have been interpreted as an example of impeded/logical imagination, where the impeded nature of logical imagination is indicated by its absence. But in either case, what is clear is that this response does *not* show the presence of fluent/logical imagination.



Note. FB = False Belief; VP = Visual Perception

Figure 8.2 **Theory-of-Mind Continuum Model**

This remains the central issue, because fluent/logical imagination is necessary to experience and understand Theory-of-Mind. So when speaking of the full spectrum of imagination, the real distinction is whether it is fluent/logical imagination, or not. This is why Figure 8.2 shows ability or difficulty in using fluent/logical imagination within the three components of Theory-of-Mind, empathy, false belief and visual perception.

What emerged from the process of quantification were four patterns of Theory-of-Mind understanding (along with two variations) divided according to each student's capacity to utilise logical imagination within the three components of Theory-of-Mind. These patterns are displayed in Table 6.23, along with students' IQ and social competence scores.

Theory-of-Mind as continuum. Figure 8.2 classifies the 20 students into groups and variations according to their ability to employ logical imagination within the three Theory-of-Mind components that show the full spectra of imagination, empathy, false belief and

visual perception. These groups together constitute a continuum, flanked at one end by Group 1, whose members are characterised by ability in all three mental states and are least influenced by thinking in association, and at the other by Group 4, whose members are characterised by difficulty in all three mental states and are most influenced by thinking in association.

The students making up each group were assembled because they share more similarities with each other in the workings of logical imagination than students in different groups. Yet the boundaries between the different groups are not absolute; they are expressions of differences in degree rather than of kind. Further, while the greatest degree of difference is found between students in Group 1 and those in Group 4, it must not be forgotten that even students in Group 4 could use fluent/logical imagination in the Theory-of-Mind components of affection, anticipation and desire, and therefore Theory-of-Mind. These mental states, however, were omitted from this continuum model because they did not show the full spectra of imagination.

Variations of Theory-of-Mind understanding can be found both within and between groups, which means that a continuum of Theory-of-Mind abilities can be seen *within* each group, as well as *between* groups. This continuum of Theory-of-Mind is an expression of the great variety of Theory-of-Mind abilities and disabilities found among the 20 students with ASD. Figure 8.3 shows the Theory-of-Mind continuum within Group 1.

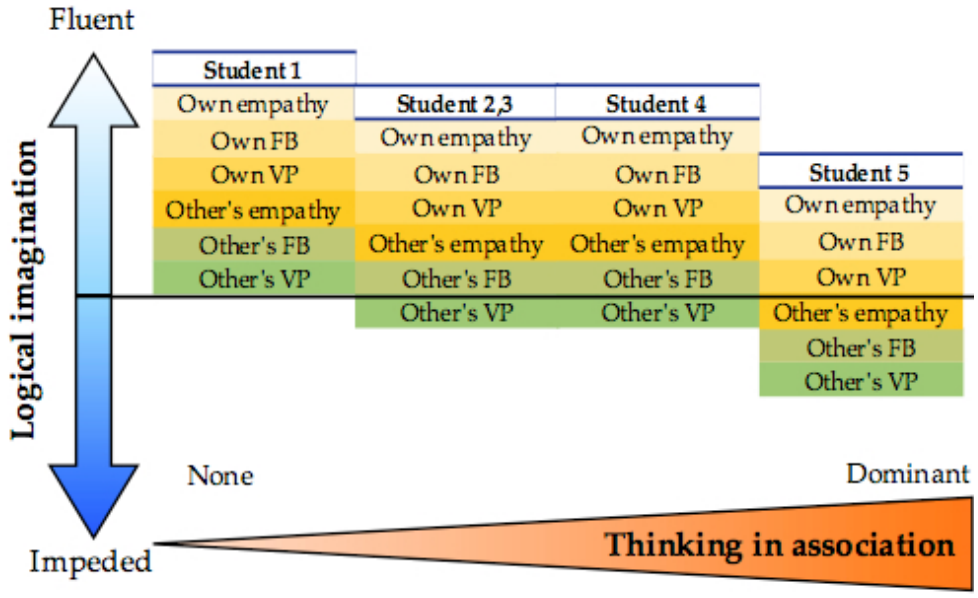


Figure 8.3 **Theory-of-Mind continuum within Group 1**

Figure 8.3 presents the three components of Theory-of-Mind, empathy, false belief and visual perception, as experienced by the five students with ASD within Group 1. Even within a single group, variations of Theory-of-Mind abilities are apparent. Student 1, for example, showed fluent/logical imagination in all three mental states, from both his own perspective and that of others, while Student 5 could not understand these mental states in others and Students 2, 3, and 4 could not understand visual perception in others. These three students were further differentiated by their degree of thinking in association, for while Students 2 and 3 showed occasional thinking in association, Student 4 showed dominant thinking in association. Student 5 understood all three mental states but only from his own perspective, and showed dominant thinking in association.

Group 2 is made up of students who showed fluent/logical imagination only in the mental states of empathy and visual perception, which is why they were not included in Group 1. Yet of the seven members of this group, six understood these two mental factors from both their own perspective and that of another, and as a group they were characterised by a higher IQ than Group 1.

The next section examines the relationships between the components of Theory-of-Mind and answers the third research question, which concerns the relationship between experiencing one's own mind and understanding the minds of others.

8.3.2 Interrelationships between Theory-of-Mind Components

This section discusses the relationships between the three components of Theory-of-Mind that were found to demonstrate the full spectrum of imagination in students with ASD (i.e., empathy, false belief and visual perception). Figure 8.4 presents these relationships, revealing five significant relationships: (1) A positive relationship between the ability to impute empathy and the ability to impute visual perception; (2) a negative relationship between thinking in association and the ability to impute empathy and visual perception; (3) the independence of the ability to impute false belief; (4) the independence of the abilities to take the perspective of another, emotionally, visually and cognitively; and (5) a positive relationship between the ability to impute mental states to the self and the ability to impute mental states to others.

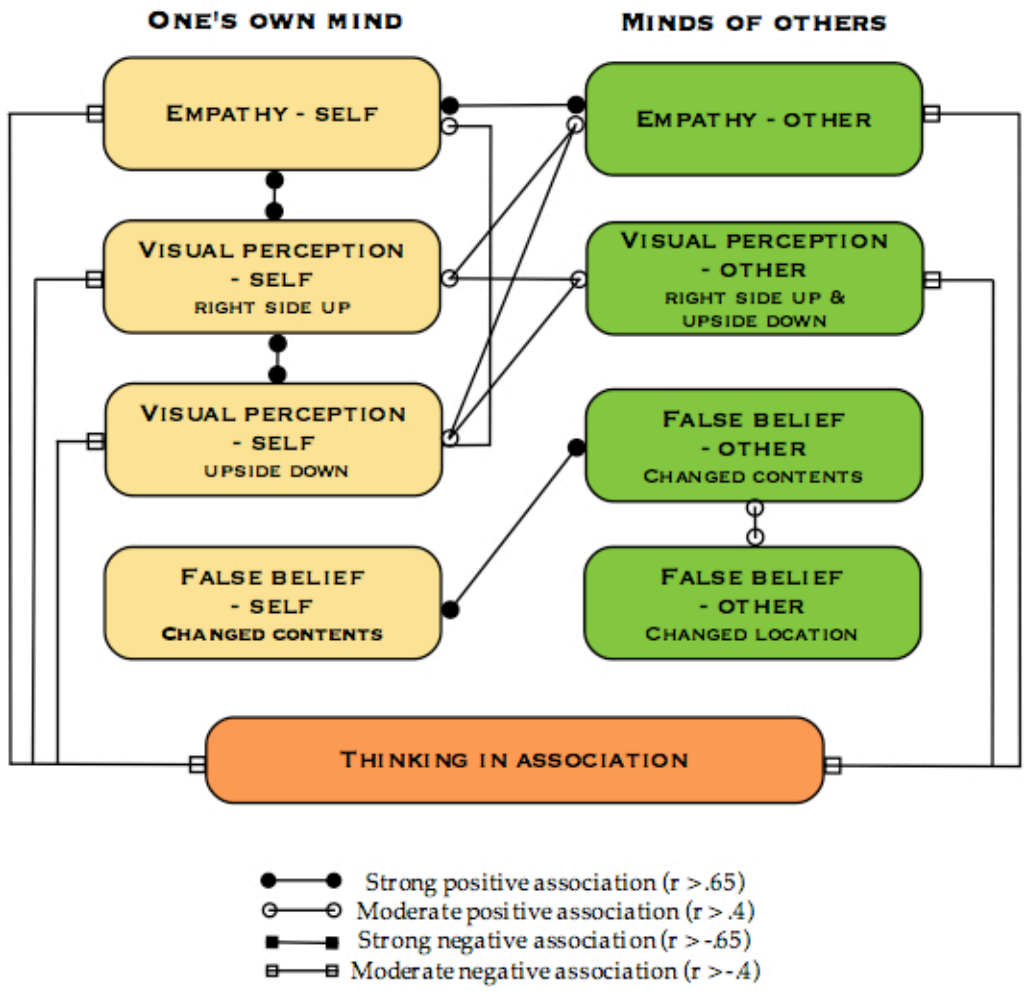


Figure 8.4 **Relationships between Theory-of-Mind components**

Relationships between Empathy and Visual Perception. A strong positive association was found between the ability to experience empathy and recognise it in others and the ability to recognise shifts in one's own visual perception and understand how these shifts appear to others. This result indicates a link between the ability to experience empathy and the ability to recognise shifts in the visual perception of others.

Further, a moderate positive association was found between the ability to recognise the empathy of others and the ability understand visual perception from one's own perspective. In other words, students with ASD who can understand how other people feel for them can also recognise shifts within their own visual perception. The converse, however, was not found. The ability to understand visual perception from the perspective of others is not associated with feeling empathy and recognising the empathy of others.

These relationships suggest that recognising visual perception from one's own perspective is linked to experiencing empathy and recognising it in others. It also suggests that the ability to take another's perspective visually is independent of the ability to take another's perspective emotionally.

Relationships between Thinking in Association and Empathy & Visual Perception. A moderate negative association was found between thinking in association and the ability to experience empathy and recognise it in others. A moderate negative association was also found between thinking in association and the ability to recognise shifts in one's own visual perception and understand it in others. In other words, thinking in association is linked to difficulties in empathy and visual perception in both self and other.

Independence of False Belief. The ability to recognise one's own false belief and to understand the false belief of another were found to be independent from other mental states (i.e., empathy and visual perception). This independence stands out more strongly given the strong positive relationships found between empathy and visual perception, and the negative relationships found between thinking in association and other mental states.

This result suggests that students with ASD who can understand false belief may not understand other mental states, and students who cannot understand false belief may understand other mental states. This in turn suggests that people with ASD who have been classified as not possessing Theory-of-Mind solely on the basis of their performance in false belief tasks may have been able to demonstrate Theory-of-Mind regarding other mental states, for example empathy and visual perception. This result is particularly important given the reliance on false belief tasks to 'credit' Theory-of-Mind understanding in the ASD population (Frith & Happé, 1999). This will be discussed further in Section 8.6.1.

Independence of Theory-of-Mind Components regarding Others. No association was found between the ability to understand empathy, false belief and visual perception in others, indicating that the different ways of taking the perspective of another, emotionally, cognitively and visually, function independently of each other. This in turn suggests the inadequacy of measuring Theory-of-Mind abilities on the basis of a person demonstrating an understanding of a single mental state, as the ability to impute any one mental state to others says little about the ability to impute other mental states. This result calls for an

inclusive approach to understanding Theory-of-Mind, one that recognises its complexity in terms of the varied relationships between Theory-of-Mind components.

Relationships between Understanding One's Own Mind and Those of Others. A positive association was found between the experience of empathy, false belief and visual perception in oneself and the understanding of these mental states in others. All students with ASD who could understand these mental states from another's perspective could also experience them from their own perspective. However, the converse was not necessarily true. Not all students who experienced these mental states from their own perspective understood them from the perspective of others (e.g., in the changed contents tasks, 13 students recognised their own false belief and 10 understood the false belief of another).

This result does not support Frith and Happé (1999) and Gopnik and Meltzoff (1994) who suggested that when individuals with ASD cannot understand the mental states of others they do not report them within themselves. Although some students with ASD did not demonstrate an understanding of empathy, false belief and visual perception of others, they did experience them within themselves. (Refer to Table 6.23, *Components and Continuum* for details.) For all mental states, understanding from one's own point of view assists understanding from the other's point of view. This indicates that it is equally important for studies in Theory-of-Mind to focus on the understanding of one's own mind as well as the understanding of the minds of others.

To sum up, in all cases, experiencing mental states from one's own point of view assists understanding these mental states from point of view of others. However, difficulties in understanding the minds of others do not indicate difficulties in experiencing one's own mind. This result answers the third research question, how experiencing one's own mind is related to understanding the minds of others.

The more a person relies on thinking in association, the more s/he has difficulties in experiencing and understanding empathy and visual perception. In addition, abilities to understand empathy, false belief and visual perception in others are independent of each other. This implies that an attempt to establish the presence or absence of Theory-of-Mind based on a sole mental state is problematic. Even establishing the presence or absence of Theory-of-Mind on the basis of a group of mental states is problematic because, as shown in the Theory-of-Mind continuum model, Theory-of-Mind understanding within any mental state is more a matter of degree than of simple presence or absence.

This section has discussed the relationships between Theory-of-Mind components and the implications arising from them. The following section discusses the relationships between Theory-of-Mind components and IQ and verbal IQ.

8.3.3 Relationships between Theory-of-Mind Components and IQ & VIQ

This section discusses the relationships between the components of Theory-of-Mind and IQ, including verbal IQ (VIQ), in 20 students with ASD. Figure 8.5 presents the relationships between Theory-of-Mind and IQ, while Figure 8.6 displays the relationships between Theory-of-Mind and VIQ. The figures are identical except for the relationships surrounding false belief.

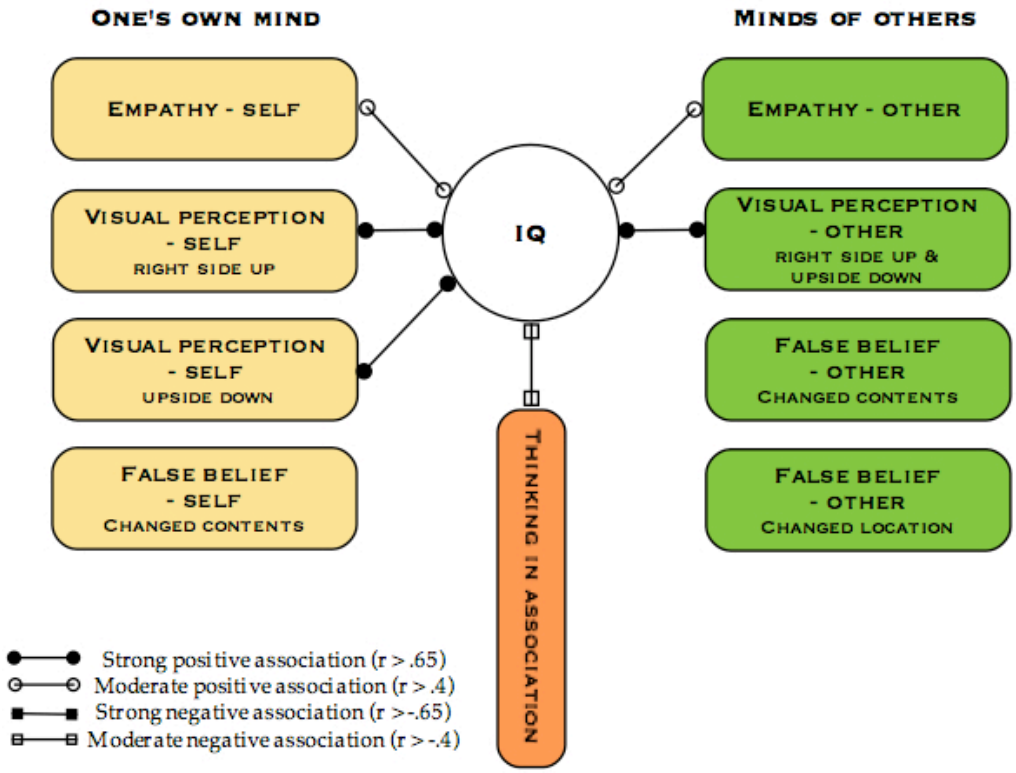


Figure 8.5 **Relationships between Theory-of-Mind components and IQ**

A moderate positive association was found between the ability to experience *empathy* and recognise it in others, on the one hand, and IQ and VIQ on the other. This indicates that those students with ASD who were fluent in empathy had higher IQ and VIQ scores than those whose empathy was limited.

