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Socioemotional development and nonverbal learning disabilities : a theoretical intersection of neurobiology and self psychology : a project based upon an independent investigation

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ABSTRACT

The purpose of this theoretical investigation is to explore how Nonverbal Learning Disabilities (NLD) influences a child's social and emotional development by examining the potential interrelationship between the literature on neurobiology related to NLD and literature on normative psychosocial development. NLD, a lesser-known learning disability subtype, can impact an individual's capacity to process and remember visual-spatial information. Individuals with NLD have difficulty with social interactions, as they cannot recognize or accurately decode another's nonverbal cues, such as facial expressions, gestures, body language and tone of voice. Due to repeated rejection from others in response to their social perception deficits, individuals with NLD often suffer from social withdrawal, depression and other socioemotional disturbances.

In this investigation, socioemotional development in children is evaluated through the neuroscientific lens of developmental neurobiology and the psychodynamic lens of self psychology. An area of commonality in both theories was the importance of empathic experiences with caregivers in early childhood for maturation of the self-regulating structures in the right hemisphere and healthy socioemotional development. As NLD is considered to be biologically based in the right hemisphere, this thesis contends

that a NLD child's inability to process his mother's nonverbal communication may have impacted the quality of his early attachment relationships, and thus influenced the maturation of the right hemisphere. This thesis offers recommendations for appropriate accommodations and interventions for clinicians, families and schools.

SOCIOEMOTIONAL DEVELOPMENT AND NONVERBAL LEARNING DISABILITIES: A THEORETICAL INTERSECTION OF NEUROBIOLOGY AND SELF-PSYCHOLOGY

A project based upon an independent investigation,
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CHAPTER I

INTRODUCTION

Nonverbal Learning Disability

Children and adolescents with learning disabilities often struggle with considerable social and emotional problems in addition to their more recognized academic problems, and over the past twenty years researchers have been looking for potential links between learning disabilities and socioemotional functioning. Although this type of investigation continues to be done, most researchers have concluded that, while some children with learning disabilities may develop social and emotional problems, most are able to cope adequately (Rourke & Fuerst, 1992). The one exception to this conclusion is that there is some evidence suggesting that children with the diagnosis of Nonverbal Learning Disability (NLD), a relatively unfamiliar learning disability subtype, are at a significantly greater risk for social and emotional problems, particularly depression, anxiety and/or suicidality, than children diagnosed with other learning disability subtypes (Rourke, Young, & Leenaars, 1989). NLD is a neurobehavioral disorder, similar to Asperger's Disorder, that affects an individual's ability to process various types of nonverbal information and is based upon neurological deficits in visual-spatial perception, complex motor skills, social competency, and emotional processing and regulation. Although neurologists and neuropsychologists

began to study NLD as a distinct learning disability subtype in the 1970's, it was not until the 1990's that educators and mental health clinicians first started to become aware of the diagnosis. Even currently, NLD is often undiagnosed or misdiagnosed due to various factors, including lack of awareness about the disorder and confusion about diagnostic criteria. Additionally, one of the troubling characteristics of the disorder is that, since NLD children often are able to adequately compensate for their deficits until the middle of elementary school, adults often overestimate their capacities and intelligence (Rourke, 1989). As a result, the NLD children's emerging failures and difficulties are most often falsely attributed to other psychosocial factors, thus delaying or preventing an accurate diagnosis. For instance, educators and mental health clinicians may misperceive the parents as being excessively overprotective of or enmeshed with the children, or view the children's compensatory functions and defenses as due to an argumentative, lazy and disruptive temperament. Consequently, children with NLD rarely receive appropriate educational or therapeutic treatment services, which only exacerbates their risk for socioemotional disturbances.

Research Gaps

Over the past few decades, technological advances have given scientists more opportunities to study the vast intricacies of the human brain. One of the benefits of these technological advances has been in the study of neurobehavioral disorders, such as Attention Deficit Hyperactivity Disorder (ADHD), Tourette's Syndrome, Autism and NLD. Since NLD is such a newly recognized disorder, the current focus of most of the research has been to: (a) determine the particular constellation of neurological assets and

deficits that differentiate NLD from other similar disorders, (b) examine how NLD manifests behaviorally, particularly in terms of academic challenges, and (c) develop reliable and valid diagnostic criteria. With the exception of a few studies linking NLD with increased risk for depression and suicide (Bender, Rosenkrans, & Crane, 1999; Bigler, 1989; Greenham, 1999; Rourke et al., 1989), there has been much less research on exploring how the neurological assets and deficits of NLD may impact the social and emotional development of a child. As the disorder greatly impacts social and emotional perceptual capabilities, more empirical and theoretical research is needed to better understand how frequent misperceptions may distort the NLD child's understanding of his internal and external world, particularly when examined in the context of the child's social milieu, such as at home with his family and at school with teachers and peers. Only by examining how these innate neurological strengths and weaknesses may affect an NLD child's development of a cohesive self, including self-esteem, patterns of object relationships and capacity for self regulation, can one appreciate how NLD may be related to the child's conduct, social behaviors, emotions, and personality development.

Most of the research published on NLD to date has concentrated on the impact of the neurological deficits on cognition and learning. While this research has greatly contributed to emerging literature in the field of education, clinicians outside of school systems are largely unaware of NLD, and therefore rarely attribute a child's difficulties as related to the diagnosis. As a result of inaccurately ascribing the child's social and emotional symptoms to other psychosocial factors without taking into account the child's neurological capacities, standard treatment interventions, such as psychotherapy and behavioral management programs, can be ineffective, leading to a cycle of frustration not

only for the child, but also for the clinician and parents (Rourke, 1989). Thus, it is not only the lack of research being done on the social and emotional problems of children with NLD, but also the overall lack of awareness of the diagnosis is negatively affecting this population children.

NLD and Clinical Social Work

Unfortunately, partly due to its name, NLD is commonly viewed as a learning disability that primarily affects a child's academic functioning. Although the disorder is neurologically based and can affect a child's ability to learn, the socioemotional components of the disorder may also be greatly disabling for the child in all other areas of life. Thus, clinical social workers have the ethical responsibility to contribute to the knowledge about this overlooked and misunderstood population by broadening the scope of the literature to take into greater account the unique socioemotional difficulties that an individual with NLD faces. As these socioemotional difficulties can be complex and may not improve with traditional clinical interventions, additional research on contributing biopsychosocial factors, theoretical foundations, as well as further empirical evaluation of clinical practices and interventions is essential. The impact of the disorder must be studied in multiple contexts, including family, school, vocational, interpersonal, intrapersonal, and recreational, as well as throughout the various stages of child development. The purpose of this theoretical investigation is to further contribute to understanding of how NLD influences a child's social and emotional development by examining the interrelationship between the literature on neurobiology related to NLD and literature on normative psychosocial development. A secondary aim is also to raise

awareness of the significant socioemotional component of the disorder amongst clinicians and explore specialized treatment practices.

The intended audience for this paper is current and future clinicians, medical professionals, educators and others who work with children and families. Although only a small subset of children's emotional and behavioral problems may have been impacted by this particular disorder, the increasing awareness and understanding of the disorder may lead to its inclusion in a child's diagnostic differential. An accurate diagnosis, particularly early on in the child's development, can be of a great benefit to the struggling child and family, as the greater overall understanding of the child's individualized needs can lead towards interventions, strategies, and accommodations that can be specifically tailored to these needs.

Overview of Theoretical Frameworks

Through preliminary research for this thesis, it became apparent that the best analysis of this phenomenon could be found by integrating a neuroscientific perspective of NLD with a psychodynamic perspective, as their combination offers a more thorough biopsychosocial framework. This theoretical investigation will explore the how NLD may influence the social and emotional development of children using the theories of developmental neurobiology (assessing the neuroscientific factors related to the disorder) and self psychology (analyzing the developmental psychodynamics behind the disorder).

The field of neuroscience encompasses the science of the nervous system and brain. Based within neuroscience, the developmental neuropsychological perspective examines the relationship between the developing brain and behavior. This perspective

assumes that brain development is influenced by an infant's relational experiences with caregivers in early childhood. This theoretical lens can offer insight into the neurological basis of NLD and how the neurological deficits of NLD may negatively influence early attachment relationships, and consequently the development of brain structures related to socioemotional functioning.

A developmental psychodynamic perspective is based on the belief that early experiences have substantial influence on an individual's conscious and unconscious mental processes, which shape an individual's personality, relationships, behaviors and beliefs. There are a number of different theories that fall under the psychodynamic umbrella. The selection of which psychodynamic theory to apply to the phenomenon of socioemotional development in NLD was difficult to determine, as each of the prevalent contemporary theories offers a potentially rich understanding of NLD on socioemotional development in children. For instance, ego psychology offered insights through Hartmann's (1939) concept of ego functions, Spitz's (1965) emphasis on mother-infant nonverbal reciprocity, and Mahler's (1968) separation-individuation developmental stage. Nevertheless, Kohut's (1971, 1977; Kohut, Goldberg, & Stepansky, 1984) theory of self psychology was ultimately chosen due to its emphasis on parental nonverbal empathic attunement during early childhood for optimal socioemotional development. As children with NLD have difficulty reading and expressing nonverbal cues and accordingly may fail to experience this empathic attunement, self psychology provides a fitting perspective into their socioemotional disturbances.