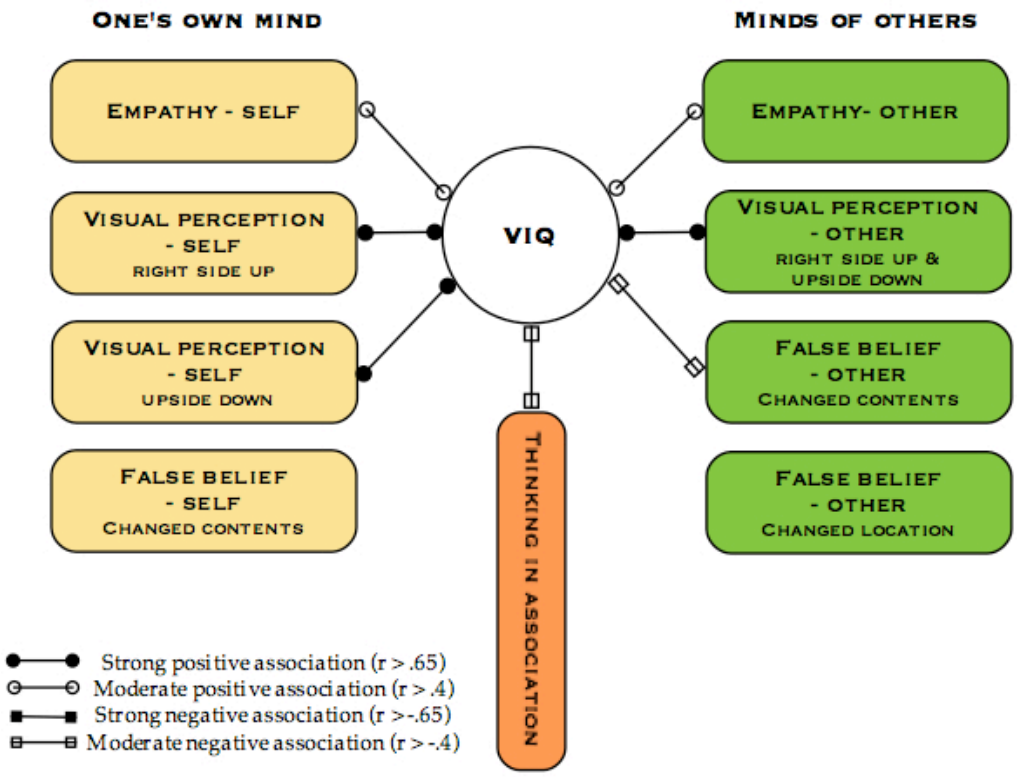


Figure 8.6 **Relationships between Theory-of-Mind components and VIQ**

Similarly for *visual perception*, where a strong positive association was found between the ability to recognise shifts in one's own visual perception and understand how these shifts appear to others, on the one hand, and IQ and VIQ on the other. This indicates that students with ASD who were fluent in visual perception had higher IQ and VIQ than those whose visual perception was limited.

Dawson and Fernald (1987), in contrast, found no significant correlation between visual perspective taking ability and IQ in individuals with ASD. In another study of visual perspective taking ability, Hobson (1984) did not come to any firm conclusion about IQ but did indicate there is a close relationship between visual perspective taking ability and cognitive ability. Although Hobson's result is consistent with the findings of this study, the relationship between visual perception and IQ in individuals with ASD needs to be studied further to explore the degree of this association.

False belief, both the ability to recognise one's own false belief and to understand the false belief of another, was the only mental state among Theory-of-Mind components that did not demonstrate any association with IQ. As discussed in the previous section, this

indicates that IQ does not seem to play an important role in false belief abilities among these students with ASD. This result is consistent with the results of early studies of Theory-of-Mind in children with ASD (Baron-Cohen et al., 1985; Perner, Frith, Leslie & Leekam, 1989) which showed that problems in imputing false belief to others are largely independent of general intellectual level.

However, understanding another's false belief, particularly in the context of the changed location task, demonstrates a moderately negative association with VIQ (Figure 8.6). This indicates that students with ASD who have higher VIQ scores have more difficulties in imputing false belief to others in this task than students with lower VIQ scores.

This negative relationship attracts attention because VIQ has been seen as an important factor in success in false belief tasks in people with ASD (e.g., Happé, 1995; Sparrevohn & Howie, 1995), and a strong positive relationship between false belief tasks and verbal abilities has continued to be reported in the ASD population (e.g., Dahlgren & Trillingsgaard, 1996; Jarrold, Butler, Cottington & Jimenez, 2000; Yirmiya, Erel, Shaked & Solomonica-Levi, 1998). While the independence of false belief from IQ can be seen as part of a broader pattern of independence from other components of Theory-of-Mind, the negative association with VIQ demands explanation.

One possible explanation is that the relationship between performance in false belief changed contents tasks and VIQ is simply negative. In a study by Perner et al. (1989), participants with ASD demonstrated relatively high verbal abilities (mean mental age 6:2 months), but only 15 percent were able to impute false belief to others. In this study, participants demonstrated a low VIQ score (mean VIQ score of 46.50). Of 20 participants, 15 showed below the lowest standardised VIQ score (i.e., VIQ score of 45). However, 40 percent of students with ASD were able to impute false belief to others. A possible conclusion is that higher IQ is associated with lower performance in false belief tasks. This conclusion, however, is contradicted by studies that have reported higher success rates in false belief tasks by high functioning individuals with ASD (e.g., Bauminger & Kasari, 1999; Happé, 1994). This leads to a second possibility.

This study has already referred to criticisms of the reliability of false belief tasks made by Nazeer (2006), an adult with ASD (see, for example, Section 8.1). He suggested false belief tasks, and in particular changed contents tasks, are designed in such a way as to

agitate individuals with ASD by eliciting answers that are meant to be wrong, followed by a demand to try again. This anxiety, in turn, may influence the results of these tasks.

Indeed, the students with ASD who demonstrated difficulties in imputing false belief to others in the changed contents task were students with higher verbal abilities. Reflecting upon the interviews, the researcher realised that these students showed a stronger desire to provide the correct answer. This desire was accompanied by anxiety as they looked for clues from the researcher's face to confirm whether or not their responses were correct. Hence, these participants may have undergone greater levels of anxiety during the task than others with lower VIQ.

Regardless of reason, this result is not comparable with those from previous studies. What stand out in this study are the relatively low IQ and VIQ scores of the participants. For example, the highest IQ (e.g., 77) and VIQ (e.g., 71) scores of students with ASD in this study are lower than the average scores of participants with ASD in previous studies that reported a positive relationship between false belief and IQ, including VIQ (e.g., Bauminger & Kasari, 1999; Sparrvohn & Howie, 1995). This issue needs to be taken up in further studies, by including participants with ASD who demonstrate varying degrees of IQ and VIQ, including low scores.

Thinking in association is the last component of Theory-of-Mind to be considered here. A strongly negative relationship was found between thinking in association and IQ and VIQ. This result is consistent with the relationship between thinking in association and other Theory-of-Mind components. This result, however, cannot be compared with previous Theory-of-Mind studies, as they did not consider the role of the spectra of imagination.

To sum up, understanding empathy and visual perception were positively related to IQ and VIQ in these students with ASD, while understanding false belief generally was not. The exception here is that the ability to understand false belief in others, found in the changed contents task, was negatively related to VIQ. Thinking in association was negatively related to IQ and VIQ. These results indicate that the various Theory-of-Mind components have different relationships to IQ and VIQ. Some Theory-of-Mind components (e.g., empathy and visual perception) demonstrate positive relationships while others (e.g., thinking in association) demonstrate negative relationships. Furthermore, false belief generally demonstrates no relationship with IQ and VIQ.

These results point to not only the complexity of Theory-of-Mind, but also the difficulty inherent in deciding on its presence or absence, in terms of cognitive ability, on the basis of a single factor. While previous studies have found a strong relationship between false belief (i.e., as the marker for Theory-of-Mind) and IQ, those studies were with participants with relatively high IQ scores. But in this study, where the participants had a lower IQ range, no such relationship was found. It would appear that more variables than previously suspected are involved in Theory-of-Mind.

8.3.4 Relationships between Theory-of-Mind Components and Social Competence

This section discusses the relationships between the components of Theory-of-Mind and their associated behavioural abilities, summarised as social competence, as presented in Figure 8.7.

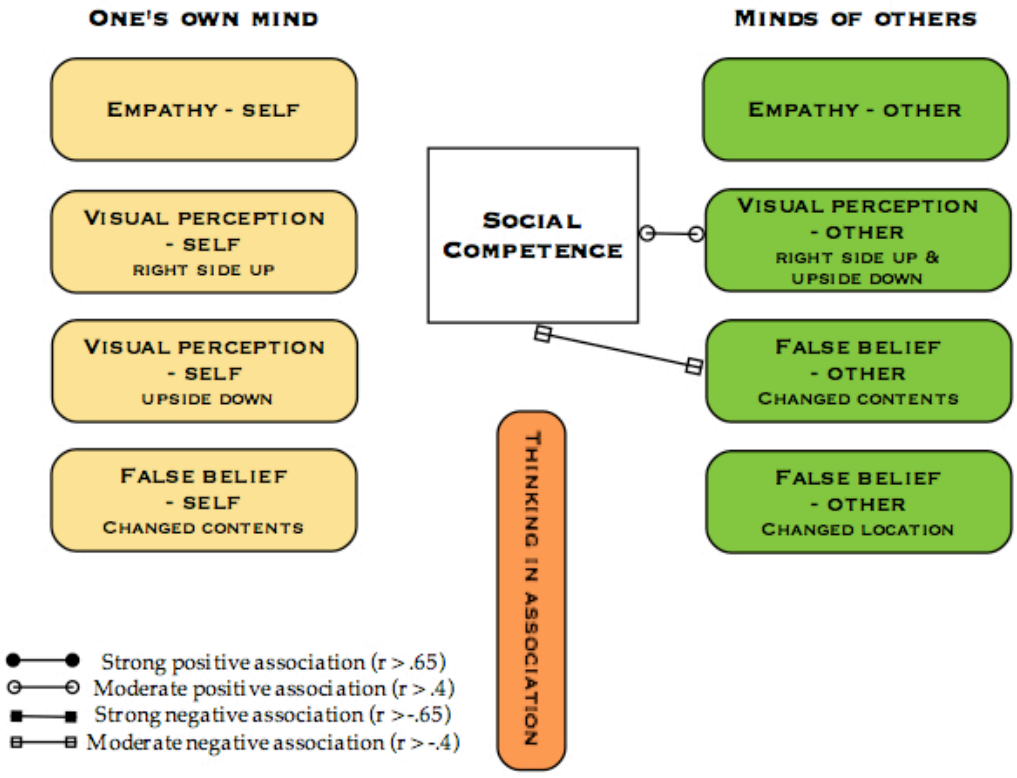


Figure 8.7 **Theory-of-Mind and social competence**

In contrast to the relationships found between Theory-of-Mind components and IQ and VIQ, social competence was found to be independent of Theory-of-Mind components with

one exception, the ability to understand visual perception in others. A moderate positive association was found between this Theory-of-Mind component and social competence, indicating that students who understand how things appear visually to others demonstrate higher social competence.

In the course of a wider ranging study, Dawson and Fernald (1987) also found a positive link between the ability to take another's visual perspective and social competence. They also found a positive association between affective perspective-taking ability, in this study corresponding to understanding the empathy of another, and social competence, while this study found no such association.

This study also found a moderate negative association between the understanding of another's false belief in the *changed contents* task and social competence, which means that students with ASD who understood another's false belief in this task demonstrated lower scores on social competence than those who could not. This study found no association with social competence and understanding the false belief of another in the *changed location* task. These results are consistent with those of previous studies (e.g., Hughes, Soares-Boucaud, Hochmann & Frith, 1997; Oswald & Ollendick, 1989; Prior, Dahlstrom & Squires, 1990).

The results of this study regarding the social competence of students with ASD need to be interpreted with caution because the social competence of student participants was evaluated only by their own teachers. As different teachers could have been influenced by differing expectations and perceptions of their students' abilities or disabilities, the social competence evaluation may be a collection of different views and perceptions held by these teachers. Checking the reliability of the social competence measurement could not be done because this study administered only one evaluation measurement (e.g., the Korean Vineland Social Maturity Scale) and the evaluation came from only a single source, the teachers, rather than parents and the researcher. This issue will be further discussed in Section 8.7 *Limitations and Implications* as one limitation of this study.

In summary, fewer associations were found between social competence and the components of Theory-of-Mind than between IQ (including VIQ) and these components. The only positive association between social competence and the components of Theory-of-Mind was found with understanding the visual perception of another. While a moderate

negative association was found between false belief and social competence, this was only in one task and requires further clarification.

The reason for this weakness of relationship between Theory-of-Mind components and social competence may lie in the fact that social competence is a very broad and complex phenomenon, and so tracing particular lines of association to the different facets of Theory-of-Mind is difficult. The complexity of the whole area of Theory-of-Mind is again highlighted here.

Section 8.3 has discussed the relationships between the components of Theory-of-Mind, followed by the relationships between these components and IQ (including VIQ) and social competence, the cognitive and social correlates of Theory-of-Mind.

Regarding the relationships between the components of Theory-of-Mind (Section 8.3.2), this study has found that the understanding of visual perception from one's own perspective is related to experiencing empathy and understanding empathy in others. A predominance of thinking in association is related to difficulties in experiencing empathy and visual perception from one's own perspective and understanding these mental states in others. An understanding of the perspectives of others emotionally (e.g., empathy), cognitively (e.g., false belief) and visually (e.g., visual perception) are independent of each other. And in all cases, understanding mental states from one's own point of view assists understanding these states from the point of view of others.

Regarding the relationships between Theory-of-Mind and IQ and VIQ (Section 8.3.3), this study found that an understanding of empathy and visual perception is positively related to IQ and VIQ. Understanding false belief is independent of IQ and VIQ, with the exception of the changed contents task which tested understanding of the false belief of another, where a negative association with VIQ was found. Thinking in association has a consistently negative association with both IQ and VIQ.

Regarding the relationships between Theory-of-Mind and social competence (Section 8.3.4), the only positive association was found with understanding the visual perception of another. A negative association was found between false belief and social competence, but only in one task.

This section has discussed individual experiences of Theory-of-Mind and proposed the Theory-of-Mind continuum model. It has also discussed the relationships between the components of Theory-of-Mind and the relationships between Theory-of-Mind

components and IQ and social competence found within 20 students with ASD considered as a group. The next section focuses on how teachers of these students with ASD understood their students' Theory-of-Mind.

8.4 Outside-In: Theory-of-Mind as Objectively Understood

The fourth research question asked how do educational professionals construe the Theory-of-Mind understanding of their students with ASD? To answer this question, this study investigated how the teachers of students with ASD understood their students' Theory-of-Mind as they observed their patterns of behaviour over time in the natural settings of school life. As this is the first time that such an investigation has been attempted, the results of this study cannot be compared to those of previous studies. Instead, teachers' understanding of their students' Theory-of-Mind will be compared to their students' subjective experiences, as revealed by grounded theory analysis.

The data that revealed teachers' understanding of their students' Theory-of-Mind were both qualitative, from in-depth interviews, document review and open questions in the Teacher questionnaire, and quantitative, from closed statements in the Teacher questionnaire. The results are presented in detail in Chapter 7 *Outside-in: Theory-of-Mind of Students with ASD as Understood by their Teachers*. In brief, it was found that the qualitative data revealed a greater depth of insight into individual students' Theory-of-Mind than the quantitative data, while the quantitative results provided a wider view than the qualitative data, revealing the general trends of teachers' understanding of their students' Theory-of-Mind.

Section 8.4.1 examines what teachers believed regarding how their students with ASD experience their own mental states. Section 8.4.2 examines what teachers believed regarding how their students with ASD understand the mental states of others. Finally, Section 8.4.3 discusses the insight into the Theory-of-Mind of their students with ASD that teachers have developed over a period of time.

8.4.1 Students' Experience of Their Own Mental States

A majority of teachers participating in this study believed their students with ASD experience their own mental states, with a minority disagreeing. Those teachers who believed their students do experience their own mental states thought they experienced

affective mental states (e.g., affection and desire) more fluently than cognitive mental states (e.g., false belief), and that students were more fluent in mental states that were private to themselves, such as emotion, than those that are associated with social relationships, such as emotional bonds with others and a desire for friendship. These trends were found in both the qualitative and quantitative data. As these mental states are aspects of Theory-of-Mind, it can be concluded that these teachers believed their students with ASD have Theory-of-Mind, although *Theory-of-Mind* is not a term they normally use.

Teachers also reported mental states that their students showed difficulties in expressing. For example, teachers reported that most of their students expressed little voluntary interest in others, and when they did they preferred older people, such as teachers, to peers. Students also had problems in finding appropriate ways to express their anger or frustration, often using violence, on themselves or others, to express themselves.

8.4.2 Students' Experiences of the Mental States of Others

Teachers tended to believe their students with ASD were less fluent in their understanding of the mental states of others than of their own. Teachers reported that while their students with ASD can make sense of human behaviour on the basis of understanding some mental states expressed by others (e.g., desire and obvious emotion such as anger), they cannot understand other mental states (e.g., subtle emotion such as mood, and the difference between a joke and the truth). In light of the definition of Theory-of-Mind (e.g., Premack & Woodruff, 1978), these difficulties suggest limitations in Theory-of-Mind.

The ability of students with ASD to understand the mental states of others seemed to be dependent on a number of factors. In the case of emotion, for example, teachers reported that their students with ASD demonstrated an understanding of strong emotions, such as the anger of their teachers, but rarely expressed an understanding of happy emotions and more subtle moods. The expression of anger was more obvious than the expression of contentment or satisfaction. Familiarity was also an issue. Students with ASD were familiar with the anger of their teachers, and so developed a sensitivity to it. Similarly, in terms of understanding the affection of others, students with ASD were more sensitive to the affection of people familiar to them than those who were not familiar. Finally, the sophistication of the mental states expressed appeared to be a factor in students' understanding. Students with ASD had difficulties understanding the emotion

being indirectly expressed by jokes, and humour is more sophisticated than the direct expression of emotion.

In summary, teachers reported that students with ASD expressed their experiences of their own mental states more frequently and fluently than their understanding of the mental states of others. This may be because one's own experience, being intimate to oneself, is easier to imagine than the experience of others. While most teachers believed their students with ASD expressed an understanding of the mental states of others, this understanding was limited to mental states which are comparatively obvious, familiar and simple.

This section has discussed teachers' understanding of their students' abilities to make sense of human behaviour on the basis of Theory-of-Mind, the ability to experience one's own mental states and understand those of others. The next section discusses the beliefs and views regarding the Theory-of-Mind of their students with ASD that their teachers have developed over time.

8.4.3 Teachers' Beliefs Regarding Their Students' Theory-of-Mind

The beliefs held by teachers regarding the Theory-of-Mind of their students with ASD covered four areas: Developmental changes over time; communication difficulties; slow development; and the variety of Theory-of-Mind abilities.

Teachers believed their students' Theory-of-Mind could develop either progressively or regressively, although they reported progressive development more often than regressive, and were more inclined to believe that their students would progress than regress.

Some teachers emphasised the importance of communication for their students with ASD, arguing that what appeared on the surface to be Theory-of-Mind difficulties may really be difficulties in communication. Some teachers also expressed confidence in their students' ability to develop their Theory-of-Mind further, although this would happen only slowly and if suitable educational interventions within a nurturing environment were provided.

Lastly, two teachers highlighted the wide variety of individual differences in Theory-of-Mind found among their students with ASD. One teacher used the metaphor of the light spectrum, with the variety of colours representing the variety of similarities and

differences in the minds of students with ASD. The diversity of views regarding the Theory-of-Mind of their students expressed by teachers in the quantitative study may be a reflection of a sense of the diversity of abilities and disabilities found within their students. Nevertheless, teachers were in general positive about the potential of their students with ASD.

8.5 Towards a Substantive Theory of Theory-of-Mind

The previous sections discussed Theory-of-Mind as subjectively experienced by students and objectively understood by their teachers. This section will compare these two aspects of Theory-of-Mind to uncover their similarities and differences as a way to answer the last research question: What are the similarities and differences between teachers' understanding of the Theory-of-Mind of their students with ASD and the subjective experiences of Theory-of-Mind held by those students? On the basis of this comparison a substantive theory of Theory-of-Mind, embracing both subjective experience and objective understanding, is proposed.

8.5.1 Theory-of-Mind as Experienced and Understood

This thesis proposes that Theory-of-Mind as subjectively experienced is governed by imagination working within other mental states. Fluent/logical imagination, for example, enables the experience of empathy and an understanding of false belief, in oneself and others. Impeded/logical or fluent/associational imagination results in the absence of empathy and in difficulties in understanding false belief.

Theory-of-Mind as objectively understood, on the other hand, is governed by expression. Teachers can understand their students' Theory-of-Mind only through their observations of its expression. Fluent expression of mental states tends to be interpreted as evidence of the presence of Theory-of-Mind experiences, while impeded expression tends to be interpreted as evidence of their absence. The beliefs that teachers hold regarding their students' Theory-of-Mind therefore depend on what they observe of the ways in which their students express themselves.

In this study teachers observed a wider range of mental states expressed by their students with ASD than those students themselves experienced (Table 8.1). This disparity can be explained in two ways. Firstly, this list of observed mental states emerged from the

anecdotes of teachers as they watched their students over a long period of time, so mental states that are only occasionally or even rarely expressed, such as self reflection, find their way into the data.

Table 8.1 ***Students' Own Mental States***

	Experienced Mental States	Observed Mental States
Fluent	Affection, anticipation, desire, emotion, memory, sensory responses, thinking and visual perception	Affection, anticipation, deception, desire, imitation, intention, memory, self reflection, self regulation and sensory sensitivity
Impeded	Emotion, sensory responses, thinking, visual perception	Desire, emotion, thinking, processing information, spatial perception

Secondly, teachers considered some mental states to be of particular importance, and they were correspondingly sensitive to their presence or absence. For example, teachers were particularly interested in their students' ability to understand acceptable codes of conduct and to reflect on their behaviour.

Regarding the ability to understand the mental states of others, however, the opposite pattern is revealed. Teachers observed a narrower range of mental states being expressed by their students with ASD than those students themselves experienced (Table 8.2). This is discussed further in the following sections.

Table 8.2 ***Students' Understanding Mental States of Others***

	Experienced Mental States	Observed Mental States
Fluent	Affection, desire, empathy, false belief, sympathy and visual perception	Desire, visual perception, sympathy
Impeded	Empathy, false belief, sympathy and visual perception	Jokes, sympathy

8.5.2 Similarities between Theory-of-Mind as Experienced and Understood

A comparison between Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers reveals that the mental states experienced by students and understood by teachers generally correspond to each other (Tables 8.1 & 8.2). From an inside-out approach, fluent/logical imagination was found within affection, desire,

emotion and sensory responses, and from an outside-in approach these mental states were observed most frequently and fluently (Section 8.4.1). In other words, what was fluently experienced by students was frequently observed by their teachers.

Another similarity is found in sensitivity to unpleasant feelings. Grounded theory analysis reveals that students with ASD tend to be more sensitive to unpleasant feelings than pleasant ones, and demonstrate a more sophisticated vocabulary about their unpleasant feelings (Table 5.1). One teacher commented that her students speak more often of their unpleasant feelings than their pleasant ones.

Finally, one issue that is found in the autobiographical literature regarding the experience of ASD is that of bonds with animals (e.g., Brøsen, 2005; Grandin, 2006; Lawson, 1998; Tammet, 2006). Individuals with ASD have written about overcoming their difficulties with interpersonal relationships by developing such bonds (e.g., Grandin, 2006). In Korea, however, neither students with ASD nor their teachers raised this issue. Indeed, a number of students said they prefer people to animals. This seems to indicate a difference between European and Korean culture, since all these authors share a European cultural heritage.

However, despite these similarities, Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers demonstrate greater differences than similarities. This is discussed in the following section.

8.5.3 Differences between Theory-of-Mind as Experienced and Understood

Teachers of students with ASD expressed an understanding of their students' Theory-of-Mind which could be summarised as broad but not deep. As they watched their students over time they could see the workings of their mental states and make professional judgements about their developmental possibilities. However, as these observations were necessarily only of their students' external behaviour, they did not penetrate into their inner worlds and did not show insight into how the minds of their students worked.

For example, looking at Theory-of-Mind as subjectively experienced, all students with ASD in this study experienced affection, and 19 of the 20 experienced emotion and the desire for friendship. Yet while teachers did observe affection and emotion within their students, they did not do so to the degree that was experienced by students. Desire for friendship, in particular, was not observed by teachers at all.

The understanding of teachers may have been influenced by the apparent indifference displayed by their students with ASD in behaviours such as avoiding eye contact. The absence of overt expressions of desire for friendship may have given rise to this failure to recognise it within their students.

Teachers also tended to be less sensitive to their students' ability to understand mental states in others than to their ability to experience mental states themselves (Table 8.2). Students' ability to impute empathy and false belief to others was not observed by their teachers. In particular, while 14 students experienced empathy and 13 recognised it from others, no teachers reported that their students experienced empathy.

This disparity between Theory-of-Mind as subjectively experienced and objectively understood highlights the importance of communication, and how communication is a problem for people with ASD. The understanding that teachers develop for their students with ASD is dependent upon what their students are seen to express, and how they express it. But this study has shown that students with ASD have difficulties with communication, and in some cases they would not communicate their understanding unless they were in a situation in which they were specifically asked to do so. It follows that teachers tend to underestimate the Theory-of-Mind abilities of their students with ASD. The implications of this are discussed in the following sections.

8.5.4 A Substantive Theory of Theory-of-Mind: Theory-of-Mind Typology

In the field of psychology, the term Theory-of-Mind was first defined by Premack and Woodruff (1978) as the ability to impute mental states to the self and others. They acknowledged that as mental states are not directly observable, Theory-of-Mind can only be understood through inference, on the basis of behaviour.

Early studies of Theory-of-Mind sought to understand it in terms of the presence or absence of false belief, with particular focus on the ability to impute false belief to others. (Liu, Wellman, Tardif & Sabbagh, 2008). Recently there has been a trend towards seeing Theory-of-Mind as a more complex phenomenon, as combinations of mental states rather than just false belief (e.g., Blackshaw, Kinderman, Hare & Hatton, 2001; Brown & Whiten, 2000; Steel, Joseph & Tager-Flusberg, 2003). Even so, none of these studies included the subjective experiences of people with ASD.

In contrast, this study has focused on Theory-of-Mind as subjectively experienced and objectively understood, and in doing so has viewed it as a continuum of experiences and abilities. The study has been methodologically supported by a grounded theory approach and a mixed methods research design. It was supported philosophically by the work of Nagel (1986) and Chalmers (1995; 1999), and theoretically by the special education concepts of the social model of disabilities (Oliver, 1990) and self-determination (Wehmeyer, Agran & Hughes, 1998). The study of Theory-of-Mind as subjectively experienced yielded complex patterns of experience that make up Theory-of-Mind, central to which is imagination on spectra working within the components of Theory-of-Mind. The study of Theory-of-Mind as objectively understood resulted in different patterns of understanding held by teachers regarding the Theory-of-Mind of their students with ASD.

Bringing together these two aspects of Theory-of-Mind, as subjectively experienced and objectively understood, this study proposes a new typology of Theory-of-Mind (Figure 8.8). This typology is constituted by two axes. One axis is that of imputing mind to self/imputing mind to others, while the other axis is that of subjective/objective. This typology of Theory-of-Mind constitutes a substantive theory of Theory-of-Mind.

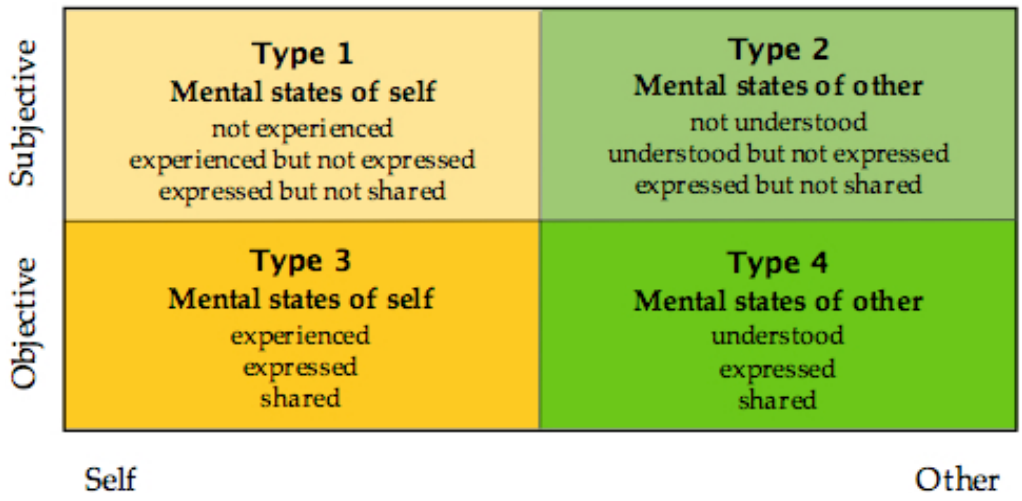


Figure 8.8 **Theory-of-Mind Typology**

8.5.2.1 Theory-of-Mind Typology

Theory-of-Mind ability can be plotted along the subjective/objective axis depending on the degree to which Theory-of-Mind understanding can be shared with others. To the degree it can be shared (i.e., implying the working of logical imagination), Theory-of-Mind

becomes objective. To the degree Theory-of-Mind understanding can *not* be shared (i.e., implying the working of associational imagination), Theory-of-Mind becomes subjective. The reasons why Theory-of-Mind cannot be shared are because mental states are either not experienced; or if experienced, they are not expressed; or if expressed, their expression is not understood by others. These two axes, of self/other and subjective/objective, suggest four types of Theory-of-Mind (Figure 8.8).

The subjective end of the subjective/objective axis has a private nature, because of its relationship to expression. Expression emerged as a core category in the grounded theory analysis of teachers' understanding of the Theory-of-Mind of their students with ASD because a person's experience can only be inferred from the expression of that experience. Strictly speaking, if a person experiences a mental state but does not express it there is no evidence available to others that the experience has actually occurred. This becomes an issue when considering Types 1 and 2 of Theory-of-Mind.

Type 1 Theory-of-Mind is characterised by either not experiencing mental states; or experiencing mental states but not expressing them; or expressing mental states but in a way that cannot be shared. In other words, Type 1 Theory-of-Mind is confined within one's own subjectivity, and so cannot be objectively observed.

Since the objective evidence for the experience of a mental state is its expression, then there is little practical difference, from the perspective of an observer, between the three aspects of Type 1 Theory-of-Mind. For example, there is no perceived difference between a mental state not being experienced at all and a mental state being experienced but not expressed. The third aspect, a mental state being expressed but not shared, is the clearest, but even here any judgement about it can only take the form of an interpretation.

An example from this study can be seen in a student with ASD who said, 'I feel happy if mum is sick.' This statement has been interpreted by the researcher to mean, 'I feel happy if mum is sick because I like her, and so mum reminds me of happiness.' This interpretation may or may not be correct, but whether correct or not the dominance of associational imagination, and the self-reference of the mental state, places this example in Type 1 Theory-of-Mind.

Type 2 Theory-of-Mind is characterised by either not understanding the mental states of another; or understanding the mental states of another but not expressing this understanding; or expressing an understanding of mental states of another but in a way that

cannot be shared. In other words, Type 2 Theory-of-Mind, like Type 1, is Theory-of-Mind which is confined within subjectivity. It differs from Type 1 only in that the mental states in question are understood in another rather than experienced within oneself.

The same caveats apply as in the case of Type 1 Theory-of-Mind. In the absence of expression, for the objective observer the difference between these three aspects are simply a matter of interpretation. For example, when a student in this study was asked how his friend would feel if she was stopped from using a computer that she wanted to use, he answered with her name. This statement could be interpreted as an expression of a felt understanding regarding the plight of the student's friend, but expressed in a way that could not be shared, or as mere association, with no felt connection to the friend's situation. In either case, fluent/associational imagination or impeded/logical imagination was dominant within the response, and Theory-of-Mind remains confined within subjectivity.

Type 3 Theory-of-Mind is characterised by experiencing mental states oneself and expressing these mental states to and sharing them with others. With Type 3, Theory-of-Mind moves beyond the subjective to the objective, through the medium of communication. An example of this would be those students in this study who said they would feel sad if their mother was sick. Type 3 Theory-of-Mind, however, has not been considered significant in the majority of Theory-of-Mind studies, because of a preoccupation with understanding the mental states of others as a defining characteristic of Theory-of-Mind.

Type 4 Theory-of-Mind is characterised by understanding the mental states of others and expressing this understanding to and sharing it with others. An example would be found in a student with ASD saying to the researcher, 'I think my friend feels happy if he is given a muffin.' Another example, expressing false belief, would be the statement, 'I think my friend thinks the biscuit is in the other box (which no longer contains the sought for biscuit).' Type 4 Theory-of-Mind is what most researchers are looking for when they test for Theory-of-Mind.

Previous studies of individuals with ASD have focused on what in this study is called Type 4 Theory-of-Mind, characterised by both fluent/logical imagination and effective communication. The majority of Theory-of-Mind studies (e.g., Baron-Cohen et al., 1985; Sally & Hill, 2006; Wellman et al., 2002) saw cognitive difficulties as the

characteristic of people with ASD. In contrast, Hobson (1993) saw deficient inter-subjective engagement as the characteristic of people with ASD. Despite their differences, both these approaches look for Theory-of-Mind in an ability to understand the mind of others and to communicate that understanding. In other words, they are looking for Type 4 Theory-of-Mind. This study, in contrast, has developed a wider concept of Theory-of-Mind.

8.5.2.2 Applying the Theory-of-Mind Typology

This section applies this typology to different aspects of Theory-of-Mind, beginning with some general patterns and continuing to the Theory-of-Mind continuum model. In doing so, it suggests that Theory-of-Mind is more complex and variegated than assumed in most studies. This in turn has implications both for further research into Theory-of-Mind and for the development of interventions in the field of special education.

Patterns of Theory-of-Mind. In terms of the broad patterns of Theory-of-Mind, the key finding is that more students with ASD could experience their own mental states than could understand them in others. In other words, more students fall within Type 3 Theory-of-Mind than Type 4. While some students with ASD could experience their own mental states but not understand those of others, there is no example of any student who could understand the mental states of others but not experience them himself. In other words, while there is a strong positive relationship between Types 3 and 4, there is no support for the assumption that an inability to understand the minds of others *necessarily* entails an inability to experience one's own mind.

These results differ from those found in previous studies (e.g., Baron-Cohen et al., 1985; Sally & Hill, 2006; Wellman et al., 2002), which have tended to focus on what in this study is called Type 4 Theory-of-Mind on the assumption that the presence of Type 4 Theory-of-Mind is *the* marker of Theory-of-Mind itself. Further, some studies (e.g., Frith & Happé, 1999) have assumed that Types 3 and 4 Theory-of-Mind are *necessarily* related: A person who can understand the mental states of others can also subjectively experience them, and a person who cannot understand the mental states of others cannot subjectively experience them. But this study has shown that although these two types of Theory-of-Mind are strongly associated, they are distinct from each other. Of the 20 students with ASD in this study, every student who understood the mental states of others could experience their own mental states, but not every student who experienced their own

mental states could understand those of others. In other words, while understanding the mental states of others can be seen as a guarantee of the ability to experience one's own mental states, the converse is not true.