The next chapter will focus on the methodology of this theoretical exploration. Chapter II will further elaborate on the theoretical frameworks, introduce key concepts of

each theory, and introduce the process of analysis. Chapter III will present a summary of the NLD empirical research, exploring the history of the diagnosis, characteristics of the disorder, methodological concerns of the current research and the proposed diagnostic criteria. Chapter IV will examine the developmental neuropsychological perspective, focusing on how the neurologically based assets and deficits associated with NLD may affect the developing brain substrates linked to social and emotional development in children. This chapter will specifically explore the relationship between right hemisphere dysfunction and NLD, the etiological theories of NLD, and the research on the neuroscience of attachment. Chapter V will examine how NLD may influence the social and emotional development in children through a self psychology perspective, by focusing on how NLD may influence the intrapersonal experiences of a child and explore how early empathic failures and selfobject deficits may affect the development of a cohesive sense of self. Chapter VI will discuss, analyze and synthesize the previous two chapters through a case study, concluding with treatment recommendations. In sum, by analyzing socioemotional development in children with NLD through the neuroscientific and psychodynamic theories, the intention of this thesis is to offer a more comprehensive biopsychosocial theoretical explanation of the socioemotional problems of this population and propose developmentally appropriate interventions to minimize the potential detrimental impact of NLD.

CHAPTER II

METHODOLOGY

Introduction

This chapter will outline this thesis's methodological approach to investigating how Nonverbal Learning Disability (NLD) may influence socioemotional development in children. The chapter will begin with a description of the theoretical frameworks of developmental neurobiology and self psychology, offering a brief introduction to the key concepts and providing a rationale for the suitability of these two theories for the examination of the thesis. Next, this chapter will explain how these theoretical frameworks will be used to reflect on and analyze socioemotional development of children with NLD. The chapter will conclude with a discussion of the potential bias and assumptions of the writer as well as the strengths and weaknesses of this methodology.

Theoretical Frameworks

The first component of the theoretical framework comes from a neuroscientific perspective. According to Pennington, developmental neurobiology "is the study of how (brain-based) relations develop in both typical and atypical cases" (2009, p. 72). In this field, neuropsychological conclusions are generally based upon studies of patients with acquired brain lesions and their subsequent behavioral changes. The developmental

neuropsychological framework for this thesis will particularly focus on the empirical research studying the lateralization of functions in the right and left hemispheres of the human brain, a major area of research in this field. It reviews studies showing the parallels of the characteristics of children with NLD with those of individuals with right hemisphere damage, as researchers theorize that NLD is caused by neurological deficits in the right hemisphere (Forrest, 2004; Rourke, 1989). Rourke's (1989) Neurodevelopmental Model of NLD, in which he portrays how the primary neurological assets and deficits of NLD can lead to secondary and tertiary neurological assets and deficits through a child's development, provides a developmental context to this analysis. Finally, Schore's (1994, 2003) theory of affect regulation, which emphasizes the influence of early attachment experiences on the maturation of the experience-dependent right hemisphere, can offer an additional perspective on socioemotional development. Overall, the typical and atypical maturation of the right hemisphere is the focus of this developmental neuropsychological perspective on socioemotional development in children with NLD.

The second component of the theoretical framework comes from a psychodynamic perspective, based in the theory of self psychology. According to Kohut (1971), the founder of the psychodynamic theory of self psychology, the development of a cohesive and healthy self is dependent upon gratifying experiences with empathic caregivers, whom he termed "selfobjects," as they provide necessary psychological functions for the vulnerable infant. Palombo (2008) termed this process as "mindsharing," which refers to the nonverbal process in which empathic caregivers unconsciously attune to the needs of their children and instinctively supply the necessary

complementary functions that are needed for the child to maintain a cohesive self. In self psychology, the "self" is defined as an innate organizational mental structure that is made up of internalized psychic configurations related to ambition, motivation and beliefs about the relationships between self and others (Kohut, 1971). Kohut (1984) asserted that the self is composed of three poles, or narcissistic self-configurations, each with specific selfobject needs: Grandiose Self (mirroring needs), Idealized Parental Imago (idealizing needs), and Alter Ego (twinship needs). He argued that over time, through the process of transmuting internalization and optimal frustration, children integrate the mirroring, idealizing and twinship selfobject functions provided by their caregivers into their own autonomous self-structures. Abuse, neglect, or frequent misattunements result in failures in the internalization of the complementary psychological functions, causing narcissistic vulnerabilities, interpersonal or attachment problems, and pathological disorders of the self (e.g., narcissistic or borderline personality disorder) (Kohut et al., 1984; Palombo, 2001). Overall, this self psychology perspective will elucidate how NLD may affect early attachment experiences and subsequently influence socioemotional development.

Although NLD generally is viewed as neurologically-based and conceived as primarily related to academics due to its classification as a "learning disability," it is essential to take into account how the associated psychosocial dynamics also may play a role it its behavioral manifestations. The full understanding of a child's socioemotional development requires the integration of biological and psychological knowledge. The problematic behaviors in children with NLD can rarely be explained linearly, as they are manifestations of the intricate relationships between both the neurological dysfunctions and psychodynamic processes. Thus, through these two theoretical frameworks, which

account for both the neuroscientific perspective and the psychodynamic perspectives, the analysis and conclusions of this thesis may contribute to a more comprehensive biopsychosocial understanding of NLD.

Method of Evaluation

The final chapter, Chapter VI, will incorporate several different methods of analysis and synthesis in the discussion of the thesis. Firstly, a case study will provide a means to illustrate the identifying characteristics of NLD, as outlined in Chapter III, and an application of the key concepts within the theoretical framework, as described in Chapters IV and V. Next, an alternative theory of socioemotional development in children with NLD, derived from a synthesis of the theoretical frameworks and empirical research on NLD, will be presented. Finally, suggestions and recommendations, based on the case illustration and this theoretical approach to NLD, will be offered for clinicians working with NLD children in individual therapy, family therapy, and in schools.

Bias and Assumptions

Over the past 10 years, I have worked with children and adolescents with social, emotional, behavioral or academic difficulties, and yet I did not become aware of NLD until six years ago when I began working as a clinician at a long term residential facility for adolescent males and females with severe mental illnesses. The program's clinical consultant and attending psychiatrist was a respected, knowledgeable and insightful asset to the program's case conferences and his diagnosis of one of my clients was my official introduction to the NLD, a disorder that few of the other clinical staff were

knowledgeable about either. Through the years, I have worked with many more children and adolescents diagnosed with NLD, and learned a great deal about the complexities of the disorder. Yet, the more I learned about the socioemotional component of NLD, the more I came to understand these children's daily and unremitting struggles and defeats. I witnessed the impact of how adults, unfamiliar with the disorder, perpetuated the struggles, and how powerful the frustration, anger and resentment of both the adult and the child could become. As I became more knowledgeable of the disorder, I also was able to witness how deeply even just small tailored interventions or accommodations improved the client's positive view of self and overall functioning. These experiences and the continuing unawareness of NLD have had a significant impact on my wish to explore the socioemotional components of NLD and raise awareness of it.

Perhaps, my greatest bias in this thesis is the assumption that NLD will always influence the socioemotional development in children in some manner. Although there are no empirical studies to justify that assumption, in my own work experience I have worked with many children with NLD in both psychiatric and academic settings and have witnessed its socioemotional impact first hand. With that stated, I do not assume that all children with NLD will develop disabling socioemotional problems, but instead that many children may be able to successfully adapt to the challenges associated with the disorder, which may vary in severity. This thesis aims to increase the understanding of how NLD may influence socioemotional development so that caregivers, educators and clinicians can implement interventions earlier in the child's development, thus reducing the negative impact of NLD by helping children better adapt.

Strengths and Limitations

One of the greatest strengths of this theoretical exploration of the socioemotional development in children with NLD through both a neuroscientific and psychodynamic lens is that it offers a more comprehensive biopsychosocial perspective than most other writings about the topic. The biopsychosocial perspective, which is a fundamental element of clinical social work practice, necessitates factoring in all of the various contributing dynamics to individual development. Similarly, analysis through the case illustration offers a unique and intimate point of view of the challenges of growing up with NLD, as the case is a conglomeration of aspects of the different NLD children I have worked with, and the quotes from the parents in the case are based on real quotes.

There are a few limitations to the methodology as well. For one, at the time of writing this thesis, I am a social work graduate student, and I am certainly not an expert in the field of developmental neurobiology; I acknowledge that the depiction of the neuroscientific concepts may be overly simplified or naive. I have no personal experience in the field of neurobiology beyond the cursory appraisals of reports from various neuropsychological assessments of children I have worked with, yet it is a field that I am fascinated by and have read about voraciously. Secondly, the realistic scope of this master's level thesis provides its own limitations. The particular theoretical frameworks chosen offer a particular perspective about the phenomenon of NLD, and the potential prospects for further analysis are endless. The discussion chapter could easily become a lengthy manuscript. Finally, the limitations in the quality and diversity of empirical

research about NLD and socioemotional development places a strain on the generalizability of the conclusions.

The following chapter, Chapter III, will offer an in depth description of the phenomenon of NLD, providing the foundation for the theoretical analysis. The chapter will review the history of learning disabilities in North American schools over the past fifty years, focusing on the progression of learning disability subtyping that led to the classification of the NLD subtype. The empirical studies on NLD and socioemotional development are reviewed and the proposed diagnostic criteria are outlined.