Theory-of-Mind continuum model. The Theory-of-Mind continuum model (Figure 8.2), shows how students with ASD demonstrated differing degrees of understanding of Theory-of-Mind components according to their ability to utilise logical imagination within them. When this model is viewed within the grid provided by the Theory-of-Mind typology, the wide variety of Theory-of-Mind abilities of differing individuals can be revealed.

For example, taking a detailed look at the students in Group 1 of the Theory-of-Mind Continuum model (Figure 8.3), Student 1 demonstrated Types 3 and 4 Theory-of-Mind in emotion, false belief and visual perception, the three components of Theory-of-Mind included in the model because they showed the full spectra of imagination. Students 2, 3 and 4 demonstrated Types 3 and 4 Theory-of-Mind in empathy and false belief, and Types 2 and 3 Theory-of-Mind in visual perception. Student 5, meanwhile, demonstrated Types 2 and 3 Theory-of-Mind in all three components (Table 6.23).

This study suggests a new approach to understanding Theory-of-Mind, centred on the Theory-of-Mind continuum model and the Theory-of-Mind typology. This approach enables a detailed and sophisticated analysis of Theory-of-Mind at an individual level, which in turn sheds light on how Theory-of-Mind works within particular individuals, showing with depth and precision where their strengths and weaknesses lie. This in turn has the potential to assist educators in devising strategies that can acknowledge the individual strengths of learners and precisely target their specific weaknesses.

8.6 Reviewing Theory-of-Mind in the ASD Population

The review of previous studies of Theory-of-Mind found in Chapter 3 *Theory-of-Mind* addressed four issues: Focus on false belief rather than other mental states; focus on the minds of others rather than one's own mind; investigating Theory-of-Mind through tests rather than through lived experience; and the specific deficit approach to Theory-of-Mind rather than understanding how Theory-of-Mind actually works. These issues are discussed here in the light of the results of this study.

8.6.1 False Belief: Theory-of-Mind Component or Theory-of-Mind

Previous studies have focused on false belief as the marker of Theory-of-Mind (Hale & Tager-Flusberg, 2005; Hughes & Leekam, 2004), and the narrowness of this approach has been acknowledged by some researchers. Recent studies (e.g., Blackshaw et al., 2001; Brown & Whiten, 2000; Steele et al., 2003) have broadened their attention to include other mental states such as desire, emotion, joint attention and perception as aspects of Theory-of-Mind, and the present study can be seen as part of the same trend.

The Theory-of-Mind continuum model presented here demonstrates that false belief is just one of three components of Theory-of-Mind. While over half the students in this study demonstrated fluent/logical imagination within false belief, and thus demonstrated Theory-of-Mind, others did so within empathy and visual perception. However, if this study followed the dominant trend of exclusive reliance on false belief to establish Theory-of-Mind, students who demonstrated an understanding of empathy and visual perception would be classified as not experiencing Theory-of-Mind. It also follows that previous studies (e.g., Baron-Cohen et al., 1985; Sicotte & Stemberger, 1999), in giving priority to false belief, may have misclassified such individuals as showing a Theory-of-Mind deficit.

8.6.2 Understanding the Minds of Others or Experiencing One's Own Mind

Previous studies also placed a major focus on understanding the minds of others rather than one's own mind. Frith and Happé (1999) and Gopnik and Meltzoff (1994) suggested this approach, with the argument that the concept of self is so closely associated with that of others that difficulty in understanding the minds of others can indicate difficulty in understanding one's own mind.

This study demonstrated a strong correlation between experiencing of one's own mental states, such as empathy, false belief and visual perception, and understanding those of others, and that students who understand these mental states from the perspective of others can understand them from their own perspective. However, contrary to Frith and Happé (1999) and Gopnik and Meltzoff (1994), it also demonstrated that the converse is not true, that students with ASD can experience their own mental states but not understand those of others.

Rather than a simple either/or, presence/absence approach to Theory-of-Mind, it may be more productive to focus on the *experience* of Theory-of-Mind, including individual variations in strengths and weaknesses. This approach would include, for example, the five students in this study who demonstrated an understanding of visual perception from their own perspective but not that of others and three students who showed the same pattern in relation to false belief. In the Theory-of-Mind Typology, these students did not have a Theory-of-Mind of mind deficit; rather, they demonstrated Types 2 and 3 Theory-of-Mind in visual perception and false belief. Acknowledging their particular abilities and difficulties, educational programs that can address specific Theory-of-Mind experiences could be developed.

8.6.3 Tests or Lived Experiences of Theory-of-Mind

Most studies of Theory-of-Mind in people with ASD have relied on performance in false belief tasks to credit Theory-of-Mind. However, while these tests can show that individuals with ASD can or cannot think in the same way as people without ASD (Bovee, 2000), they cannot explain *how* they think. To investigate this, it is necessary to attend to the subjective experience of Theory-of-Mind for individuals with ASD. This study has taken an inside-out approach to students with ASD and revealed a wide variety of Theory-of-Mind abilities and difficulties, where the key factor in understanding the variety of Theory-of-Mind experiences has been revealed to be imagination on spectra.

A model of Theory-of-Mind that allows explanation of *how* people with ASD experience difficulties in Theory-of-Mind is particularly valuable because it can provide help in the next step of reducing these difficulties. This issue will be discussed in Section 8.7.

In brief, this study has demonstrated that including the voices of people with ASD by considering their inner experiences can provide insight into the Theory-of-Mind of this population. This study further calls for the voices of people with ASD to be included in future studies of Theory-of-Mind in this population, because such studies inevitably involve judgements about their minds.

8.6.4 Specific Deficit Approach or Theory-of-Mind Continuum Model

Previous Theory-of-Mind studies have been characterised by a specific deficit approach which disregards the varieties of experiences and performances in Theory-of-Mind among individuals with ASD. A Theory-of-Mind continuum model, on the other hand, can accommodate these varieties. All 20 students with ASD who participated in this study could be placed within it, divided into four groups and two variations on the basis of their ability to demonstrate the full spectrum of logical imagination in relation to Theory-of-Mind components.

The four groups range from fluency in all three components of Theory-of-Mind (i.e., Group 1) to difficulty in all three (i.e., Group 4), with the other groups and variations in between. What distinguishes the members of each group is that they share more commonalities than differences in Theory-of-Mind abilities. However, even though the groups were designed to accommodate differences in Theory-of-Mind abilities, two students could not be classified into the groups at all. These are classified as Variations 1 and 2. This indicates the difficulties inherent in neatly classifying Theory-of-Mind abilities, even when more choices are available than a simple binary of deficit or credit.

Further, the specific deficit approach to Theory-of-Mind cannot account for the Theory-of-Mind of students in Group 2 because of their difficulties with false belief. However, these students, who made up seven out of the 20 participants in this study, demonstrated Theory-of-Mind ability in empathy and visual perception.

According to the specific deficit approach to Theory-of-Mind found in most Theory-of-Mind studies these students do not have Theory-of-Mind, while according to the classic definition of Theory-of-Mind (i.e., the ability to impute mental states to the self and others) they do. They represent a population that has participated in Theory-of-Mind studies and has been misunderstood because of an exclusive focus on false belief as the marker of Theory-of-Mind.

If the view that false belief is the sole marker of Theory-of-Mind is discarded, it then becomes more difficult to decide what specific mental state or collection of states demonstrates the presence or absence of Theory-of-Mind. For example, one might conclude that the students in Group 4 do not have Theory-of-Mind because they did not demonstrate abilities in any of the three Theory-of-Mind components that showed the full spectrum of imagination (i.e., empathy, false belief and visual perception). However, these

students *were* fluent in utilising logical imagination within affection and desire, making any such judgement problematic.

This indicates that the specific deficit approach to Theory-of-Mind has an explanatory power that is far more limited than that of the Theory-of-Mind continuum model, which can accommodate the wide variety of Theory-of-Mind abilities and difficulties found within the lived experience of the ASD population.

8.7 Limitations and Implications

8.7.1 Limitations

This study of the Theory-of-Mind of students with ASD as subjectively experienced and objectively observed is subject to limitations in the administration of psychological tests, the conduct of exploratory factor analysis and the construction of a formal theory.

Psychological tests were administered to students with ASD to evaluate their IQ, social competence and degree of ASD. The researcher evaluated the IQs of all students with ASD (CA range 15:4-19:11) through the Korean-Wechsler Adult Intelligence Scale (K-WAIS). However, this test was standardised with adults aged over 16 years, while two students in this study had chronological ages under 16 (15:4 and 15:11). The researcher therefore administered another IQ test, the Korean Education Developmental Institute Wechsler Intelligence Scale for Children-Revised (KEDI-WISC), for these two students. The two students demonstrated scores that were below the floor of both tests. The results of K-WAIS were used to establish consistency in the analysis of the relationships between IQ and Theory-of-Mind components. Validity in the IQ tests remains problematic, regardless of the type of test, as the tests were not standardised for people with ASD, so no norms are available to differentiate the IQs of people with ASD within this population. This study therefore employed the raw IQ scores for quantitative analysis instead of the standardised IQ scores. The results of the IQ tests need to be interpreted with these limitations in mind.

The Korean Vineland Social Maturity Scale (KVSMS) was administered by teachers of students with ASD. The KVSMS is one of the most frequently used measures to evaluate developmental abilities of students with disabilities in Korea, fulfilling the purposes of intervention and research (e.g., Kang, 2007; Kim & Choe, 2003). Because of

its popularity, and supported by school policy, administering the KVSMS was part of the evaluation processes in the three special schools involved in this study. All teachers were familiar with administering this scale. However, the reliability of the KVSMS is problematic because of possible different perceptions regarding their students' social and developmental abilities held by teachers, whether more strict or more lenient. Because of the problematic reliability of the KVSMS, the relationship between social competence and Theory-of-Mind components requires caution in its interpretation.

In addition, further study is required to clarify the relationships between IQ, social competence and Theory-of-Mind components between and within individuals with ASD. False belief, in particular, demonstrated both a negative relationship and no significant relationship, according to different false belief tasks, with IQ and social competence. This calls for further study.

The degree of ASD was evaluated through the Korean Childhood Autism Rating Scale (KCARS, 1996), the Korean version of the Childhood Autism Rating Scale (CARS). KCARS is the most commonly used tool to evaluate ASD in special education school settings in Republic of Korea (e.g., Choi, 2003) and its reliability and validity have been generally acknowledged (Gillberg, Nordin & Ehlers, 1996; Jordan, 1999). However, this tool seemed inappropriate for this study because it is designed for children, while the students who participated in this study were mature (CA range 15:4-19:11). Nevertheless, given the absence of age appropriate tools, this study administered KCARS and supplemented it with a classification based on qualitative descriptions of the autistic symptoms of individual students (Section 4.6.6.2 of Chapter 4). The results of this study therefore require careful interpretation.

Another limitation concerns the analysis of the teachers' questionnaire. This questionnaire was first analysed using exploratory factor analysis. While the sample size (n=15) of this study meets the minimum requirement for exploratory factor analysis (Field, 2004), such a small sample size calls for cautious interpretation of any results.

The present study adopted a grounded theory approach to investigate the subjective experiences of students with ASD and their teachers. As a result, the Theory-of-Mind continuum model has been proposed. The Theory-of-Mind continuum model does not reflect *all* the variations found within Theory-of-Mind components. In order to throw into clear relief the use of logical imagination, it includes only those components of Theory-of-

Mind within which the full spectra of imagination are found. Including other components of Theory-of-Mind would make the model more complex, possibly too complex. However, a degree of complexity is inevitable when seeking to understand the nature of the human mind. The network of mental states and their relationships is so intimately intertwined, shading into each other through degrees, that the task of making a definite judgement regarding the presence or absence of Theory-of-Mind at any single point can only be a matter of interpretation.

The Theory-of-Mind continuum model and Theory-of-Mind Typology demonstrated their explanatory power for various Theory-of-Mind experiences of individuals with ASD. However, this theory regarding Theory-of-Mind needs to be formalised. A grounded theory approach involves collecting data from other settings after a substantive theory emerges, in order to build a formal theory (Glaser, 1992; Glaser & Strauss, 1967). However, this process was not included in this study. To formalise the substantive theory that has emerged from this study further data collection and analysis are required. Data collection needs to be done under the guidance of theoretical sampling, defined as gathering data from individuals who can contribute to developing a theory (Creswell, 1998; Strauss & Corbin, 1998). It needs to include a variety of individuals with ASD from a variety of settings to maximise the variations in Theory-of-Mind experiences.

Lastly, this substantive theory was based on 20 secondary and post secondary school students (CA 15:4-19:11, IQ below 44-77) and 11 teachers in Republic of Korea. Generalisation of the theory can therefore be limited to individuals with ASD sharing similar chronological ages and intellectual abilities – or at least applying this theory to individuals with ASD beyond these parameters requires acknowledgement of its limited applicability.

8.7.2 Implications

While this study has limitations, it also provides implications for research into and education of individuals with ASD. Firstly, this study opens up the possibility of including the voices of individuals with ASD in the study of their minds. To date, these voices are rarely heard in studies of their inner worlds (Baron-Cohen, 1995; Frith & Happé, 1999). This absence has been pointed out as a major problem in the study of Theory-of-Mind (Bovee, 2000). This study has demonstrated a way to include the voices of people with ASD through communication and the use of personalised research materials. These

practices were based on a social model of disabilities and self-determination, concepts from special education. As a result, this study contributes to the inclusion of both subjective and objective perspectives in research on the Theory-of-Mind of people with ASD.

By studying Theory-of-Mind as subjectively experienced, this study revealed the wide variety in strengths and difficulties in Theory-of-Mind demonstrated by students with ASD. Students with ASD found it easier to experience their own mental states than to understand those of others. Some students found it easier to experience affective mental states rather than cognitive mental states, while others found the opposite. In other words, students with ASD are generally better at using logical imagination across time (i.e., subjectivity) than space (i.e., inter-subjectivity). In addition, students had differing levels of difficulty in using logical imagination within mental states.

Students' subjective experiences informed the individual differences found in Theory-of-Mind. These individual differences can play a major role in teaching Theory-of-Mind for individuals with ASD. Unlike seeing Theory-of-Mind as a single system of 'pass' or 'fail', a focus on individual differences can guide choices regarding those aspects of Theory-of-Mind in particular individuals that need to be strengthened or compensated for.

As Pring (2000) explained, education mediates between subjectivity, in the form of personal experience, and objectivity, in the form of publicly held social knowledge. It follows that an understanding of subjectivity is fundamental for education. Individual differences in Theory-of-Mind mirror the subjective experiences of individuals with ASD. What is required is the development of systematic multidimensional tools capable of evaluating the complexity of Theory-of-Mind, along with educational programs to strengthen abilities and compensate for difficulties.

8.8 Conclusion

This study has investigated Theory-of-Mind as subjectively experienced by students with ASD and objectively understood by their teachers. It has been guided in how to view and study the mind by philosophy of mind, and in how to view and accommodate disabilities by special education.

Qualitative analysis, through a grounded theory approach, was used in order to remain as close as possible to the actual lived experiences of the individuals with ASD participating in this study. Quantitative analysis, guided by a mixed methods research design, was used to reveal a broad pattern of objectively measured cognitive and social abilities. Theory-of-Mind as subjectively experienced by students with ASD was compared to Theory-of-Mind as objectively understood by their teachers. This revealed a typology of Theory-of-Mind.

Reflecting on the research questions guiding this study, analysis of the subjective experiences of students with ASD gave rise to in-depth insights concerning the workings of Theory-of-Mind within their inner worlds. Students with ASD used the spectra of imagination to experience a wide variety of mental states within themselves and understand those in others. Some mental states (e.g., affection, anticipation and desire) were experienced and understood with fluent/logical imagination only while others (e.g., empathy, false belief and visual perception) were experienced and understood with the full spectrum of logical imagination. This study found that these students with ASD found it easier to experience their own minds than understand the minds of others. This meant that while there is a close relationship between experiencing one's own mind and understanding the minds of others, they are not necessarily tied.

Analysis of the objective understanding of their teachers gave rise to a broad picture of students' Theory-of-Mind abilities, as well as their developmental potential. A disparity was revealed between teachers' objective understanding of their students' Theory-of-Mind and the actual subjective experiences of the students. This disparity was largely a product of difficulties in communication. Teachers understood what their students expressed, but students expressed less than they experienced.

This study proposed a Theory-of-Mind continuum model based on students' subjective experiences, and a Theory-of-Mind typology based on the comparison between the subjective experiences of students with ASD and the objective understanding of their teachers. The Theory-of-Mind continuum model and Theory-of-Mind typology provide a detailed and sophisticated picture of the workings of Theory-of-Mind in individuals with ASD that has potential in the field of special education for the design and implementation of interventions precisely calibrated to suit specific individuals.

This study suggests that difficulties in understanding the mental states of others are not unique to students with ASD, as they were also experienced by teachers in their efforts to understand the Theory-of-Mind of their own students. This indicates the inherent obscurity of Theory-of-Mind, concerning as it does invisible mental states. This obscurity raises the question of why the difficulties that individuals with ASD have with understanding the mental states of others should be regarded as unique to them. While their difficulties are more obvious than those of individuals without ASD, the nature of these difficulties is not essentially different. For this reason, it is advisable to reflect upon the attitudes with which the difficulties that people with ASD have with Theory-of-Mind are approached, as well as the terminology used to describe these difficulties (e.g., 'mindblindness') and these individuals (e.g., 'passers' or 'failers'). There is no doubt that previous studies of Theory-of-Mind have made great contributions to elucidating the characteristics of ASD. These contributions will increase by continuing to reflect on the methodologies and terminologies that have been employed since the beginning of Theory-of-Mind studies.

While this study has created a new typology, it is not meant to provide a definitive way of viewing Theory-of-Mind. Rather, it seeks to open up new possibilities in Theory-of-Mind research, in particular by taking up the opportunity to actively engage the ASD population in a dialogue on the nature of ASD as it is actually experienced. By uniting both subjective and objective approaches to the study of Theory-of-Mind, much more can be learnt about the ASD population, and more effective educational interventions can be developed for them.

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APPENDICES

A-1 Interview Booklet (English)

A-2 Interview Booklet (Korean)

B-1 Teacher Questionnaire (English)

B-2 Teacher Questionnaire (Korean)

C-1 Participant Information Sheet for Parents and Guardians (English)

C-2 Participant Information Sheet for Parents and Guardians (Korean)

C-3 Participant Information Sheet for Teachers (English)

C-4 Participant Information Sheet for Teachers (Korean)

C-5 Participant Information Sheet for Principals (English)

C-6 Participant Information Sheet for Principals (Korean)

C-7 Consent Form for Parents and Guardians (English)

C-8 Consent Form for Parents and Guardians (Korean)

C-9 Consent Form for Teachers (English)

C-10 Consent Form for Teachers (Korean)

C-11 Consent Form for Principals (English)

C-12 Consent Form for Principals (Korean)

D-1 Drawings of Faces Showing Four Basic Emotions

D-2 Drawings of Four Situations

D-3 Word Cards

D-4 Cupcake, Kettle and Elephant Cards

D-5 Biscuit Boxes

D-6 Student-Drawn Portraits of Self and Friend

E-1 Korean Translation of Interview Sample with Bob

E-2 Korean Translation of Interview Sample with Brett

Interview Booklet (English)

1) When I am given a present, I feel ( ).
2) If my friend hits me, I feel ( ).
3) If my mum is sick, I feel ( ).
4) If I lose my mum in a supermarket, I feel ( ).
5) When I am alone, I feel ( ).
6) When I am with my friend, I feel ( ).
7) I am happy when ( ).
8) I am sad when ( ).
9) I am frightened when ( ).
10) I am angry when ( ).
11) I like ( ).
12) I dislike ( ).
13) I love ( ).
14) I hate ( ).
15) I need help from ( ).
16) When I am angry, I ( ).
17) If I am sick, my mum feels ( ).
18) If I am happy, my mum feels ( ).
19) If I shout during study time, my teacher feels ( ).
20) If I hit my friend, my friend feels ( ).
21) If my friend feels sad and cries, I feel ( ).
22) I want to ( ) to a sick and crying friend.
23) I ( ) a friend.
24) I want to (have / not have) a friend in the future.
25) My friend is ( ).
26) My friend does ( ) for me.

27) I do ( ) for my friend.

28) When I am with my friend, I feel ( ).

29) I don't like to hear ( ).

30) I don't like to taste ( ).

31) I don't like to smell ( ).

32) I don't like to feel ( ).

33) I don't like to see ( ).

34) I like to hear ( ).

35) I like to taste ( ).

36) I like to smell ( ).

37) I like to feel ( ).

38) I like to see ( ).

39) "Going to school" – reminds me of ( ).

40) "Going to school" – I hear ( ).

41) "Going to school" – I see ( ).

42) "Crying" – reminds me of ( ).

43) "Crying" – I hear ( ).

44) "Crying" – I see ( ).

Please choose O if the statement is correct or choose X if it is incorrect.

45) I prefer to be alone than to be with friends (O/X).

46) I prefer to be with friends than to be by myself (O/X).

Interview Booklet (Korean)

1) 나는 선물을 받을 때 기분이 ( ).

2) 나는 친구가 때리면 기분이 ( ).

3) 나는 엄마가 아프면 기분이 ( ).

4) 나는 마트에서 엄마를 잃어버리면 기분이 ( ).

5) 나는 혼자 있으면 기분이 ( ).

6) 나는 친구랑 있으면 기분이 ( ).

7) 나는 ( ) 기뻐요.

8) 나는 ( ) 슬퍼요.

9) 나는( ) 무서워요.

10) 나는 ( ) 화가 나요.

11) 나는 ( )가 좋아요.

12) 나는 ( )가 싫어요.

13) 나는 ( )를 사랑해요.

14) 나는 ( )가 미워요.

15) 나는 ( ) 의 도움이 필요해요.

16) 나는 화가 나면 ( ).

17) 내가 아프면 엄마의 기분이 ( ).

18) 내가 기쁘면 엄마의 기분이 ( ).

19) 내가 공부시간에 소리지르면 선생님 기분이 ( ).

20) 내가 친구를 때리면 친구의 기분이 ( ).

21) 친구가 슬퍼서 울면 나는 기분이 ( ).

22) 아파서 우는 친구에게 나는 ( ) 해주고 싶어요.

23) 나는 친구가 ( ).

24) 나는 앞으로 친구가 (있었으면/없었으면) 좋겠어요.

25) 내 친구는 ( ) 입니다.

26) 친구는 나에게 ( ) 을 해줍니다.

27) 나는 친구에게 ( ) 을 해줍니다.

28) 친구와 함께 있으면 기분이 ( ).

29) ( ) 소리가 싫어요.

30) ( ) 맛이 싫어요.

31) ( ) 냄새가 싫어요.

32) ( ) 느낌이 싫어요.

33) ( ) 을 보면 싫어요.

34) ( ) 소리가 좋아요.

35) ( ) 맛이 좋아요.

36) ( ) 냄새가 좋아요.

37) ( ) 느낌이 좋아요.

38) ( )을 보면 좋아요.

39) '학교에 가다'라고 하면 ( )이 떠올라요.

40) '학교에 가다'라고 하면 ( )이 들려요.

41) '학교에 가다'라고 하면 ( )이 보여요.

42) '울어요'라고 하면 ( )이 떠올라요.

43) '울어요'라고 하면 ( )이 들려요.

44) '울어요'라고 하면 ( )이 보여요.

아래의 설명이 맞으면 동그라미를, 틀리면 엑스표를 고르세요.

45) 나는 혼자 있을 때가 친구와 있을 때보다 더 좋아요 (O/X).

46) 나는 친구랑 있을 때가 혼자 있을 때보다 더 좋아요 (O/X).

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Investigating Theory of Mind

Researchers from the University of Sydney and Charles University, Prague, the Czech Republic, are seeking to investigate the understanding of the concept of Theory-of-Mind held by teachers. Theory-of-Mind is "the ability to explain and predict human behaviour by imputing mental states such as their beliefs, desires, intentions, and emotions, to the self and others".

While previous studies on Theory-of-Mind reported that people with Autism Spectrum Disorders (ASD) show difficulties in understanding Theory-of-Mind, they paid less attention to how people with ASD actually experience Theory-of-Mind. As a result, difficulties in understanding Theory-of-Mind demonstrated by people with ASD could not lead to intervention methods to improve them. This study aims to identify the implications of intervention in Theory-of-Mind by focusing on Theory-of-Mind as experienced by students with ASD and the opinions held by teachers concerning their students' Theory-of-Mind.

This questionnaire seeks information about your knowledge of and attitudes toward Theory-of-Mind. We would be grateful if you would agree to take part in our study by answering all questions and returning the questionnaire to the researchers. Please be assured that at no stage in the survey process will you be identified. Do not write your name on this survey, or any make other markings that would identify you. In completing this survey you agree for the researchers to use your results as part of their research. These results will be used to establish current levels of thinking about Theory-of-Mind held by pre-service teacher education students. Results from three countries will be examined and compared.

We thank you for considering this request.

Please tick a box where appropriate:

Age: ❒ <20 ❒ 21-29 ❒ 30-39 ❒ 40-49 ❒ 50+

Years of Teaching: _____

Gender: ❒ Male ❒ Female

Country of Study: ❒ Australia ❒ Korea ❒ Czech Republic

Highest degree awarded: _____

Major area of Teaching: _____

Minor area of study: _____

Statements from 1 to 34 concern your attitudes towards students with Autism Spectrum Disorders (ASD) regarding their ability to experience their own mental states and understand those of others. To answer, please fill in the circle beside each statement that most accurately presents the extent to which you agree or disagree with the statement. You may choose from a scale from ① to ⑤ where ① means you strongly agree with the statement and ⑤ means you strongly disagree.

►Scale : ①-Strongly agree, ②-Agree, ③-Neutral, ④-Disagree, ⑤-Strongly disagree.

Statement	Scale				
1. I think that students with ASD do not understand that people act on the basis of mental states, such as intention, desire, emotion, false belief and thought.	①	②	③	④	⑤
2. I think that for students with ASD, the ability to understand that people act on the basis of mental states, such as intention, desire, emotion, belief and thought does not change over time.	①	②	③	④	⑤
3. I think that students with ASD do not feel sadness.	①	②	③	④	⑤
4. I think that students with ASD do not feel happiness.	①	②	③	④	⑤
5. I think that students with ASD do not feel anger.	①	②	③	④	⑤
6. I think that students with ASD do not feel fear.	①	②	③	④	⑤
7. I think that students with ASD feel loneliness.	①	②	③	④	⑤
8. I think that students with ASD can develop strong emotional bonds with people.	①	②	③	④	⑤
9. I think that students with ASD can develop strong emotional bonds with animals.	①	②	③	④	⑤
10. I think that students with ASD are indifferent about having friends.	①	②	③	④	⑤
11. I think that students with ASD wish that their desire be understood by other people.	①	②	③	④	⑤
12. I think that students with ASD can understand the feelings of others if they understand their own feelings.	①	②	③	④	⑤
13. I think that students with ASD understand the feelings of others better if they can understand their own feelings.	①	②	③	④	⑤
14. I think that students with ASD do not understand the emotions of others.	①	②	③	④	⑤
15. I think that students with ASD do not understand the intentions of others.	①	②	③	④	⑤
16. I think that students with ASD do not understand the desires of others.	①	②	③	④	⑤
17. I think that students with ASD do not understand the beliefs of others.	①	②	③	④	⑤
18. I think that students with ASD do not understand the thoughts of others.	①	②	③	④	⑤
19. I think that students with ASD are extremely sensitive regarding one or more of the physical senses of seeing, hearing, touching, tasting and smelling.	①	②	③	④	⑤

►Scale : ①-Strongly agree, ②-Agree, ③-Neutral, ④-Disagree, ⑤-Strongly disagree.

Statement	Scale				
20. I think that students with ASD are extremely insensitive regarding one or more of the physical senses of seeing, hearing, touching, tasting and smelling.	①	②	③	④	⑤
21. I think that some students with ASD experience the physical senses of seeing, hearing, touching, tasting and smelling in a mixed or jumbled way.	①	②	③	④	⑤
22. I think that students with ASD process sensory information (seeing, hearing, touching, tasting and smelling) differently to their peers without ASD.	①	②	③	④	⑤
23. I think that students with ASD do not make eye contact.	①	②	③	④	⑤
24. I think that students with ASD are aware they are different from their peers without ASD.	①	②	③	④	⑤
25. I think that students with ASD can develop a sense of belonging.	①	②	③	④	⑤
26. I think that students with ASD understand that reality and their beliefs about reality can be different.	①	②	③	④	⑤
27. I think that students with ASD understand that reality and other people's beliefs about reality can be different.	①	②	③	④	⑤
28. I think that students with ASD can understand the intentions of others engaging in the same behaviour if they can understand their own intention to engage in a certain behaviour.	①	②	③	④	⑤
29. I think that students with ASD can understand the intentions of others engaging in the same behaviour better if they understand their own intention to engage in a certain behaviour.	①	②	③	④	⑤
30. I think that students with ASD think in pictures.	①	②	③	④	⑤
31. I think that students with ASD process information differently from their peers without ASD.	①	②	③	④	⑤
32. I think that students with ASD process information with no individual differences.	①	②	③	④	⑤
33. I think that for students with ASD, the ability to understand that people act on the basis of mental states such as intention, desire, emotion, belief and thought can develop over time.	①	②	③	④	⑤
34. I think that for students with ASD, the ability to understand that people act on the basis of mental states such as intention, desire, emotion, belief and thought can deteriorate over time.	①	②	③	④	⑤

Questions 35 to 38 concern your experiences regarding teaching students with ASD and the completion of this questionnaire. Please be free in expressing your experiences.

35. What is most difficult about teaching students with ASD?

36. Please provide any memorable episodes you have experienced while teaching students with ASD.

37. What do you think about ASD?

38. Please provide any comments on or advice for this questionnaire.

Thank you so much.

The University of Sydney 교육 사회복지 대학

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마음 이론 탐구

시드니 대학교 연구자들과 체코 프라하에 위치한 촬스 대학교 연구자가 자폐성 장애 학생들을 지도하시는 선생님의 마음이론에 대한 이해도를 탐구하고자 합니다. 마음이론이란 "바람, 감정, 의도, 믿음, 생각 등의 마음 상태를 자신과 타인에게 비추어 인간 행동을 설명하고 예측하는 능력"을 말합니다.

기존 마음 이론 연구는 자폐성 장애인들의 마음이론 결핍을 보고해 왔을 뿐, 실제로 이들이 마음이론을 어떻게 경험하는지는 간과해왔습니다. 그 결과, 종전의 마음 이론 연구는 자폐성 장애인들의 교육을 증진시킬 수 있는 교육방법을 제공해오지 못했습니다. 이에 따라 본 연구는 자폐성 장애인들이 마음이론을 어떻게 경험하는지와 교육현장에서 자폐성 장애아동을 지도하시는 선생님의 의견에 초점을 맞추고 있어, 실제로 이들의 교육에 실제적 증진을 가져올 것으로 기대됩니다.

본 설문지는 마음이론에 대한 선생님의 이해와 태도에 관한 정보를 담고 있습니다. 본 설문지 작성은 자발적입니다. 선생님께서 모든 질문들에 답한 후 연구자에게 설문지를 돌려 주시는 것을 통해 본 연구에 참여해주신다면 대단히 감사하겠습니다. 본 설문지를 작성하는 것은 설문지에 담긴 정보를 연구자에게 연구의 일환으로 활용할 수 있도록 동의하시는 것을 의미합니다. 자폐성 장애 학생들의 마음이론에 관한 교사의 이해도에 대한 결과가 대한민국, 호주, 체코의 세 나라에서 수집되어 조사·비교될 것입니다. 설문지 처리의 어느 절차에서도 선생님의 개인적인 정보를 알리지 않을 것임을 약속 드립니다. 설문지에 이름을 기입하거나, 선생님의 개인적인 정보를 알릴 만한 어떤 표시도 남기지 마시길 바랍니다.

본 요청에 대해 검토해 주신데 감사 드립니다.

관련된 정보에 표시해주십시오:

나이: ❒ <20 ❒ 21-29 ❒ 30-39 ❒ 40-49 ❒ 50+

교육경력: _____

성별: ❒ 남자 ❒ 여자

나라: ❒ 호주 ❒ 한국 ❒ 체코

최종학력: _____

주전공: _____

부전공 (중등의 경우): _____

본 설문지의 1번부터 34번까지 문항은 자폐성 장애 학생들의 자신과 타인의 마음상태를 이해하는 능력에 대한 선생님의 태도와 이해에 대한 질문으로 구성되어 있습니다. 본 설문지에 답하기 위해, 선생님의 의견에 부합되는 1부터 5까지 해당하는 기준 척도에 동그라미를 그려 주세요.

▶척도 기준 : ①-강하게 동의함, ②-동의함, ③-보통, ④-동의 안 함, ⑤-강하게 동의 안 함.

문항	척도				
1. 나는, 자폐성 장애 학생은 **사람들이 의도, 바람, 감정, 믿음, 생각 등과 같은 마음 상태에 따라 행동한다는 것**에 대해 이해하지 못한다고 생각한다.	①	②	③	④	⑤
2. 나는, **사람들이 의도, 바람, 감정, 믿음, 생각 등과 같은 마음 상태에 따라 행동한다는 것**에 대한 자폐성 장애 학생의 이해도가 시간이 지나도 변하지 않는다고 생각한다.	①	②	③	④	⑤
3. 나는, **자폐성 장애 학생은 슬픔을 느끼지 않는다**고 생각한다.	①	②	③	④	⑤
4. 나는, **자폐성 장애 학생은 기쁨을 느끼지 않는다**고 생각한다.	①	②	③	④	⑤
5. 나는, **자폐성 장애 학생은 화남을 느끼지 않는다**고 생각한다.	①	②	③	④	⑤
6. 나는, **자폐성 장애 학생은 두려움을 느끼지 않는다**고 생각한다.	①	②	③	④	⑤
7. 나는, **자폐성 장애 학생은 외로움을 느끼지 않는다**고 생각한다.	①	②	③	④	⑤
8. 나는, **자폐성 장애 학생은 사람들과 강한 감정적 유대를 형성할 수 있다**고 생각한다.	①	②	③	④	⑤
9. 나는, **자폐성 장애 학생은 동물과 강한 감정적 유대를 형성할 수 있다**고 생각한다.	①	②	③	④	⑤
10. 나는, **자폐성 장애 학생은 친구가 있던 없던 상관하지 않는다**고 생각한다.	①	②	③	④	⑤
11. 나는, **자폐성 장애 학생이 자신의 바람이나 요구를 다른 사람들에게 이해 받고 싶어한다**고 생각한다.	①	②	③	④	⑤
12. 나는, **자폐성 장애 학생이 자신의 느낌을 이해한다면 다른 사람의 느낌도 이해할 수 있다**고 생각한다.	①	②	③	④	⑤
13. 나는, **자폐성 장애 학생이 자신의 느낌을 이해한다면 다른 사람의 느낌을 더 잘 이해할 수 있다**고 생각한다.	①	②	③	④	⑤
14. 나는, **자폐성 장애 학생은 다른 사람들의 감정을 이해하지 못한다**고 생각한다.	①	②	③	④	⑤
15. 나는, **자폐성 장애 학생은 다른 사람들의 의도를 이해하지 못한다**고 생각한다.	①	②	③	④	⑤
16. 나는, **자폐성 장애 학생은 다른 사람들의 바람을 이해하지 못한다**고 생각한다.	①	②	③	④	⑤

▶척도 기준 : ①-강하게 동의함, ②-동의함, ③-보통, ④-동의 안 함, ⑤-강하게 동의 안 함.