CHAPTER III

NONVERBAL LEARNING DISABILITIES

Overview of Learning Disabilities

Neurobehavioral disorders

The major consensus amongst both scientists and educators is that the term 'learning disability' or 'learning disorder' falls within the classification of a neurobehavioral disorder. As defined by pediatric neurologists and neuropsychologists, neurobehavioral disorders are innate or acquired brain-based dysfunctions that influence both an individual's behavior and how an individual's brain can process information (Stewart & Stewart, 2007). Autism, traumatic brain injury, mental retardation, and Tourette's syndrome are other examples of neurobehavioral disorders. Although the exact neurobiological etiology for some neurobehavioral disorders remains a mystery, it is agreed upon that these disorders are based upon particular neurological deficits, which are either organic at birth or due to environmental factors (e.g. lead poisoning or head injury) that impacted brain development and functioning (Palombo, 2001).

Definition, eligibility and services

There are a variety of definitions and opinions of what characteristics describe or constitute a diagnosis of a learning disability, and these definitions can vary somewhat depending upon the professional discipline and taxonomy system. This may be because

each professional discipline needs their own standardized definitions for specific research purposes and to determine eligibility for services.

Educational definitions. The federal law in the United States pertaining to special education and disability services in schools, known as the Individuals with Disabilities Education Act (IDEA 2004), provides the following definition of learning disabilities that is used by schools throughout the country:

> The term 'specific learning disability' means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Such term does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage. (Statutes 20 U.S.C. §1401 [30] and 34 CFR 300.8(c)(10))

Although the definition of learning disabilities in the IDEA has not changed since 1975, the process of determining eligibility for special education services due to a learning disability has transformed considerably. Prior to the changes implemented in the most recent IDEA 2004 reauthorization, in order for a children to be diagnosed with a specific learning disability and become eligible for special education services, they were required to demonstrate a "severe discrepancy" between their IQ and their scholastic achievement in one or more of the following areas: oral expression; listening comprehension; written expression; reading skill; reading comprehension; mathematic calculation and mathematics reasoning. This discrepancy criterion often prevented younger students from receiving preventative special education services, as many students were forced to "wait to fail" (Fletcher, 1989; Rourke & Fuerst, 1992). One of the newest changes in the IDEA 2004 is the flexibility to incorporate data determined by the Response through

Intervention (RTI) model of assessment, a pre-referral intervention program developed by researchers in part to facilitate the process of efficiently and accurately diagnosing learning disabilities. Although RTI is not mandated by law, the IDEA strongly encourages schools to implement its model, as it may be able to identify and immediately provide interventions for students at risk for future academic or behavioral problems (Zirkel & Krohn, 2008). Using a multilevel and multidisciplinary preventative approach, schools can provide appropriate evidenced based interventions as soon as the need arises, without having to wait for the child to fail. Additionally, through the RTI process, any child, who continues to exhibit academic difficulties after interventions are attempted and is suspected to have learning disability, must also be referred for a comprehensive psychometric assessment. Thus, the diagnosis of a specific learning disability is determined based upon a combination of observation, testing and achievement, not just a discrepancy between IQ and achievement.

Neuropsychological definition. Dr. Byron P. Rourke (2005), a developmental neuropsychologist world renowned for his research on learning disabilities, offers a much more generalized definition of learning disabilities, which he developed after nearly forty years of research on the distinguishing characteristics of children with and without learning disabilities. He defines learning disabilities to be "...specific patterns (subtypes) of neuropsychological assets and deficits that eventuate in specific patterns of formal (e.g., academic) and informal (e.g., social) learning assets and deficits" (pg. 111). Similar to the RTI model's comprehensive assessment, Rourke emphasizes looking at learning disabilities through "a neurodevelopmental framework that takes into consideration the changing nature of the academic, socioemotional, and vocational

demands with which humans in a particular society are confronted" (Rourke & Fuerst, 1996, p. 278). Accordingly, taking into consideration the different environments and various developmental stages, Rourke has studied how learning disabilities in children manifest in distinctive, but predicable ways throughout childhood. In particular, Rourke's work has greatly concentrated on appreciating the different subtypes of learning disabilities and increasing the understanding and awareness of learning disability subtypes that may be lesser known.

Subtyping of Learning Disabilities

Researchers have only begun studying the learning disability subtypes over the past four decades. In 1967, Johnson and Myklebust made a substantial breakthrough in the study of learning disability subtypes through the publication of their book *Learning Disabilities: Educational Principles and Practices*. In the book, Johnson and Myklebust outlined five subclassifications of learning disabilities: auditory language; reading; written language; arithmetic; and nonverbal. Within each of these subtypes, the authors identified related symptom clusters, behavioral patterns and suggested specific tailored interventions. In addition, since the late 1960's Rourke and his colleagues at the University of Windsor neuropsychology laboratory have published many studies regarding the differentiation of learning disabilities subtypes. Rourke's work predominantly focuses on the distinctions between verbal learning disabilities, which they refer to as Basic Phonological Processing Disorders (BPPD), and Nonverbal Learning Disabilities (NLD) (Drummond, Ahmad, & Rourke, 2005; Fisk & Rourke, 1987; Fuerst, Fisk, & Rourke, 1989; Ozols & Rourke, 1988; Rourke, 1988a; Rourke & Fuerst, 1992; Rourke & Fuerst, 1996). This research has determined statistically

significant clusters of neuropsychological assets and deficits within these two specific learning disability subtypes, as well as demonstrated considerable differences in socioemotional adjustment between the subtypes.

Despite the these empirical studies attempting to identify and classify the different subtypes of learning disabilities, many people still erroneously perceive the term 'learning disability' as referring to a homogenous faction of school children (i.e., "the learning disabled child"), with primary difficulties in reading or writing. Therefore, the children who struggle with learning disabilities in the less prominent subjects, such as arithmetic or spatial cognition, can be underdiagnosed, which researcher's have shown can lead to a destructive cycle of failure, frustration and discouragement (Buchholz, 1987; Palombo, 1996; Vogel & Forness, 1992).

This lack of awareness and understanding of learning disabilities subtypes is perpetuated by current empirical studies, which frequently examine their learning disabled samples indiscriminately rather than dividing them into subgroups. This failure to take into account the differences between learning disability classifications can lead to inconsistent, inaccurate and ungeneralizable findings (Collins & Rourke, 2003). For example, in recent issue of the *Journal of Learning Disabilities*, the editors published a research study that explored the differing coping styles of adolescents with learning disabilities against a control group of non-learning disabled peers and concluded that adolescents with learning disabilities (as defined by the outdated IDEA discrepancy standard), are more likely to have a passive coping style (Firth, Greaves, & Frydenberg, 2010). Yet, the article makes no mention of the possible limitation of failing to subgroup the learning disabled sample, seemingly ignoring the possibility that individuals with

different clusters of deficits may have developed different coping styles. Even though learning disability subtypes have been studied for over forty years, this is an area in which there is great need for increased awareness and understanding. Unfortunately, there have been very few researchers that have focused on studying learning disability subtypes, and even fewer have chosen to research the less common subtypes, such Nonverbal Learning Disability (NLD)

History of NLD

The term 'nonverbal learning disability' originates from Johnson and Myklebust (1967), who were the first to identify and describe a group of children who shared a previously unspecified symptom cluster which impacted their overall daily functioning, interpersonally, intrapersonally and academically. In their book, Johnson and Myklebust (1967) indentified two branches of the NLD subtype: a social perception disorder and an arithmetic disorder (dyscalculia). Both of the disorders shared similar characteristics, including a higher Verbal IQ (VIQ) than Performance IQ (PIQ) on the Wechsler Intelligence Scale for Children (WISC III); disturbances in body image; poor motor skills; disorientation (poor sense of direction, cannot tell right from left); social imperceptions and judgment. They described these two groups of children as not being able to accurately perceive their world or their own behavior.

Despite these similarities, these subgroups of NLD had distinct differences. The primary disability for children with the dyscalculia subgroup of NLD was that they failed to understand mathematical principles and processes, largely because they could not make generalizations. Children in this group had deficits in visual spatial organization

and in processing nonverbal information, but were very strong auditory learners and early talkers. Reading comprehension decreased as they get older. They had a weak understanding of distance and time. Alternately, children in the social perception subgroup of NLD had the most difficulty with interpreting emotions expressed by others, understanding how their actions affected others, pretend playing, anticipating events, evaluating their surroundings, and appreciating nonverbal cues (facial expressions, gestures, prosody, subtleties). These children relied on specific details, and had trouble relating the separate parts to the whole meaning of a situation. By missing the meaning, these children misinterpreted humor and subtleties in social situations. Due to their failure to integrate sensory information, they had attentional difficulties, including distractibility, perseverations, disinhibition, hyperactivity, and overstimulation.

Although Johnson and Myklebust's publication of the classification of the subtypes of NLD was overlooked by most, Nathlie Badian (1986, 1992), a prominent teacher, professor and special education researcher, continued their work, studying the subgroup of children with nonverbal social perception deficits (with minimal or no mathematics difficulties). She described these children as having "nonverbal dyslexia" or "social agnosia," in that they lacked the ability to "decode" nonverbal input, such as social cues, in the same way a dyslexic cannot decode letters and words. Badian's research further supported evidence for the group identified by Johnson and Myklebust, and raised additional questions about the roots of the nonverbal deficits, which she suggested might be related to right hemisphere dysfunction. Having seen the need for additional insight into this group of children, she strongly encouraged other researchers to continue studying this under-recognized subtype of learning disabilities.

Byron P. Rourke, Ph.D., has been one of the leading researchers and contributors to the literature on the NLD subtype of learning disorders. Since the late 1960's, Rourke and his colleagues conducted many studies that used psychometric scales and neuropsychological measures, such as the WISC III and the Wide Range Achievement Test (WRAT), to compare patterns of identifying characteristics between subgroups of learning disabled children. Much of Rourke's focus is on studying the differences between children with verbal learning disabilities and children with nonverbal learning disabilities, the cluster of symptoms first observed by Myklebust and Johnson (1967). In his research, Rourke (1989) has focused on developing a model to illustrate his theory of how the neurological assets and deficits of NLD, which in his previous research he had shown to be the central features of the disorder, can affect academic and socioemotional difficulties through a child's development.

Clinical Characteristics of NLD

As with any neurobehavioral disorder, not all children with NLD will have the same set of assets and deficits or the same levels of symptom severity. Overall, a range of biopsychosocial factors can critically impact the degree to which the disorder manifests academically, socially and emotionally. Although much emphasis is placed on the neurological assets and deficits, psychodynamic and psychosocial factors also influence the manifestation of the disorder. Therefore, the clinical characteristics of individuals with NLD described in this chapter are common, but not collective. This next section will review the four symptom domains of the NLD syndrome: visual-spatial-organizational perception, complex psychomotor skills, academic functioning, and socioemotional

functioning. It is crucial to note that these domains do not exist independently of each other, as they are all interrelated. These domains serve only as organizational categories to describe the complicated behavioral manifestations of this confusing disorder.

Visual-Spatial-Organizational Perception

Individuals with NLD have neurological deficits in processing, storing and organizing visual-spatial-organizational information (Harnadek & Rourke, 1994). This seems to originate from how the brain of an NLD child uniquely interprets complex visual input; these children can process only the minute details of a visual image, rather than perceiving the image as a whole. In other words, children with NLD are unable to see the forest, because their mind is too focused on leaves on each individual tree. Visual perceptual deficits also impinge on their capability to recall visual images, as their brain does not effectively organize the vast amounts of minute information (Rourke & Tsatsanis, 1995). Any task requiring synthesis of complex visual input is a weakness for people with NLD. For instance, remembering and distinguishing between the faces of people is a major obstacle for individuals with NLD. In addition, they lack a sense of spatial organization, both internal and external (Rourke, 1989). Maps and directions are very confusing; these children often become lost, even in places they are familiar with. A child with NLD may continually forget where the bathroom is at his grandparent's house, even though he has been there dozens of times. Likewise, any tasks involving orientation, especially determining left from right or east from west, are lifelong struggles (Johnson & Myklebust, 1967).

These visual-spatial perceptual deficits seem to have a great influence on the overall functioning of individuals with NLD, and are the foundation to most of the

difficulties they cope with each day. For instance, one of most well recognized indicators of this disorder is the inability to perceive nonverbal cues, which is primarily attributable to failures in visual-spatial perception. In addition, one of the most challenging aspects of the visual-spatial-organizational deficit for individuals with NLD is that the handicap is often imperceptible to everyone else. Others as often blame the failures and misperceptions caused by this deficit as being due to rudeness, stupidity, selfishness or laziness on the part of the NLD individual. Even from a very early age, in interactions with caregivers these visual-spatial difficulties instigate repeated interpersonal failures, which can affect socioemotional development (Semrud-Clikeman & Hynd, 1990; Voeller, 1995).

Complex Psychomotor Skills

Individuals with NLD frequently have weaknesses in fine and gross motor skills, which combined with poor visual perception can manifest as clumsiness and poor coordination (Harnadek & Rourke, 1994). Children with NLD seem unaware of the position of their body in space and often bump into things, lose their balance, and trip or stumble. Common childhood activities entailing the mastery of complex motor patterns, such as learning to tie shoelaces, ride a bicycle, kick a ball or play catch, are difficult and require tremendous concentration (Semrud-Clikeman & Hynd, 1990). Similarly, fine motor type skills, such as using scissors, sewing, and coloring, are slow to develop. Handwriting, particularly when they are young, is illegible, as these children may have difficulty correctly holding a writing utensil and applying the appropriate amount of pressure. In addition, many NLD children have global weaknesses on the left side of their body, causing difficulty in bilateral tasks like crawling, walking, and running (Rourke,

1988b). As a result of these motor difficulties and their difficulty adapting to new or complex situations, these children are tentative in physically exploring their surroundings, which can further delay their skill development and postpone autonomy (Rourke, 1989; Semrud-Clikeman & Hynd, 1990). The amount of effort and attention that NLD children must use in order to perform seemingly routine tasks can have a large impact on the schoolwork and socioemotional functioning, as their intense focus on the motor skills and avoidance of failures can result in missing out on crucial life experiences.

Academic Functioning

NLD children and adolescents often do well academically in the early elementary school years, as the schoolwork is typically straightforward and simple (Thompson, 1985). These children often have neurological assets in rote memory and develop exceptionally proficient verbal skills, which make the process of learning to read and write much more manageable, although there may be a brief reading delay for some NLD children (Rourke, 1989). Spelling is usually a strength, as rote memorization of simple verbal or written material seems effortless, and thus NLD children typically acquire a great deal of rote verbal information. These children tend to be very talkative and many are described as sounding like "little professors," due to their expansive vocabulary and desire to interact with others by sharing their knowledge. Prior to the 3rd or 4th grade, academic expectations and stressors are typically at a level they can cope with, and they generally are able mask weaknesses with these strong verbal skills. These children are often perceived by parents and teachers to be intelligent, precocious and are placed in gifted programs. The few prevalent areas of areas of academic problems for younger

children with NLD may include difficulty learning to read an analog clock, a generally poor sense of time, and inability to estimate how long activities might take, caused by their visual-spatial and orientation deficits (Rourke, 1989).

As children with NLD enter adolescence, the academic demands intensify, become more abstract, and they can no longer rely as much upon their rote memory and verbal strengths to compensate for their weaknesses. Although they have a strong vocabulary and appear to read well, reading comprehension is often very poor; they cannot pull out prevalent themes or briefly summarize (Thompson, 1985). Due to their poor fine motor skills, handwriting and any other actions requiring manual operation (e.g. compasses or scissors) are laborious and frustrating. Science is a particular challenge, as the subject necessitates the capability for abstract thinking, reasoning, problem solving, and the ability to generalize previous learning to novel situations, all of which are weaknesses for individuals with NLD (Harnadek & Rourke, 1994).

The inclusion of mathematics disabilities as one of the diagnostic features of individuals with NLD has been highly contested amongst researchers over the years. When Johnson and Myklebust (1967) first wrote about children with NLD, they distinguished two separate subgroups: arithmetic learning disability and social perception learning disability. Other NLD researchers, such as Badian (1986, 1992), Pennington (1991) and Semrud-Clikeman & Hynd (1990) have expressed hesitancy to include mathematics deficits as definitive of the disorder. These researchers suggest that although certain areas of arithmetic may be challenging for children with NLD, they may still excel at many mathematic tasks, particularly when they can utilize their assets, such as rote memory and verbal skills (Forrest, 2004).

Rourke (1987, 1995), the most prominent NLD researcher, has always included weaknesses in arithmetic as one of the diagnostic characteristics of the NLD, based upon his early research on learning disability subtyping. In most of his early empirical studies on NLD, all of the children in his NLD sample were required to demonstrate considerably lower scores on the mathematics section of the WRAT in comparison to reading skills to be included in the NLD sample. According to Rourke (1989), most NLD adolescents will never be able to exceed a 5th or 6th grade level in arithmetic, attributing the mathematical weaknesses to the deficits in visual-spatial-organizational perception, psychomotor skills, processing novel data, reasoning, generalizing, problem solving, and concept formation. For example, a NLD student may have difficulty aligning numbers in a long division problem, or could misread calculation signs. He theorizes that these same neurological deficits that impact mathematics, are those that impact social functioning (Strang & Rourke, 1983). In more recent publications, he has stated that, although a significant majority of individual with NLD will have problems in mathematics, he agrees that it should not a definitive criteria for children to score poorer on the mathematical section of the WRAT than the reading section to be eligible for a NLD diagnosis (Pelletier, Ahmad, & Rourke, 2001).

Socioemotional Functioning

Empirical research. In his research on the characteristics of various subtypes of learning disabilities, Rourke (1988a; Rourke & Fuerst, 1991) concluded that there was no evidence supporting the argument that all learning disabilities cause social and emotional problems, because, although some of his subjects suffered from moderate to severe of socioemotional disturbance, most of them did not. The only conclusion that he could

definitively determine was that the population of children in the NLD subtype appeared to have an above-average vulnerability to developing internalized psychopathology (social withdrawal, depression, anxiety and suicidality). This conclusion of the relationship between socioemotional disturbance and NLD has been supported by numerous subsequent studies (Del Dotto, Fisk, McFadden, & Rourke, 1991; Pelletier et al., 2001; Petti, Voelker, Shore, & Hayman-Abello, 2003; Rourke & Fuerst, 1991; Rourke & Fuerst, 1992; Rourke & Fuerst, 1996; Tsatsanis & Fuerst, 1997).