17. 나는, **자폐성 장애 학생은 다른 사람들의 믿음을 이해하지 못한다**고 생각한다.	①	②	③	④	⑤
18. 나는, **자폐성 장애 학생은 다른 사람들의 생각을 이해하지 못한다**고 생각한다.	①	②	③	④	⑤
19. 나는, **자폐성 장애 학생은 시각, 청각, 촉각, 미각, 후각 등의 신체 감각 중 하나 또는 그 이상에 대해 극도로 민감하다**고 생각한다.	①	②	③	④	⑤
20. 나는, **자폐성 장애 학생은 시각, 청각, 촉각, 미각, 후각 등의 신체 감각 중 하나 또는 그 이상에 대해 극도로 둔하다**고 생각한다.	①	②	③	④	⑤
21. 나는, **자폐성 장애 학생은 시각, 청각, 촉각, 미각, 후각 등의 신체 감각들 중 한 가지 이상을 과민하게 혼합된 상태(예. 감각폭풍)로 경험할 수 있다**고 생각한다.	①	②	③	④	⑤
22. 나는, **자폐성 장애 학생은 시각, 청각, 촉각, 미각, 후각 등의 감각 정보를 비자폐성 급우들과는 다르게 처리한다**고 생각한다.	①	②	③	④	⑤
23. 나는, **자폐성 장애 학생은 눈맞춤을 하지 못한다**고 생각한다.	①	②	③	④	⑤
24. 나는, **자폐성 장애 학생이 본인과 비자폐성 급우들 간에 차이가 있음을 느낀다**고 생각한다.	①	②	③	④	⑤
25. 나는, **자폐성 장애 학생이 소속감을 계발시킬 수 있다**고 생각한다.	①	②	③	④	⑤
26. 나는, **자폐성 장애 학생은 실제로 일어난 사건과, 사건에 대한 본인의 믿음이 실재와 다를 수 있다는 것을 이해한다**고 생각한다.	①	②	③	④	⑤
27. 나는, **자폐성 장애 학생은 실제로 일어난 사건과, 사건에 대한 타인의 믿음이 실재와 다를 수 있다는 것을 이해한다**고 생각한다.	①	②	③	④	⑤
28. 나는, **자폐성 장애 학생이 어떤 행동에 대한 자신의 의도를 이해한다면 같은 행동을 하는 다른 사람들의 의도도 이해할 수 있다**고 생각한다.	①	②	③	④	⑤
29. 나는, **자폐성 장애 학생이 어떤 행동에 대한 자신의 의도를 이해한다면 같은 행동을 하는 다른 사람들의 의도를 더 잘 이해할 수 있다**고 생각한다.	①	②	③	④	⑤
30. 나는, **자폐성 장애 학생은 주로 정보를 시각적 그림으로 처리한다**고 생각한다.	①	②	③	④	⑤
31. 나는, **자폐성 장애 학생은 비자폐 급우들과 정보를 처리하는 방법이 다르다**고 생각한다.	①	②	③	④	⑤

▶척도 기준 : ①-강하게 동의함, ②-동의함, ③-보통, ④-동의 안 함, ⑤-강하게 동의 안 함.

32. 나는, **자폐성 장애 학생들이 정보를 처리하는 방법에 개인차가 없다**고 생각한다.	①	②	③	④	⑤
33. 나는, **의도, 바람, 감정, 믿음, 생각 등과 같은 마음상태가 사람의 행동을 동기화 한다는 것**에 대한 자폐성 장애 학생의 이해도가 시간이 지남에 따라 향상될 수 있다고 생각한다.	①	②	③	④	⑤
34. 나는, **의도, 바람, 감정, 믿음, 생각 등과 같은 마음상태가 사람의 행동을 동기화 한다는 것**에 대한 자폐성 장애 학생의 이해도가 시간이 지남에 따라 저하될 수도 있다고 생각한다.	①	②	③	④	⑤

35번부터 38번까지는 자폐성 장애학생 지도와 본 설문지를 작성하시면서 선생님들의 느낀 점에 관한 질문입니다. 선생님들의 의견을 자유롭게 기술하여 주십시오.

35. 자폐성 장애 학생을 가르치시면서 가장 어려운 점은 무엇입니까?

36. 자폐성 장애 학생을 가르치시면서 기억에 남는 에피소드가 있다면 말씀해주십시오.

37. 자폐성 장애에 대해 어떻게 생각하시는지 적어주십시오.

38. 본 설문지 작성 중 선생님께서 느끼신 점이나 조언하실 부분이 있다면 말씀해주십시오.

수고 많이 하셨습니다. 대단히 감사합니다.

The University of Sydney

Faculty of Education and Social Work

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PARTICIPANT INFORMATION SHEET

Investigating Theory of Mind

Dear Parent or Guardian,

(1) What is the study about?

This study aims to investigate the thoughts and beliefs of persons who are responsible for the care of students or persons diagnosed with a disability and/or **Autism Spectrum Disorder**.

(2) Who is carrying out the study?

Associate Professor David Evans, from the Faculty of Education and Social Work at the University of Sydney, in collaboration with Dr Iva Strnadova, Charles University, Prague, The Czech Republic, and Visiting Scholar at the University of Sydney. Also working on this project will be Ms Yoon Suk Hwang, who is undertaking research towards her Doctor of Philosophy. She will be under the supervision of Professor Evans throughout the project.

(3) What does the study involve?

We are asking you to contribute to this project by completing an interview with one of the researchers. The interview consists of a series of questions asking you about your experiences in caring for your child, the services that you use to assist you to meet the **needs** of your child, and your knowledge and understanding of how social skills, emotional well-being and theory-of-mind **are** promoted with your child. You are not obliged to answer all questions, and you are welcome to contribute other comments that you believe are important to how you meet the needs of your child.

At the conclusion of the interview we would like to ask your child some questions about how they socialize with other children. We would like to first spend time with your child to assist them become acquainted with the researcher; we will **then** have them answer some questions. You are welcome to remain with the researcher while these questions are being asked.

(4) How much time will the study take?

The interviews will take 45 minutes at a time that is convenient for you. The interview with your child will take approximately 60 minutes on two occasions.

(5) Can I withdraw from the study?

Involvement of you and your child in this study is completely voluntary - you are not under any obligation to consent. **Should you decide to withdraw, you have the right to request that any data collected or recorded be destroyed. You also have the right to observe the destruction of the records in an appropriate manner.**

(6) Will anyone else know the results?

All aspects of the study, including the results, will be strictly confidential and only the researcher will have access to information on participants except as required by law. A report of the study will be made available to you and your child; further reports may be presented at conferences or submitted for publication, but individual participants or the school/institution will not be identifiable in such materials.

(7) Will the study benefit me?

The information gathered from this project will be used to gain a greater understanding of how parents and families cater for persons with disabilities and **Autism Spectrum Disorder**. We plan to use this information to inform the development of education programs **to** better meet the needs of students/persons with disabilities.

(8) Can I tell other people about the study?

You are welcome to tell other parents and people about this study. If they wish further information I would be happy to talk with them. They can contact Associate Professor Evans at +61 2 9351 8463, or Dr Strnadova at +42 0221 900 270.

(9) What if I require further information?

When you have read this information, I will be happy to discuss it with you further and answer any questions you may have. If you would like further information at any stage, please feel free to **contact** me (Ph: +61 2 9351 8463).

(10) What if I have a complaint or concerns?

Any person with concerns or complaints about the conduct of a research study can contact the Manager, Ethics Administration, University of Sydney on + 61 2 9351 4811 (telephone); +61 2 9351 6706 (facsimile) or gbriody@usyd.edu.au (email)

This information sheet is for you to keep

Yours Sincerely

David Evans PhD Iva Strnadova PhD Yoon Suk Hwang
5th November, 2006

The University of Sydney

Faculty of Education and Social Work
Building A35

NSW 2006 AUSTRALIA

데이빗 에반스 철학박사
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안에서 바라보기: 자폐성 장애인이 경험하는 마음이론

학부모님께,

안녕하세요. 호주 시드니 대학교에서 데이빗 에반스 교수 지도 하에 박사과정을 밟고 있는 황윤숙입니다. 귀댁의 자녀가 본 박사연구 프로젝트에 참여할 수 있도록 학부모님의 허락을 구하고자 합니다.

연구 소개

본 연구는 마음이론과 관련해, 자폐성 장애 학생들이 마음에 대해 겪는 어려움 및 장점 등을 포함한 내적 경험을 탐구하고자 합니다. 마음이론이란 주의, 의도, 바람, 감정, 믿음 등의 마음 상태를 미루어 본인이나 타인의 행동 등을 이해하는 능력을 일컫습니다.

연구 방법

a) 고등학교에 재학 중인 자폐성 장애 학생 총 20명이 본 연구에 참여합니다.
b) 참여 학생들은 본 연구자(황윤숙)와 인터뷰를 하게 됩니다. 인터뷰는 대략 한 시간 정도가 걸릴 것으로 예상되며, 필요할 경우, 후속 인터뷰를 요청 받으실 수도 있습니다.
c) 인터뷰는 교내에 위치한 조용한 교실에서 수업 시간 중에 실시될 것이고, 자료 분석을 위해 비디오 녹화될 것입니다. 만약 인터뷰 중 학생이 불편해 하는 것이 관찰될 경우, 인터뷰가 종료될 것이며, 학생 본인 역시 인터뷰의 종료를 어느 때건 요청할 수 있습니다.

연구 효과

마음 이론 연구는 자폐성 장애인들의 마음이론 결핍을 보고해 왔을 뿐, 실제로 이들이 마음이론을 어떻게 경험하는지는 간과해왔습니다. 그 결과, 종전의 마음 이론 연구는 자폐성 장애인들의 교육을 증진시킬 수 있는 교육방법을 제공해오지 못했습니다. 본 연구는 자폐성 장애인들이 마음이론을 어떻게 경험하는지에 초점을 맞추고 있어 실제로 이들의 교육에 실제적 증진을 가져올 것으로 기대됩니다.

비밀 보장

인터뷰 참여자의 비밀 보장은 가명사용, 신원확인이 가능한 자료를 삭제하거나 코드로 대체함으로써 철저하게 보장될 것입니다. 모든 자료는 법에서 지정한대로 시드니 대학교 내의 안전한 장소에 7년 동안 보관될 것이며, 이후에는 가장 효과적으로 안전한 방법으로 폐기 처분될 것입니다.

자발적 참여

본 연구 참여는 자발적으로 이루어지며, 참여자들은 어느 때건 참여를 철회할 수 있습니다. 본 연구는 시드니 대학교 인간 연구 윤리 위원회의 승인을 받았습니다. 따라서 만약 본

연구와 관련해 어떤 문의나 불만이 있으실 경우 윤리 위원회 담당자에게 연락을 하실 수 있습니다 (61 2 9351 4811). 이와 관련한 문제는 철저하게 비밀리에 처리될 것이며, 그 처리 결과가 당신에게 보고될 것입니다.

더 문의사항이 있으실 경우, 연구자 황윤숙(y.hwang@edfac.usyd.edu.au)이나 지도교수 데이빗 에반스 (d.evans@edfac.usyd.edu.au.)에게 연락하시기 바랍니다. 본 연구에 귀댁의 자녀가 참여하는 것을 고려해주셔서 감사 드립니다. 참여에 동의하시는 경우, 본 편지에 동봉된 참여 허가서에 서명하시어 연구자(황윤숙)에게 돌려주시면 감사하겠습니다.

황윤숙, David Evans (Ph.D.) 드림.

The University of Sydney

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Facsimile +61 2 9351 2606
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PARTICIPANT INFORMATION SHEET

Investigating Theory of Mind

Dear Teacher,

(1) What is the study about?
The aim of this study is to explore the inner experiences of students with intellectual disabilities and Autism Spectrum Disorder (ASD) regarding Theory-of-Mind, their difficulties as well as their strengths. Theory-of-Mind is the ability to understand human behaviour through imputing mental states, such as attention, intention, desire, emotion and belief, to oneself and others.

(2) Who is carrying out the study?
Associate Professor David Evans, from the Faculty of Education and Social Work at the University of Sydney, in collaboration with Dr Iva Strnadova, Charles University, Prague, The Czech Republic, and Honorary Associate at the University of Sydney. Also working on this project will be Ms Yoon Suk Hwang who is undertaking research towards her Doctor of Philosophy; she will be under the supervision of Professor Evans throughout the project.

(3) What does the study involve?
This part of the study involves one of the researchers interviewing you about how you promote issue relating to Theory-of-Mind with students in your classroom. The questions will seek to gather information about how you promote Theory-of-Mind in your classroom, as well as your knowledge about the concept of Theory-of-Mind.

(4) How much time will the study take?
The interview with will last approximately 45 minutes, and will be conducted at a time convenient to yourself.

(5) Can I withdraw?
Involvement in this study is completely voluntary - you are not under any obligation to consent. You have the right to request that any data collected or recorded be destroyed should you decide to withdraw and can observe that such records are destroyed appropriately

(6) Will anyone else know the results?
All aspects of the study, including results, will be strictly confidential and only the researcher will have access to information on participants except as required by law. A report of the study will be made available to you **and your child;** further reports may be presented at conferences or submitted for publication, but individual participants or the school/institution will not be identifiable in such materials.

(7) Will the study benefit me?
The information gathered from this project will be used to gain a greater understanding of how teachers cater for persons with disabilities and Autism Spectrum Disorders. We plan to use this information to better inform the development of education programs that better meet the needs of students/persons with disabilities.

(8) Can I tell other people about the study?

You are welcome to tell other parents and people about this study. If they wish further information I would be happy to talk with them. They can contact Associate Professor Evans at +61 2 9351 8463, or Dr Strnadova at +42 0221 900 270.

(9) What if I require further information?

When you have read this information, I will be happy to discuss it with you further and answer any questions you may have. If you would like further information at any stage, please feel free to me (Ph: +61 2 9351 8463).

(10) What if I have a complaint or concerns?

Any person with concerns or complaints about the conduct of a research study can contact the Manager, Ethics Administration, University of Sydney on + 61 2 9351 4811 (telephone); +61 2 9351 6706 (facsimile) or gbriody@usyd.edu.au (email)

This information sheet is for you to keep

Yours Sincerely

David Evans PhD
Iva Strnadova PhD
Yoon Suk Hwang

5th November, 2006

The University of Sydney

Faculty of Education and Social Work
Building A35

NSW 2006 AUSTRALIA

데이빗 에반스 철학박사
특수교육과 부교수
조기 중재 센터장

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안에서 바라보기: 자폐성 장애인이 경험하는 마음이론

선생님께,

안녕하세요. 호주 시드니 대학교에서 데이빗 에반스 교수 지도 하에 박사과정을 밟고 있는 황윤숙입니다. 본 박사연구 프로젝트에 선생님의 참여를 구하고자 합니다

연구 소개

본 연구는 마음이론과 관련해, 자폐성 장애 학생들이 마음에 대해 겪는 어려움 및 장점 등을 포함한 내적 경험을 탐구하고자 합니다. 본 연구는 또한 자폐성 장애 학생들의 마음이론에 대한 교사들의 이해와 태도를 알아보고자 합니다. 마음이론이란 주의, 의도, 바람, 감정, 믿음 등의 마음 상태를 미루어 본인이나 타인의 행동 등을 이해하는 능력을 일컫습니다.

연구 방법

a) 고등학교에 재학 중인 자폐성 장애 학생과 그들을 가르치는 교사, 각각 20명이 본 연구에 참여합니다.
b) 참여 교사들은 본 연구자(황윤숙)와 인터뷰를 하게 됩니다. 인터뷰는 대략 한 시간 정도가 걸릴 것으로 예상되며, 필요할 경우, 후속 인터뷰를 요청 받으실 수도 있습니다. 참여 교사들에 의해 작성된 교육 관련 문서들 (예. 개별화 교육 계획안)이 수집, 문서에 기재된 장단기 목표 등이 분석될 수도 있니다.
c) 인터뷰는 교내에 위치한 조용한 교실에서 방과 후에 실시될 것이고, 자료 분석을 위해 녹음될 것입니다. 만약 인터뷰 중 교사가 불편함을 느낄 경우, 인터뷰 종료를 요청하실 수 있으며, 인터뷰가 종료될 것입니다.