Unfortunately, several of the studies supporting a relationship between socioemotional disturbance and NLD, particularly the works of Rourke and his colleagues, have methodological flaws that elicit concern over the accuracy of the conclusions. Some of these limitations include use of data that is derived from very small samples or do not include control groups. A major challenge in the research of NLD seems to be recruiting an adequately sized sample, as the disorder is still largely underdiagnosed or misdiagnosed. Additionally, since there are no standard clinical diagnostic criteria, the comparison of conclusions from different studies may not yet be feasible. Referral bias is another concern, as most of the studies conducted through Rourke's Windsor laboratories are based upon children referred to a clinic for neuropsychological testing, rather than referred for school-based or mental health assessment (Little, 1993). Not only does neuropsychological testing, which is dependent on parent report, differ from school-based assessment, which is dependent on teacher report, but also these children's referral may have been due to disproportionately more severe psychosocial symptomatology.

Several studies have also found contradictory conclusions to the relationship between NLD and socioemotional disturbance. In one investigation, studying NLD adults instead of children and thus utilizing the Minnesota Multiphasic Personality Interview instead of the Personality Inventory for Children (PIC), the researchers found deficits in communication and social skills, but no significant evidence of internalizing psychopathology in any of the participants (Del Dotto et al., 1991). In another study, limited by a small sample size, the author found that that children with verbal learning disabilities were more likely to be withdrawn or have an internalized psychopathology than children with NLD, based upon teachers' observations (Forrest, 2004). This study may also be limited in that it did not take into account the characteristic early verbosity of NLD children when interacting with adults, which may have made them appear to be more competent to teachers than they were. Additional studies also seemingly contradict Rourke's conclusions, yet are irrelevant due to blatant methodological flaws. For example, in one study participants were determined to have NLD based solely upon criteria of having lower scores in mathematical achievement tests (Yu, Buka, McCormick, Fitzmaurice, & Indurkhya, 2006). However, in the following quote, Greenham (1999) offers a concise summation on learning disabilities, psychosocial functioning and the relevance of contradictory studies,

> Rourke and Fuerst's (1991) hypothesis receives some support, primarily from studies that make direct comparisons of well-defined subtypes of children with LD. Studies that provide contradictory or inconclusive results tend to be less well-controlled on a number of factors. Very few studies have attempted to test this hypothesis directly by comparing subtypes of LD on the relevant psychosocial variables. The low prevalence of the NLD subtype may discourage attempts to replicate this work. (p. 190)

Until the fixed diagnostic criteria for NLD is established and the disorder becomes more well known, research on NLD will continue to have methodological flaws such as these.

Socioemotional disturbances. The interplay of the various neurological assets and deficits of NLD seem to predispose children to develop social and emotional problems. For instance, due to visual-spatial-organization deficits, children with NLD are unable to accurately process and retain the nonverbal informational exchange that is a crucial component of human social and emotional communication. They can not accurately decode meaning from nonverbal social cues, such as gestures, body language, and facial expressions of others (Badian, 1992; Cornoldi, Rigoni, Tressoldi, & Vio, 1999; Dimitrovsky, Spector, Levy-Shiff, & Vakil, 1998; Johnson & Myklebust, 1967; Petti et al., 2003). Similarly, many NLD children are also unable to appropriately express themselves through these nonverbal channels. For instance, in the United States it is generally expected that people maintain periodic eye contact during social interactions; however, children with NLD tend to avoid or take no notice of other people's attempts at eye contact. Even with coaching, their gaze may be unnatural and unsettling. Correspondingly, although the accepted rules about the use of physical touch and proximics (personal space) vary from culture to culture and individual to individual, NLD children are often unaware or incapable of learning of these boundaries. Despite frequent redirections, NLD children are frequently overly affectionate with strangers, physically aggressive towards peers, or unknowingly violate another's personal space. In sum, due to their various deficits, individuals with NLD will attempt to interact in an environment in which they can barely speak the common language, are commonly misunderstood or

rejected by those around them, and consequently are oblivious about subtle or assumed expectations, with an end result of stress, anxiety and frustration.

Even the areas of strength for children with NLD can result in social and emotional problems when they interact with the deficits. For instance, although these children may have strong vocabularies and speak knowledgeably about subjects, they may talk endlessly, with inappropriate prosody (vocal tone, pitch, speed, rhythm, volume, and emphasis), and fail to recognize the negative feedback from others. In consequence, they are unable to learn how to modify their behavior to comply with more socially acceptable standards, resulting in social rejection and alienation. These children do not learn from past experiences, nor are they aware of how their behavior may appear to others (Voeller, 1995).

In social situations, a child with NLD may make false judgments and react based upon only what they perceive, which is often only small parts or details separate from the whole picture. Consequently, interactions may feel unnatural, awkward, strained or forced to others, and the endless petty misunderstandings caused by the NLD children's poor social judgment and misperceptions can lead to the children developing social anxiety or isolation. These children do not understand what they are doing wrong or why they are being rejected, because in their subjective reality their responses are justified or appropriate. According to Palombo (2000),

> For them, negotiating interactions with others is as difficult as running an obstacle course at night with a flashlight. What is perceived is negotiable or avoidable; what is not observed trips up the runner, leading to bewilderment and frustration. NLD patients are unaware that these failures are caused by their deficits and not obstacles placed in their path by others. (p. 316)

Their neurological deficits in problem solving, reasoning, and concept formation, and cause-and-effect thinking, all impact the social experiences, often causing them to be dissatisfying, confusing and ultimately frustrating. They do not know how to act in social situations and lack the ability to rapidly adapt or "wing it" like most people are able to do (Thompson, 1997). These children will approach all novel situations with the same maladaptive strategy, often rigidly relying on their verbal strengths. As a result, NLD children can behave in ways that can seem rude, obstinate, disruptive or noncompliant, which frequently tests the patience of their peers, teachers and family members. Due to their bizarre interactions and unpredictable actions, these children are often mislabeled with behavioral or psychiatric disorders and also are at a high risk for teasing, bullying, victimization, and rejection (Denckla, 1991; Fuerst & Rourke, 1993; Grace & Malloy, 1992; Harnadek & Rourke, 1994; Little, 2002)

There is evidence that the higher rate of depression and anxiety in individuals with NLD leads to an increased suicide risk (Bender et al., 1999; Fletcher, 1989; Rourke et al., 1989). This may be due to how the particular neurological deficits characteristic of the disorder create a "…fertile ground for the development of the suicide process" (Kowalchuk & King, 1989, p. 178). Individuals with NLD have deficits in emotional processing, and are often unable to recognize or label their feeling states (Whitney, 2002). Erin Bigler (1989) describes the suicide process of one of the NLD subjects in her study,

> His movement towards suicide as a solution to his adjustment difficulties was more a result of his social ineptitude and his verbal ruminations on how to cope. His inability to process internal emotional states led to an over rumination of "options" and suicide emerged. (p. 181)

Individuals with NLD have difficulty adapting to new life stressors and may cling to erroneous perceptions of reality, resulting in unremitting feelings of inadequacy as they continuously fail to alleviate their problems. With the addition of depression and social alienation, suicide may feel like the only adaptive solution.

Diagnosis of NLD

At this time, there is no definitive criterion for diagnosing NLD. Unfortunately, without inclusion of NLD in the Diagnostic Statistical Manual (DSM IV), International Classification of Diseases (ICD), IDEA 2004, or any established taxonomy system, the diagnostic standards will continue to be inconsistent, empirical research will be ungeneralizable, and the disorder will remain unknown and misunderstood. As a result, teachers are less likely to refer students for assessment, the symptoms of the disorder are more likely to be deemed as psychodynamic in nature, and these children will internalize pejorative labels on their character, affecting their self-esteem and aspirations. Without a standard definition, children are less likely to receive supportive services when they are young, which is necessary in order to minimize the risk of developing socioemotional disturbances (Casey, Rourke, & Picard, 1991; Petti et al., 2003; Strang & Rourke, 1983; Thompson, 1985).

Over the past three decades, Rourke's research on NLD has substantially advanced the neuropsychological understanding of this specific learning disorder and many of the NLD diagnoses currently given by school psychologists and neuropsychologists are based upon his published works. Rourke recently proposed his

current definition and diagnostic criteria for consideration to be included in the next ICD revision. His proposed definition of NLD is the following,

> The syndrome of Nonverbal Learning Disabilities (NLD) is characterized by significant primary deficits in some dimensions of tactile perception, visual perception, and complex psychomotor skills, and in dealing with novel circumstances. These primary deficits lead to secondary deficits in tactile and visual attention and to significant limitations in exploratory behavior. In turn, there are tertiary deficits in tactile and visual memory and in concept-formation, problem-solving, and hypothesis-testing skills. Finally, these deficits lead to significant difficulties in the content (meaning) and function (pragmatics) dimensions of language. In contrast, neuropsychological assets are evident in most areas of auditory perception, auditory attention, and auditory memory, especially for verbal material. Simple motor skills are most often well developed, as are rote verbal memory, language form, amount of verbal associations and language output. This mix of neuropsychological assets and deficits eventuates in some formal learning (e.g., academic) assets, such as single-word reading and spelling. It also increases the likelihood of significant difficulties in other aspects of formal learning (e.g., arithmetic, science) and informal learning (e.g., as transpires during play and other social situations). Psychosocial deficits, primarily of the externalized variety, often are evident early in development; psychosocial disturbances, primarily of the internalized variety, are usually evident by late childhood and adolescence and into adulthood. (Rourke et al., 2002 p. 310-311)

See **Appendix A** for Rourke's 10 item diagnostic criteria for NLD, which he has also proposed to the ICD.

One major challenge when researching NLD has been determining accurate and reliable assessment measures to determine if individuals meet the diagnostic criteria for NLD, particularly since the neurological assets and deficits manifest differently for children of different ages (Casey et al., 1991). In response to this dilemma, Rourke and his colleagues published a series of classification rules based on standardized neuropsychological tests (Drummond et al., 2005; Pelletier et al., 2001). According to Rourke, these rules are a means of determining, at different age brackets, if a child should be referred for a more comprehensive neuropsychological assessment, which is essential

for a diagnosis of NLD. In addition, these rules can function as standardized criteria of NLD for research purposes See **Appendix B** for these classification rules.

Unfortunately, in 2003 the revised WISC IV (Wechsler Intelligence Scale for Children) replaced the WISC III, the psychometric test used in Rourke's classification rules. The WISC IV abandoned the Verbal IQ and Performance IQ indexes, which had signified one of the most recognized (and disputed) criterions of NLD. There are no published studies so far that have investigated how differences in scores between the new Verbal Comprehension Index (VCI) and Perceptual Reasoning Index (PRI) in the WISC IV may compare to differences between the VIQ and PIQ in the WISC III for assessing NLD. The WISC IV also has new subtests (Matrix Reasoning, Picture Concepts, Word Reasoning, Letter-Number Sequencing, and Cancellation) that need to be investigated to determine if they may be incorporated in a revised classification system. Nevertheless, in addition to standardized aptitude tests, any child suspected of having NLD must have a comprehensive neuropsychological evaluation. This evaluation is necessary to assess the child's sensory, perceptual, psychomotor, attentional, concept formation, and problem solving skill level, as well as judgment, reasoning, and visual-spatial-organization capacities (Rourke, 1989). Socioemotional functioning should also be explored using projectives (e.g. Rorschach test) and personality assessment (Yalof, 2006).

Under/Misdiagnosis

Despite the documented socioemotional risks linked with NLD, the greater public remains unfamiliar with the diagnosis for a number of reasons. First and foremost, the lack of a discrete diagnostic criteria in the DSM IV or IDEA often forces schools to diagnose these children with more established or better understood behavioral or

psychiatric disorders in order for them to receive services (Yalof, 2006). Children with NLD are often diagnosed with Asperger's Disorder, due to the similarities in the behavioral characteristics of the disorders. Some argue that the disorders can be comorbid, since Asperger's refers to a behavioral condition while NLD refers to a neuropsychological condition (Stein, Klin, & Miller, 2004). It has been argued that individuals with Asperger's Disorder typically also have NLD, but not all individuals with NLD will have Asperger's (Gunter, Ghaziuddin, & Ellis, 2002; Klin, Volkmar, Sparrow, Cicchetti, & Rourke, 1995; Rourke, 2008). The difference seems to fall in the severity of the deficits. However, this is an area of continued controversy.

Often school systems will view the NLD symptoms as conduct problems or minor deficits that the children will outgrow (Thompson, 1985). This is compounded by the disorder's similarities and comorbidities with various behavioral disorders (Oppositional Defiant Disorder, Conduct Disorder, and Disruptive Behavior Disorder NOS), psychiatric/personality disorders (Bipolar Disorder, Schizoid, Borderline) or other learning disabilities (Learning Disability NOS, ADHD, Communication Disorder, and Mathematics Learning Disorder). Lastly, the term "nonverbal learning disability" is misleading, as the difficulties associated are not all nonverbal and the disorder affects more than just learning.

Prevalence

During the 2006-2007 school year, 13.6% of all children enrolled in federally supported U.S. schools received special education services, with 5.4% diagnosed with a specific learning disability and .9% deemed eligible for services due to a serious emotional disturbance (Snyder, Dillow, & Hoffman, 2009). According to Rourke (1989),

NLD affects at least 10% of all children with learning disabilities, which is approximately .5% of the population of the United States, or about 1.5 million people. The ratio between males and females appears to be 1:1 (Rourke, 1989). Yet, due to the lack of awareness about NLD as well as the lack of clinical diagnostic criteria, the disorder is likely vastly underdiagnosed or misdiagnosed.

Conclusion

Children with NLD face the daily challenge of trying to fit into an environment while having little understanding of the expectations, rules, and appropriate customs. Their neurological deficits cause them to misperceive their interactions with those around them, creating disparity between the meanings they construe and reality (Palombo, 1993, 2006).They perceive the reactions and behaviors of the people in their lives as unfair and unpredictable. It does not matter how hard they try to do the right thing, because they always end up being rejected or punished. Unlike their peers, children with NLD can not figure things out on their own; they need to be specifically taught the things that most people pick up naturally. Since these children are generally intelligent, this can be hard for adults to believe. For instance, it may be difficult for a teacher to believe that children with such strong verbal skills cannot recognize that the simple act of turning the classroom lights down, a nonverbal cue, means that they should be quiet. As a result, the behavior of these children is misunderstood as “won’t” instead of “can’t.” The repeated stress and frustration can be overbearing for children with NLD, eventually causing the children to withdraw, feel hopeless and become depressed.

CHAPTER IV

NLD AND THE RIGHT HEMISPHERE: A DEVELOPMENTAL NEUROBIOLOGY PERSPECTIVE

Introduction

Over the past few decades, there have been a number of speculations about the fundamental neurobiological origin of NLD. Although the precise etiology of NLD still remains unclear, most researchers have come to believe that the disorder originates from dysfunctions and insufficiencies in the right hemisphere of the brain (Rourke, 1982; Semrud-Clikeman & Hynd, 1990). This assumption is largely based upon a number of studies that have found significant similarities when comparing individuals diagnosed with NLD to individuals who have suffered from brain injuries to the right hemisphere (Gross-Tsur, Shalev, Manor, & Amir, 1995; Semrud-Clikeman & Hynd, 1990). The link between NLD and the right hemisphere is also consistent with research identifying the dominant neuropsychological functions of the right hemisphere. These studies have found evidence that the right hemisphere plays a large role in nonverbal communication, emotional processing and visual-spatial functions, all of which are primary weaknesses in individuals with NLD (Galin, 1974; Schore, 1994; Schore, 2003).

This chapter will explore the research on the functions of the right hemisphere of the brain and how these may relate to NLD. Next, it will give an overview of Rourke's

(1989) "white matter" model, which theorizes that dysfunctional white matter fibers in the right hemisphere are the neurobiological basis of the disorder and the neurological assets and deficits caused by these dysfunctional fibers result in the developmental manifestation of the NLD syndrome. In addition, this chapter will review Rourke's (1989) Neurodevelopmental Model of NLD, which is generally recognized as the most probable explanation of the development of neurological strengths and weaknesses associated with NLD. Finally, this chapter will review Allan Shore's (1994,1997, 2003) developmental neuropsychological theory of attachment and affect regulation, which posits that the maturation of the right hemisphere during the first two years of infancy is dependent upon the synchrony of shared nonverbal emotional experiences between the infant and primary caregiver. Schore's theory argues that obstacles to this synchrony, such as caregiver or infant neurological information processing deficits, can result in the infant being unable to develop the neurological functions of affect regulation, thus increasing the risk of psychopathology. Similar to Rourke's model, Shore's research has substantial impact on understanding socioemotional development in children with NLD.

History of Hemisphere Lateralization

The human brain is the complex, and largely mysterious organ, comprised of structures and functions too vast to detail in this chapter. The structures and functions most applicable to NLD are the neurons, synaptic connections and neural pathways in the right cerebral hemispheres. Scientists first became interested in studying the lateralization of the left and right cerebral hemispheres of the human brain in the middle of the 19th century, when it was discovered that specific areas of the left hemisphere were involved

in language. The term "lateralization" of function refers to the position within the brain that specializes in processing that function. Unlike vast research on the language-localized functions of the left hemisphere, research on the localized functions of the right hemisphere was minimal until World War II, when scientists were able to study combat survivors with isolated wounds to distinct sections of the right hemisphere. Split-brain studies in the 1960s further developed the research on the lateralized functions of different sections of the brain. For many years the left hemisphere was referred to as the "dominant" hemisphere, as it was believed that it was responsible for all types of cognitive functions and language, while the right hemisphere was thought to be the "minor" hemisphere, as it was responsible for lesser functions, such as art, music, spatial relations and creativity (Semrud-Clikeman & Hynd, 1990). Over the past 20 years, studies have shown that while some functions are unquestionably lateralized between the right hemisphere and the left hemisphere, most tasks rely on some type of collaboration between both hemispheres, through intermodal white fibers, and thus neither is necessarily more dominant than the other (Goldberg & Costa, 1981).

Localized Functions of the Right Hemisphere

There have been a number of studies that have demonstrated different neurological functions in which the right hemisphere is dominant, many of which coincide with the neurological deficits in NLD. These right hemisphere dominant functions include cognitive flexibility, organizing or integrating complex or novel information, visual-spatial perception, processing of emotions, social perception, and nonverbal communication (Galin, 1974; Goldberg & Costa, 1981; Mapstone et al., 2003;

Ostrove, Simpson, & Gardner, 1990; Schore, 1994). The processing of facial expressions, gestures, prosody, and other nonverbal cues also occurs primarily in the right hemisphere (Blonder, Burns, Bowers, & Moore, 1993; 1995; Borod, Haywood, & Koff, 1997; Ross & Mesulam, 1979). Since implicit memory appears to be stored in the right hemisphere, it has been argued that the right hemisphere is the neurobiological core of the human unconscious (Joseph, 1992) and sense of corporeal and emotional self (Devinsky, 2000).