연구 효과

마음 이론 연구는 자폐성 장애인들의 마음이론 결핍을 몇몇의 심리학적 실험에 기초해 보고해 왔을 뿐, 실제로 이들이 마음이론을 어떻게 경험하는지, 또 자폐성 장애 학생들의 마음이론에 대해 교사들의 어떻게 이해하고 있는지 등은 간과되어 왔습니다. 그 결과, 종전의 마음 이론 연구는 자폐성 장애인들의 교육을 증진시킬 수 있는 교육방법을 제공해오지 못했습니다. 본 연구는 마음이론의 교육적 부분에 보다 초점을 맞추고 있어 실제로 이들의 교육에 실제적 증진을 가져올 것으로 기대됩니다.

비밀 보장

인터뷰 참여자의 비밀 보장은 가명사용, 신원확인이 가능한 자료를 삭제하거나 코드로 대체함으로써 철저하게 보장될 것입니다. 모든 자료는 법에서 지정한대로 시드니 대학교 내의 안전한 장소에 7년 동안 보관될 것이며, 이후에는 가장 효과적으로 안전한 방법으로 폐기 처분될 것입니다.

자발적 참여

본 연구 참여는 자발적으로 이루어지며, 참여자들은 어느 때건 참여를 철회할 수 있습니다. 본 연구는 시드니 대학교 인간 연구 윤리 위원회의 승인을 받았습니다. 따라서 만약 본 연구와 관련해 어떤 문의나 불만이 있으실 경우 윤리 위원회 담당자에게 연락을 하실 수 있습니다 (61 2 9351 4811). 이와 관련한 문제는 철저하게 비밀리에 처리될 것이며, 그 처리 결과가 당신에게 보고될 것입니다.

더 문의사항이 있으실 경우, 연구자 황윤숙(y.hwang@edfac.usyd.edu.au)이나 지도교수 데이빗 에반스 (d.evans@edfac.usyd.edu.au.)에게 연락하시기 바랍니다. 본 연구에 귀댁의 자녀가 참여하기를 희망하시는 경우, 본 편지에 동봉된 참여 허가서에 서명하시어 연구자(황윤숙)에게 돌려주시면 감사하겠습니다.

황윤숙, David Evans (Ph.D.) 드림.

The University of Sydney

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PARTICIPANT INFORMATION SHEET

Investigating Theory of Mind

Dear Principal,

(1) What is the study about?
The aim of this study is to explore the inner experiences of students with intellectual disabilities and Autism Spectrum Disorder (ASD) regarding Theory-of-Mind, their difficulties as well as their strengths. Theory-of-Mind is the ability to understand human behaviour through imputing mental states, such as attention, intention, desire, emotion and belief, to oneself and others.

(2) Who is carrying out the study?
Associate Professor David Evans, from the Faculty of Education and Social Work at the University of Sydney, in collaboration with Dr Iva Strnadova, Charles University, Prague, The Czech Republic, and Honorary Associate at the University of Sydney. Also working on this project will be Ms Yoon Suk Hwang who is undertaking research towards her Doctor of Philosophy; she will be under the supervision of Professor Evans throughout the project.

(3) What does the study involve?
This part of the study involves one of the researchers interviewing a teacher in your school about how you promote issue relating to Theory-of-Mind with students in their classroom. The questions will seek to gather information about how they promote Theory-of-Mind in their classroom, as well as their knowledge about the concept of Theory-of-Mind.

(4) How much time will the study take?
The interview with will last approximately 45 minutes, and will be conducted at a time convenient to the teacher.

(5) Can I withdraw ?
Involvement in this study is completely voluntary - you are not under any obligation to consent the teacher in your school to participate. You have the right to request that any data collected or recorded be destroyed should you decide to withdraw your consent and can observe that such records are destroyed appropriately

(6) Will anyone else know the results?
All aspects of the study, including results, will be strictly confidential and only the researchers will have access to information on participants except as required by law. A report of the study will be made available to you and the teacher; further reports may be presented at conferences or submitted for publication, but individual participants or the school/institution will not be identifiable in such materials.

(7) Will the study benefit me?
The information gathered from this project will be used to gain a greater understanding of how teachers cater for persons with disabilities and Autism Spectrum Disorders. We plan to use this information to

better inform the development of education programs that better meet the needs of students/persons with disabilities.

(8) Can I tell other people about the study?

You are welcome to tell other parents and people about this study. If they wish further information I would be happy to talk with them. They can contact Associate Professor Evans at +61 2 9351 8463, or Dr Strnadova at +42 0221 900 270.

(9) What if I require further information?

When you have read this information, I will be happy to discuss it with you further and answer any questions you may have. If you would like further information at any stage, please feel free to me (Ph: +61 2 9351 8463).

(10) What if I have a complaint or concerns?

Any person with concerns or complaints about the conduct of a research study can contact the Manager, Ethics Administration, University of Sydney on + 61 2 9351 4811 (telephone); +61 2 9351 6706 (facsimile) or gbriody@usyd.edu.au (email)

This information sheet is for you to keep

Yours Sincerely

David Evans PhD
5th November, 2006

Iva Strnadova PhD

Yoon Suk Hwang

The University of Sydney

Faculty of Education and Social Work
Building A35

NSW 2006 AUSTRALIA

데이빗 에반스 철학박사
특수교육과 부교수
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메일: d.evans@edfac.usyd.edu.au

안에서 바라보기: 자폐성 장애인이 경험하는 마음이론

교장 선생님께,

안녕하세요. 호주 시드니 대학교에서 데이빗 에반스 교수 지도 하에 박사과정을 밟고 있는 황윤숙입니다. 귀교의 본 박사연구 프로젝트 참여를 위해 교장선생님의 허락을 구하고자 합니다

연구 소개

본 연구는 마음이론과 관련해, 자폐성 장애 학생들이 마음에 대해 겪는 어려움 및 장점 등을 포함한 내적 경험을 탐구하고자 합니다. 본 연구는 또한 자폐성 장애 학생들의 마음이론에 대한 교사들의 이해와 태도를 알아보고자 합니다. 마음이론이란 주의, 의도, 바람, 감정, 믿음 등의 마음 상태를 미루어 본인이나 타인의 행동 등을 이해하는 능력을 일컫습니다.

연구 방법

a) 고등학교 별로 각각 한명에서 세 명 사이의 자폐성 장애 학생과 특수교육 교사 (귀교 내 특수교육 교사의 인원에 따라)가 본 연구에 참여하게 됩니다. 총 40명의 학생들과 그들의 교사가 모집됩니다.
b) 참여 교사들은 본 연구자(황윤숙)와 인터뷰를 하게 됩니다. 인터뷰는 대략 한 시간 정도가 걸릴 것으로 예상되며, 필요할 경우, 후속 인터뷰를 요청 받으실 수도 있습니다. 참여 교사들에 의해 작성된 교육 관련 문서들 (예. 개별화 교육 계획안)이 수집, 문서에 기재된 장단기 목표 등이 분석될 것입니다.
c) 학생 인터뷰는 교내에 위치한 조용한 교실에서 방과 중에 실시될 것입니다. 교사 인터뷰는 수업이 끝난 후 실시될 것입니다. 인터뷰들은 자료 분석을 위해 비디오 녹화될 것이며, 만약 인터뷰 중 학생이 불편함을 느낄 경우, 인터뷰는 종료될 것이며, 학생과 교사는 인터뷰 종료를 요청하실 수 있습니다.

연구 효과

마음 이론 연구는 자폐성 장애인들의 마음이론 결핍을 몇몇의 심리학적 실험에 기초해 보고해 왔을 뿐, 실제로 이들이 마음이론을 어떻게 경험하는지, 또 자폐성 장애 학생들의 마음이론에 대해 교사들의 어떻게 이해하고 있는지 등은 간과되어 왔습니다. 그 결과, 종전의 마음 이론 연구는 자폐성 장애인들의 교육을 증진시킬 수 있는 교육방법을 제공해오지 못했습니다. 본 연구는 마음이론의 교육적 부분에 보다 초점을 맞추고 있어 실제로 이들의 교육에 실제적 증진을 가져올 것으로 기대됩니다.

비밀 보장

인터뷰 참여자의 비밀 보장은 가명사용, 신원확인이 가능한 자료를 삭제하거나 코드로 대체함으로써 철저하게 보장될 것입니다. 모든 자료는 법에서 지정한대로 시드니 대학교

내의 안전한 장소에 7년 동안 보관될 것이며, 이후에는 가장 효과적으로 안전한 방법으로 폐기 처분될 것입니다.

자발적 참여

본 연구 참여는 자발적으로 이루어지며, 참여자들은 어느 때건 참여를 철회할 수 있습니다. 본 연구는 시드니 대학교 인간 연구 윤리 위원회의 승인을 받았습니다. 따라서 만약 본 연구와 관련해 어떤 문의나 불만이 있으실 경우 윤리 위원회 담당자에게 연락을 하실 수 있습니다 (61 2 9351 4811). 이와 관련한 문제는 철저하게 비밀리에 처리될 것이며, 그 처리 결과가 당신에게 보고될 것입니다.

더 문의사항이 있으실 경우, 연구자 황윤숙(y.hwang@edfac.usyd.edu.au)이나 지도교수 데이빗 에반스 (d.evans@edfac.usyd.edu.au.)에게 연락하시기 바랍니다. 본 연구에 귀댁의 자녀가 참여하기를 희망하시는 경우, 본 편지에 동봉된 참여 허가서에 서명하시어 연구자(황윤숙)에게 돌려주시면 감사하겠습니다.

황윤숙, David Evans (Ph.D.) 드림.

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PARENTAL (OR GUARDIAN) CONSENT FORM

I, ... agree to participate, and permit .....……..... , who is aged ..... years, to participate in the research project – **Investigating Theory of Mind**.

In giving my consent I acknowledge that:

1. I have read the Participant Information Sheet and the time involved for my son/daughter's participation in the project. The researcher/s has given me the opportunity to discuss the information and ask any questions I have about the project and they have been answered to my satisfaction.

2. I understand that I can withdraw my son/daughter from the study at any time without prejudice to my or my child's relationship with the researcher/s now or in the future.

3. I agree that research data gathered from the results of the study may be published provided that neither my child/ nor I can be identified.

4. I understand that if I have any questions relating to my son/daughter's participation in this research I may contact the researcher/s who will be happy to answer them.

5. I acknowledge receipt of the Participant Information Sheet.

Signature of Parent/Carer	Signature of Participant
Please PRINT name	Please PRINT name
Date	Date

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학부모 (보호자) 동의서

본인, ...는 본인과 ..... 세인 본인의 자녀 .....의 " 마음이론탐구" 프로젝트 참여에 동의합니다.

연구 참여 동의와 관련해 본인은 아래의 사항들을 숙지하고 있습니다:

1. 참여자 정보지와 제 자녀의 본 프로젝트 참여에 소요되는 시간에 관해 읽었습니다. 연구자/들이 본 프로젝트에 관해 궁금한 사항들을 질문하고 토론할 기회를 본인에게 주었으며, 질문들은 만족스럽게 답변되었습니다.

2. 어느 때건 본인 자녀의 본 연구 참여 철회가 가능하다는 것과, 참여 철회가 본인 자녀와 연구자와의 현재 또는 미래 관계에 대한 편견 없이 이루어지리라는 것을 이해하고 있습니다.

3. 본 연구를 통해 모아진 자료들이 발표될 수 있다는 것과 이를 통해 본인 자녀의 신분이 확인되지 않으리라는 것에 동의합니다.

4. 본인 자녀의 연구 참여와 관련해 궁금한 점이 있을 때엔 어느 때건 연구자/들에게 연락할 수 있음과 그들이 흔쾌히 답변하리라는 것을 이해하고 있습니다.

5. 참여자 정보지를 수령했음을 인정합니다.

학부모/보호자 서명	참여자 서명
이름을 적어 주십시오	이름을 적어 주십시오
날짜	날짜

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TEACHER CONSENT FORM

I, ... agree to participate in the research project – Investigating Theory of Mind.

In giving my consent I acknowledge that:

1. I have read the Participant Information Sheet and the time involved for my participation in the project. The researcher/s has given me the opportunity to discuss the information and ask any questions I have about the project and they have been answered to my satisfaction.

2. I understand that I can withdraw from the study at any time without prejudice to my relationship with the researcher/s now or in the future.

3. I agree that research data gathered from the results of the study may be published provided that I cannot be identified.

4. I understand that if I have any questions relating to my participation in this research I may contact the researcher/s who will be happy to answer them.

5. I acknowledge receipt of the Participant Information Sheet.

Signature of Teacher

Please PRINT name

Date

The University of Sydney 교육 사회복지 대학

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교사 동의서

본인, ...는 " 마음이론탐구" 프로젝트에 참여하는 것에 동의합니다.

연구 참여 동의와 관련해 본인은 아래의 사항들을 숙지하고 있습니다:

1. 참여자 정보지와 본 프로젝트 참여에 소요되는 시간에 관해 읽었습니다. 연구자/들이 본 프로젝트에 관해 궁금한 사항들을 질문하고 토론할 기회를 본인에게 주었으며, 질문들은 만족스럽게 답변되었습니다.

2. 어느 때건 본 연구에 참여하는 것을 철회할 수 있다는 것과, 참여 철회가 본인의 연구자와의 현재 또는 미래 관계에 대한 편견 없이 이루어지리라는 것을 이해하고 있습니다.

3. 본 연구를 통해 모아진 자료들이 발표될 수 있다는 것과 이를 통해 본인의 신분이 확인되지 않으리라는 것에 동의합니다.

4. 본 연구 참여와 관련해 궁금한 점이 있을 때엔 어느 때건 연구자/들에게 연락할 수 있음과 그들이 흔쾌히 답변하리라는 것을 이해하고 있습니다.

5. 참여자 정보지를 수령했음을 인정합니다.

.....
교사 서명

.....
이름을 적어주십시오

.....
날짜

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Email: d.evans@edfac.usyd.edu.au

PRINCIPAL CONSENT FORM

I, ... agree for ……. to participate in the research project – **Investigating Theory of Mind**.

In giving my consent I acknowledge that:

1. I have read the Participant Information Sheet and the time involved for their participation in the project. The researcher/s has given me the opportunity to discuss the information and ask any questions I have about the project and they have been answered to my satisfaction.

2. I understand that I can withdraw from the study at any time without prejudice to my relationship with the researcher/s now or in the future.

3. I agree that research data gathered from the results of the study may be published provided that my I, my school, teachers or students cannot be identified.

4. I understand that if I have any questions relating to my participation in this research I may contact the researcher/s who will be happy to answer them.

5. I acknowledge receipt of the Participant Information Sheet.

Signature of Principal

Please PRINT name

Please name of school

Date

The University of Sydney 교육 사회복지 대학

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교장 동의서

본인, ...는 " 마음이론탐구" 프로젝트에 참여하는 것에 동의합니다.

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2. 어느 때건 본 연구에 참여하는 것을 철회할 수 있다는 것과, 참여 철회가 본인의 연구자와의 현재 또는 미래 관계에 대한 편견 없이 이루어지리라는 것을 이해하고 있습니다.

3. 본 연구를 통해 모아진 자료들이 발표될 수 있다는 것과 이를 통해 본인, 본교, 교사들 또는 학생들의 신분이 확인되지 않으리라는 것에 동의합니다.

4. 본 연구 참여와 관련해 궁금한 점이 있을 때엔 어느 때건 연구자/들에게 연락할 수 있음과 그들이 흔쾌히 답변하리라는 것을 이해하고 있습니다.

5. 참여자 정보지를 수령했음을 인정합니다.