The right hemisphere is dominant during the first two years after birth (Nelson & Bloom, 1997; Schore, 1994). During this prelinguistic stage of development, all sensory input is nonverbal and the infant must learn to accurately perceive and integrate visual-spatial images, patterns, sounds, and rhythms. The ability to interpret facial expressions and other nonverbal social cues is particularly important at this stage, as the mother-infant attachment relationship serves as a foundation for the future social relationships and is essential for the development of self-regulation (Bowlby, 1980; Schore, 1994). Neural growth and synaptic connections in the infant's maturing brain are dependent upon these early relational experiences, which serve as building blocks for more complex skills later in life (Greenough & Black, 1992).

Goldberg and Costa (1981) developed a neurodevelopmental model of central processing deficiencies in children, which was centered on their findings on the differences between how the right and left hemispheres process information. This model was based upon data that showed that the right hemisphere had a higher white matter to gray matter ratio than the left hemisphere. According to Cozolino (2006), white matter is made of long myelinated fibers that carry information to various parts of the brain and connect neural networks, which are made of gray matter. The interconnection of multiple

neural networks is necessary for the development of more complex and abstract skills and functions. Thus, the white matter increases the communication, efficiency and speed of the neural networks and is essential for the integration of brain functions throughout the nervous system.

Goldberg and Costa (1981) hypothesized that due to these difference in white and grey matter, the two hemispheres process information uniquely. The right hemisphere, which has more white matter, is more adept at processing complex and novel information from multiple modalities, while the left hemisphere, which has more gray matter, is more adept at analyzing and categorizing one mode of input at a time. The white matter fibers in the right hemisphere are essential for processing the information from multiple sensory and perceptual modalities, such as is needed for nonverbal communication, social interaction or abstract reasoning. Goldberg and Costa (1981) also proposed that the right hemisphere is more equipped to process novel information and to construct new schemas, whereas the left hemisphere can only process information into existing schemas. In addition, Goldberg and Costa (1981) theorized that disruptions in infant neurological development or early white matter dysfunction would have a great impact on the acquisition of right hemisphere processes and the brain's efforts to adapt to the disruption by rerouting the primary neural pathways may then block the development of complex behavior and higher order functions.

Rourke's White Matter and Neurodevelopmental Models of NLD

Using research on hemispheric cauterization and Goldberg and Costa's (1981) model as a framework, Rourke (1989) observed that children within the NLD subtype of

learning disabilities exhibited weaknesses in right hemisphere localized functions, while also exhibiting strengths in left hemisphere functions. He theorizes that NLD is neurobiologically based on dysfunctional or damaged white matter in the right hemisphere. He argues that the amount of white matter that is damaged or dysfunctional, the type of white matter damaged or dysfunctional, and the developmental stage during which the destruction or dysfunction occurs will influence the severity of the disorder and its developmental and behavioral manifestations. Rourke developed this "white matter" model as a means to explicate the presence of the NLD phenomenon in various other neurological diseases and disorders, such as Callosum Agenesis, Asperger's Disorder, Velocardiofacial syndrome, William's syndrome, and Turner syndrome (Rourke, 1995).

Based on his "white matter" model, Rourke (Harnadek & Rourke, 1994; 1988b) developed a Neurodevelopmental Model of Primary and Secondary Assets and Deficits (**Appendix C**), which illustrates the developmental process in which the primary neuropsychological assets and deficits of children born with NLD evolve into secondary, and then tertiary neuropsychological assets and deficits as the children mature. These then eventually lead to specific predictable patterns of academic and socioemotional strengths and weaknesses. Rourke (1989) theorizes that the symptomatology of NLD is the consequence of the children's efforts to adapt to their right hemisphere neurological deficits by compensating with their overly developed left hemisphere neurological strengths. In other words, not all of the symptoms of NLD are organic, but instead are the result of the brain's attempt to adapt to the initial deficits. Ironically, the brain's initial efforts to adapt by rewiring the neural pathways may prevent the child from being able to

adapt to the more complex challenges that require higher-level experience-dependent right hemisphere skills or the integration of both hemispheres later in development.

Neurological Assets

Although each NLD individual's neurological capacities differ, typically individuals with NLD have primary strengths in auditory perception, simple motor skills, and they can memorize rote material or repetitive motor actions easily and quickly (Rourke, 1989). According to Rourke (1989), these three neurological talents can lead to the acquisition of strengths in selective and sustained attention, particularly towards simple, repetitive, spoken verbal information, such as in learning the letters of the alphabet. These attentional skills help the NLD child develop a strong rote auditory and verbal memory, the "tertiary asset" in Rourke's model. Each asset complements the ease of mastering the next asset, resulting in speech and language strengths in phonology, reception, repetition, storage, associations, and output. These verbal skills manifest academically through assets in simple reading and word decoding, spelling, rote memory, and possibly, with time and practice, graphomotor skills.

Neurological Deficits

Rourke's research has demonstrated that children with NLD often have primary deficits in tactile perception (including sensory integration), visual perception (especially visual-spatial-organizational skills), complex psychomotor skills (fine and gross motor), and an over-reliance on prosaic and rote responses towards novel information and situations (Casey et al., 1991; Drummond et al., 2005; Forrest, 2004; Harnadek & Rourke, 1994; Rourke, 1989). These primary deficits lead to secondary deficits, including poor attention to tactile and visual input and a lack of physical exploratory behavior

(Rourke, 1989). These secondary deficits then result in the tertiary deficits of poor memory for complex, novel or nonverbal information and difficulties with concept formation, problem solving, strategizing, appreciation of humor, understanding cause and effect, and reception of feedback (Fisher, DeLuca, & Rourke, 1997; Strang & Rourke, 1983). These then manifest in difficulties with pragmatic verbal communication, including speech prosody and overreliance on repetitive and rote language in social situations (Rourke & Tsatsanis, 1996). Academically, as they grow older, NLD children begin to have difficulty with reading comprehension, science (complex concept formation and problem solving) and mechanical arithmetic (Strang & Rourke, 1983). Socially, adapting to novel situations is problematic and they have weaknesses in social perception, social judgment, and social interaction skills, which can lead to social withdrawal and isolation (Del Dotto et al., 1991). Although younger children may initially externalize or "act out" their distress, individuals with NLD have a high risk of developing internalizing coping strategies, such as social withdrawal or self blame, leading to depression, anxiety, and possibly suicide (Rourke et al., 1989).

Attachment and the Developing Right Hemisphere

The first developmental task of infancy is to develop a consistent and secure attachment relationship. According to Bowlby's (1980, 1988) theory of attachment, widely considered the foundation of all attachment theories, infants (and many other animals) are born with a biological drive to seek out attachments with primary caregivers. He hypothesized that this drive has emerged as a consequence of evolution, due to the infant's need for care and protection. Current research has shown that attachment is

needed not only for physical safety and growth, but also is essential for socioemotional development (Schore, 2009).

The surge in literature in the field of attachment recently has focused on building upon Bowlby's (1980, 1988) theory by studying the neurobiological structures that undergird physiological functions of attachment (Schore & Schore, 2008). Bowlby always believed that attachment was biologically based, yet it has not been until recently that technology has permitted scientists to fully explore how early experiences can shape early brain development. Allan Schore (1994, 2003), a neuropsychologist, developed his own theory of attachment, converging the psychoanalytic theory of the unconscious with recent neurodevelopmental discoveries. He theorizes that early emotional exchanges between the infant and caregiver shape developing neurological structures associated with affect regulation within the right hemisphere.

In his writings, Schore (1994, 2003) expanded upon Bowlby's (1980, 1988) concept of "internal working models," the internalized representations of children's early attachment relationships and their unconscious understanding of self and others. Throughout life, these models serve as unconscious guides for regulating affect and coping with interpersonal stress. Schore (1994) argues that these internal working models are made of unconscious memories of early attachment relationships that are stored in the right hemisphere, which is dominant for implicit learning, during an experience-dependent period of brain maturation in the first years of life. These "affectively burnt in' templates of early object relations then shape the individuals interpretation of interpersonal experiences and attachment behavior (Schore, 2003 p. 12).

Shore (1994) believed that “affect synchrony” between the infant and caregiver was essential for the experience-dependent maturation of self-regulation structures within the right hemisphere. Affect synchrony refers to the process in which:

> the psychobiologically attuned mother synchronizes the spatiotemporal patterning of her exogenous sensory stimulation with the spontaneous overt manifestations of the infant’s organismic rhythms. Via this contingent responsivity, the mother appraises the nonverbal expressions of her infant’s internal arousal and affective states, regulates them, and communicates them back to the infant (Schore, 2009, p.192).

Schore (1994, 2003) asserts that the development and organization of neurobiological self-regulation structures in the right hemisphere occurs in the context of emotional communications between the mother’s right hemisphere and the infant’s right hemisphere. Since the sensitive period for the development of these structures occurs in the first two years, these affective communications are nonverbal, thus dependent upon both the mother and infant’s capacity to recognize and process facial expressions, prosody, gestures, and touch.