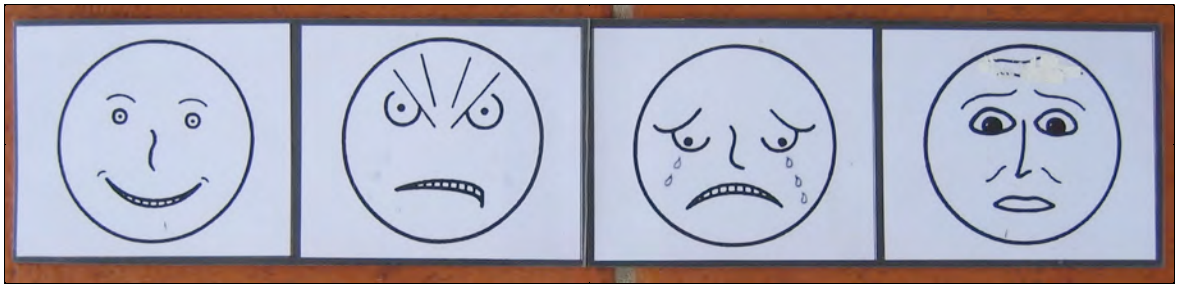
교장 서명

이름을 적어주십시오

학교명

날짜

Drawings of Faces Showing Four Basic Emotions



Drawings of Four Situations

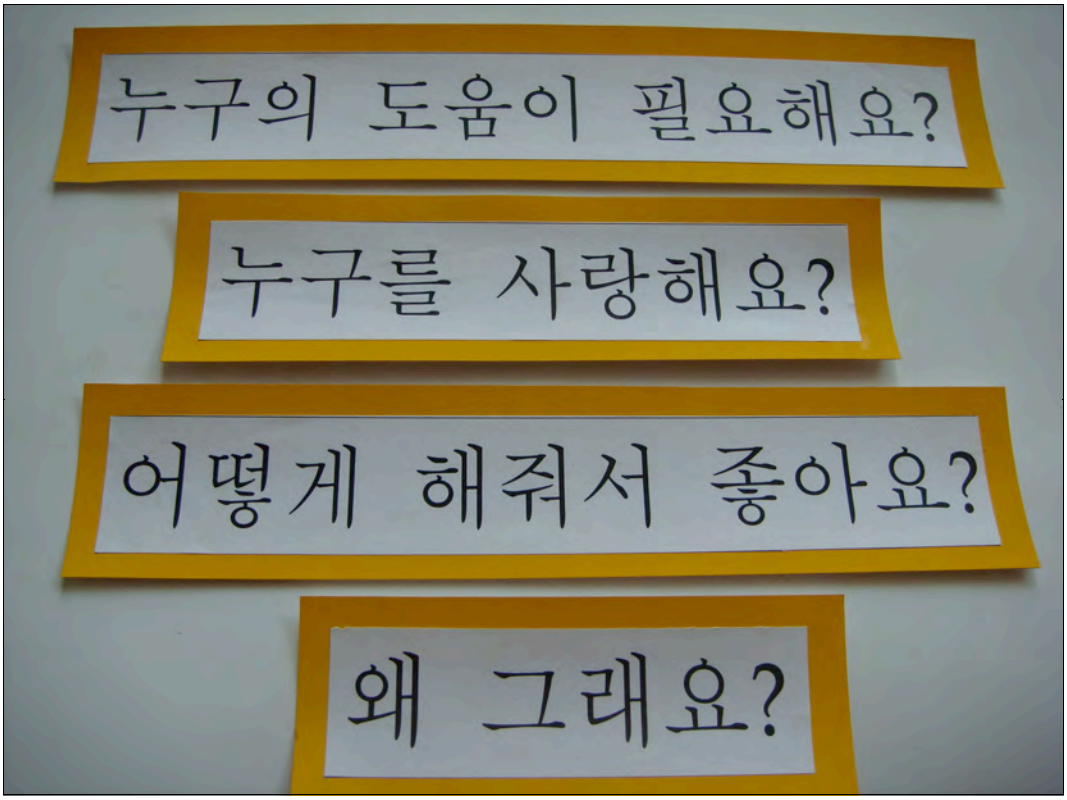
Happiness

Sadness

Anger

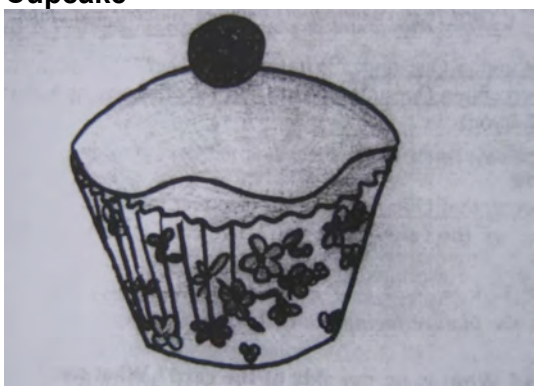
Fear

Word Cards



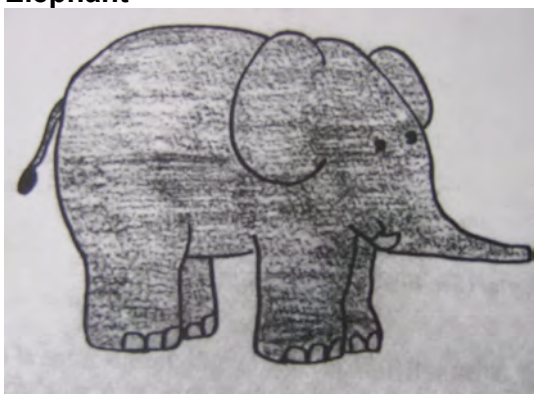
Cupcake, Kettle and Elephant Cards

Cupcake



Kettle

Elephant



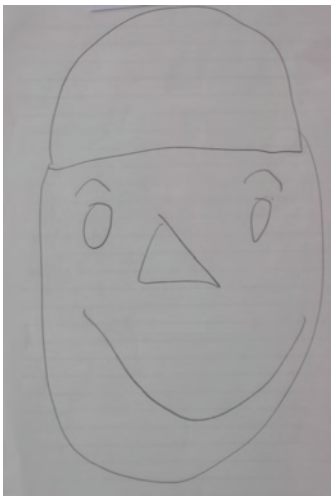
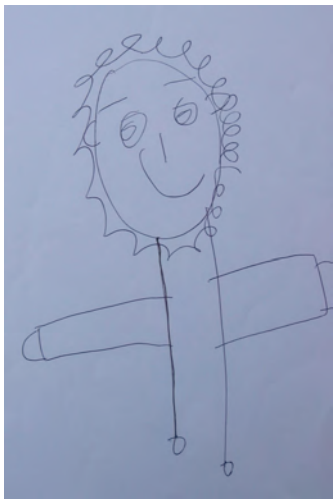
Biscuit Boxes

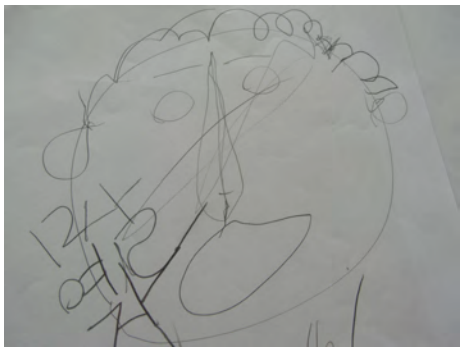
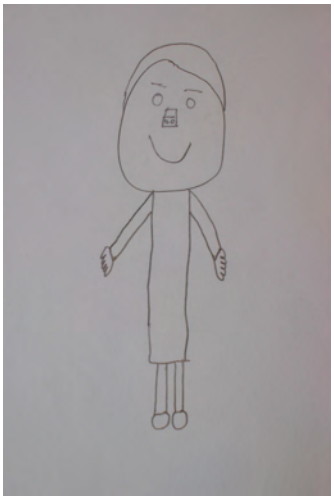
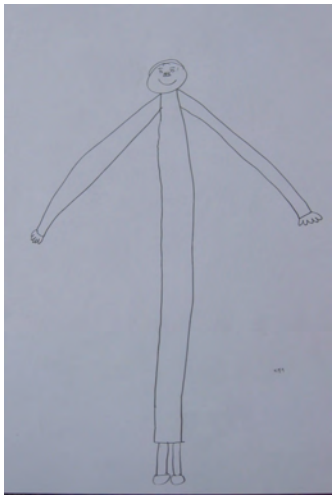
Biscuit Box A

Biscuit Box B

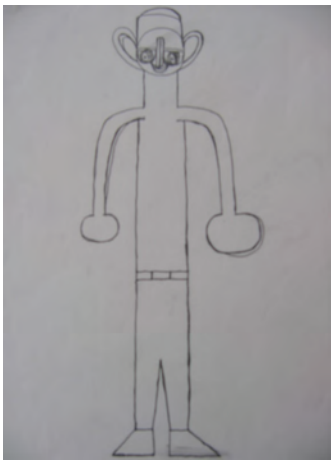
Student-Drawn Portraits of Self and Friend

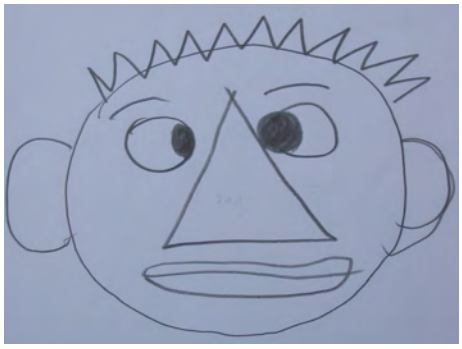
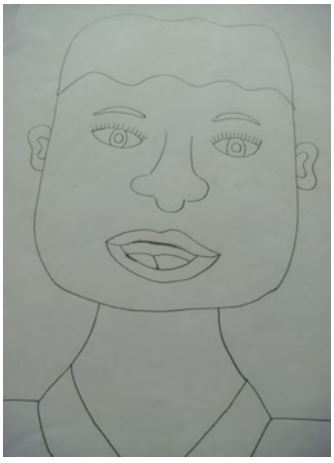
Group 1

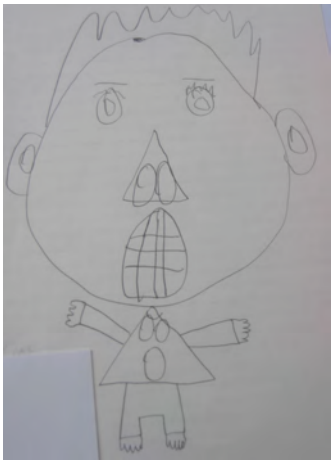
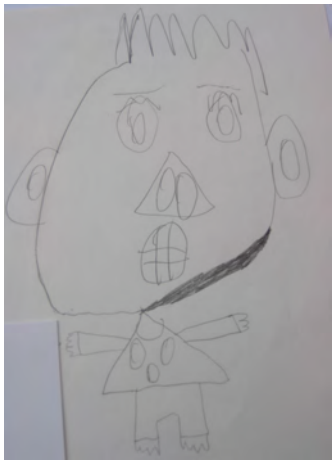
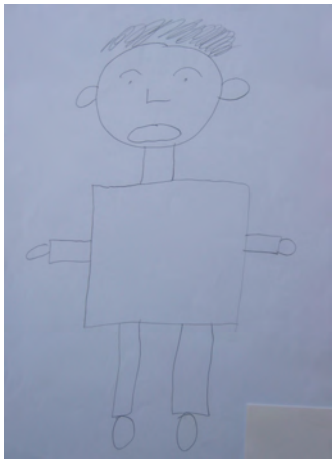
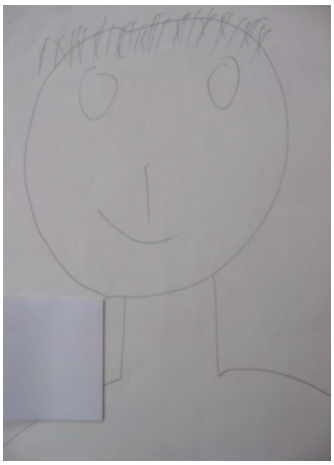
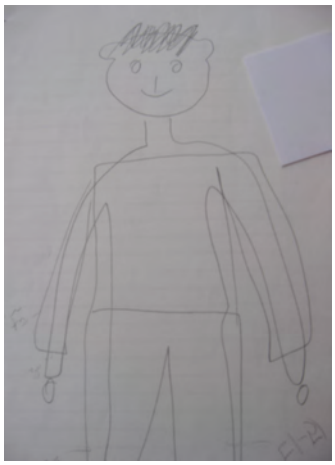
Name	Self	Friend
Chris & classmate		
Daniel & younger brother		
George & classmate		

Name	Self	Friend
Patrick & younger sister		
Peter & classmate		

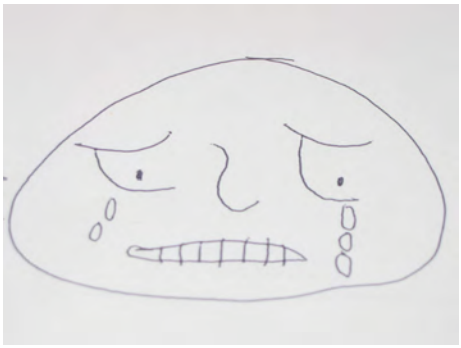
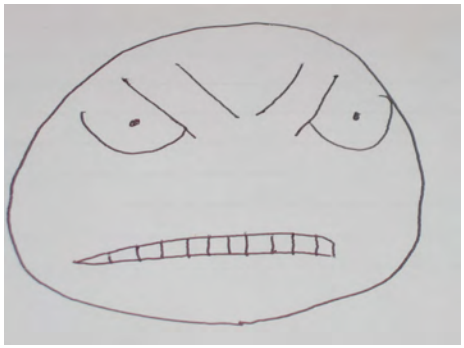
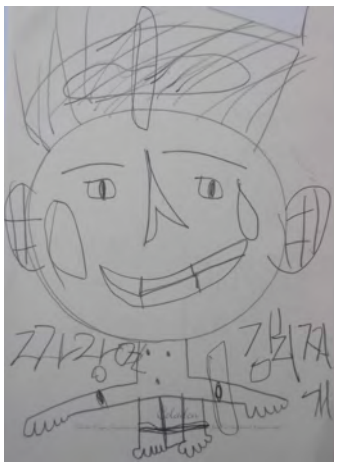
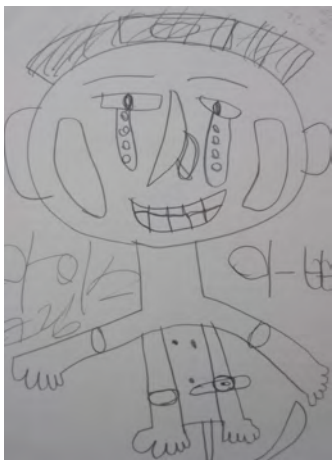
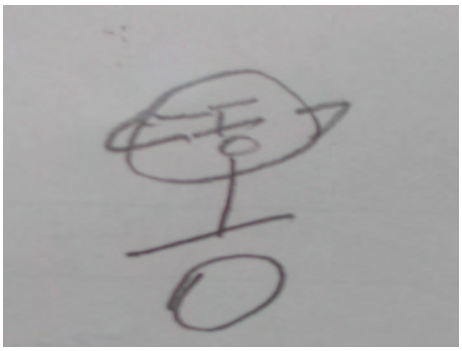
Group 2

Name	Self	Friend
Bob & classmate		

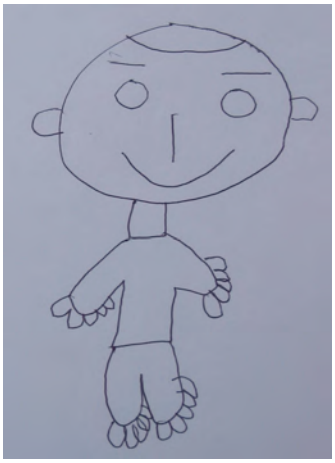
Name	Self	Friend
David & brother		
Ian & girl friend		
Jerry & classmate		

Name	Self	Friend
John & classmate		
Kevin & church friend		
Tom & mother		

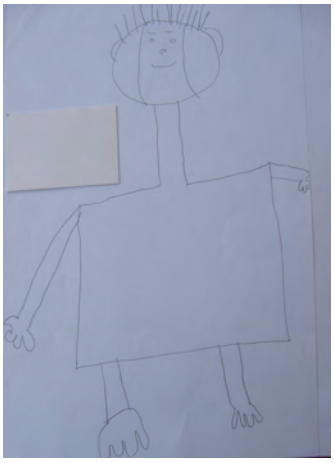
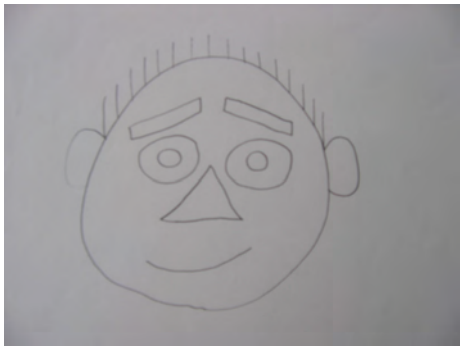
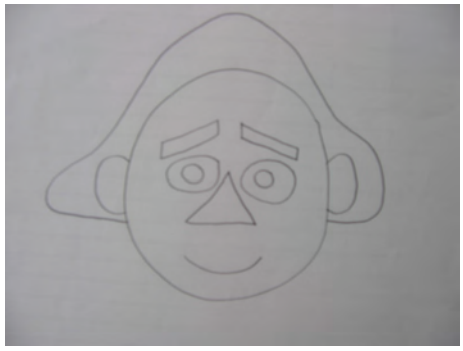
Group 3

Name	Self	Friend
Edward & teacher	**Refused to draw himself**	**Refused to draw his friend**
Michael & mother		
Paul & father		
Ron & himself		

Group 4

Name	Self	Friend
Brett & classmate		
Joshua & classmate		

Variations

Name	Self	Friend
Fred & classmate		
Nicholas & classroom teacher		

Korean Translation of Interview Sample with Bob

RI: 이 친구 기분이 어때요?

1) 웃고 있어요.

웃고 있어요. 그래서 기분이?

2) 좋다 (하이파이브).

(화가 난 표정 그림을 가리키며 밥을 바라봄).

3) 화나요.

(하이파이브) 정말 잘 했어요.

Korean Translation of Interview Sample with Brett

RI: 그럼 Brett 선생님이 물어보는 거로 하고 싶어요 아니면 쓰는 거로 할까?

SI: 1) (대답하는 거 짚기)

RI: 그래. 그럼 이거 읽어 보세요.

SI: 2) 나는 언제 기분이 좋아요?

RI: Brett 언제 기분이 좋아요 (웃는 표정 가리키며)?

SI: 3) 기뻐요.

RI: (자기 보고형 질문지 제시) Brett은 선물을 받으면 기분이 어때요?

SI: 4) 기뻐요.

RI: Brett은 친구가 때리면 기분이 어때요?

SI: 5) 무서워요.

RI: Brett은 엄마가 아프면 기분이 어때요?

SI: 6) 좋아요.

RI: 엄마가 아프면?

SI: 7)…

RI: 아이고 아프다. Brett. 그러면 기분이 어때요?

SI: 8) 쇼핑도 못가요.

RI: 엄마가 아프셔서 엄마랑 쇼핑을 못 가면 기분이 어때요?

SI: 9)…

RI: Brett.

SI: 10) …

RI: 엄마가 아프면 기분이 어때요?

SI: 11) 무서워요.