In a “good enough” environment, the infant will gradually internalize the mother’s affect regulating functions, a process in which neural pathways and connections are created in the infant’s orbitofrontal cortex (Hartmann, 2009; Schore, 1994, 2003). The orbitofrontal cortex is, “the executive center of the right-hemispheric networks of attachment, social relationships, affect regulation, and higher-level input into bodily homeostasis" (Cozolino, 2006, p. 72). Schore (1994, 2003) posits that a necessary part of this process is the repeated sequence of misattunement and repair between the mother and infant. When the mother misattunes with her infant, she can regulate this negative affective state in her infant by re-attuning quickly, providing repairing experiences that

promote tolerance and resiliency. However, if these ruptures remain unresolved or prolonged, the infant will be unable to internalize the capacity for self regulating, forcing the infant to adopt other maladaptive means of coping. If these attachment failures are severe or recurring, the prolonged stress and emotional dysregulation can inhibit brain growth and result in deficiencies in the neural circuits in the limbic system (Cozolino, 2006). Thus, Schore argues that many of the functions of the right brain are directly linked to early attachment relationships with caregivers and without these attachments infants will not be able to internalize affect regulation functions in the right hemisphere. Affect regulation is essential for socioemotional development, as without the capacity to modulate shifting states of emotional arousal and the capacity to adaptively cope with interpersonal and intrapersonal stressors, the risk for developing psychopathology increases (Schore, 1994).

Rourke's research on NLD and the right hemisphere and Schore's theory of attachment and affect regulation are particularly relevant to the investigation of the socioemotional development of children with NLD. Their research raises questions about the extent in which socioemotional problems in NLD are genetically predisposed, or the result of innate neurological factors, such as deficits in processing of nonverbal communication, influencing environmental factors. Deficits in attachment security can then influence postnatal brain development. Whether the white matter dysfunction is genetically-based or occurs gradually as the child's brain matures are areas for further empirical investigation.

CHAPTER V

NLD AND THE DEVELOPMENT OF THE COHESIVE SELF: SELF PSYCHOLOGY THEORETICAL PERSPECTIVE

Introduction

The psychodynamic theory of self psychology was conceptualized by Heinz Kohut (1971, 1977; Kohut et al., 1984). Although it originally was expected to be a simple clinical contribution to the understanding and treatment of patients with narcissistic personality disorders in classic psychoanalysis, self psychology has developed into a unique psychodynamic model of human development and motivation. While working with narcissistic patients in analysis, Kohut became disillusioned with classical approach of drive-based interpretation and analytic neutrality, which he felt neglected the value of therapeutic empathy and introspection (Siegel, 1996). In his writings, Kohut (1971, 1977; Kohut et al., 1984) proposed that narcissism, which psychoanalysis previously had regarded as a maladaptive ego defense, was natural, and that individuals could develop a healthy narcissistic sense of self. He asserted that the development of healthy narcissism and a cohesive self was dependent upon attachment experiences with a "good enough" empathic caregiver during early childhood. Rejecting Freud's (1914) theory of inborn instinctual drives and psychic conflict, Kohut speculated that the aggressive and sexual drives were the consequence of an unempathic or

invalidating environment, in which a child's early narcissistic needs were not adequately satisfied by caregivers. Although for most of his career Kohut had tried to make his theory fit within the boundaries of classical psychoanalysis, towards the end of his life he came to recognize and accept that his hypothesis of the development of the cohesive self should be considered a stand-alone theory of human motivation. Since Kohut's death in 1981, self psychology has become one of the modern conceptualizations of psychoanalytic theory.

Key Concepts of Self Psychology

One of the more confusing terms in psychoanalytic theory, the term "self," has no consistent definition amongst theorists, analysts, or neuroscientists, and "self" has often been used interchangeably in psychoanalytic literature with the term "ego" (Milrod, 2002). According to Kohut (1977), the "self" refers to an innate organizational structure within the mind, separate from the ego, made up of psychic configurations of a person's subjective experiences, patterns of interpersonal functioning and innate cognitive capacities, skills and talents. The narcissistic self configuration is first developed in early childhood through the gradual internalization of experiences and interactions with caregivers, forming enduring psychic structures related to ambition, motivation, values and ideals. Kohut believed that it was the self, not unconscious psychic conflict, that was the core of psychological health, energy and motivation.

Contradicting the classical psychoanalytic emphasis on instinctual drives, Kohut asserted that the environment, or specifically a child's "experience of the environment," has the greatest impact on the development of the cohesive self, as the infantile

amorphous self is dependent for survival upon psychological functions provided by "selfobjects" (Kohut & Wolf, 1978). Kohut used the term "selfobject" to refer to the objects, typically people, that empathically supply psychological functions for the vulnerable infant, who lacks the psychic self structures to function autonomously. Because the infant experiences these selfobject functions as part of his own self and not as provided by another, Kohut distinguishes these objects as selfobjects. For example, a selfobject, such as a mother, provides the function of affect regulation when she comforts her infant in distress. Over time, the child is able to internalize the functions provided by selfobjects and develop his own psychic structures, which make up his maturing sense of self.

Kohut (1971) agreed with Freud (1914) that all infants are born in a state of primary narcissism, or "libidinal investment of self, a stage from which the infant emerges only when he begins to experience his supplies coming from outside" (Fonagy & Target, 2003, p. 166). Kohut (1977) refers to the unformed psychic structure of the self during primary narcissism as the "virtual self," because at this stage the infant has not yet begun to integrate any selfobject experiences and his "self" exists only in the minds of his parents. Over time, as the child internalizes the selfobject functions, a "nuclear self", or the cohesive organizational core of self, arises from the virtual self. Beginning in the first few months of life and then continually throughout the lifespan, Kohut et al. (1984) asserts that humans are inherently motivated to develop and maintain a cohesive sense of self through continual experiences with selfobjects. Kohut (1977) describes the developmental trajectory of the maturation of the narcissistic self, beginning with the newborn's state of primary narcissism and resulting in an enduring cohesive self.

According to self psychology, optimal self configuration results in healthy narcissism, which Kohut (1977) described as a nuclear self capable of comfortably balancing realistic aspirations and idealized goals, while realizing the potential of innate cognitive abilities, talents, and skills. However, Kohut does not delve into how internal neuropsychological factors (such as impaired cognitive abilities, talents and skills) may influence the capacity for a child to perceive and experience selfobject functions, components that are essential optimal self configuration.

According to Kohut (1971), the development of a cohesive self begins with the infant's emergence from the state of primary narcissism and his recognition of the source of selfobject functions as existing as separate from the infant's self, and thus out of the infant's control. To defend against the sense of helplessness, the child constructs a "Grandiose Self," an exhibitionist false self in which the child perceives himself as omnipotent. At this stage, Kohut asserted the significance of an empathic selfobject (typically the mother), who can provide the selfobject function of "mirroring" this grandiose self by providing affirmation, admiration, and approval of the child's exhibitionism needs. Ideally, as a result of the mirroring selfobject functions, the child experiences pleasure in his growth and accomplishment, feels special and lovable, and internalizes a sense of personal pride and mastery, causing the development of enduring psychic configurations of self-worth and self-esteem. Only then can the child relinquish the defense of an omnipotent false, grandiose self and accept his own limitations. According to Kohut (1977), successful empathic mirroring allows for the child to develop ambitions and enjoy challenges, as he is not only motivated for the reward of recognition, but also aware of his limitations and confident in his abilities.

In the second stage of self-development, which occurs simultaneously with the Grandiose Self, the child creates the "Idealized Parental Imago", a mental representation in which his parents are omnipotent. According to Kohut (1971), as the child emerges from primary narcissism, he also defends against his own sense of helplessness by projecting onto his caregiver the power to magically simulate for the child the security and omnipotence that he experienced in the primary narcissistic state. Caregivers must therefore supply idealizing selfobject functions by providing opportunities for the child's adulation and tolerating the child's unrealistic fantasies of the caregiver's wisdom, strength, and goodness. In addition, caregivers must provide the selfobject functions of recognizing and regulating the child's state of physical and emotional arousal. Due to this, the child idealizes the caregiver's ability to magically protect him from pain and discomfort as well as elicit feelings of bliss and security within the child. The child then strives to merge with the perfect selfobject, forges an attachment to his "protector," and greedily takes in the caregiver's omniscient wisdom on cultural customs, rules of conduct, morals, values and principles. According to Kohut (1977), as a child integrates these idealizing selfobject functions, he develops his own realistic sense of influence and power and capacity of self-soothing, self-regulation and self-control. Lastly, through idealization of the caregiver's rules and values, the child learns how to behave appropriately according to the culture's customs and develop a set of idealized goals. Gradually, as the child begins to recognize his caregiver's limitations and his own capacities, he is able to relinquish this imago.

In his final work, Kohut et al. (1984) added an additional narcissistic configuration, called the Alter Ego, which he felt was also necessary for development of

the optimal cohesive self. Emerging later in development and related to both the Grandiose Self and the Idealized Parental Imago, the Alter Ego refers to a child's need for twinship selfobject functions. In other words, after the child has begun to develop his nuclear self, he begins to yearn for some type of commonality or bond with other people. This kinship permits the child to feel secure in his own sense of self, as he is both unique and part of a common human linkage. As a result, the child feels intact and whole.

Kohut (1971) used the term "transmuting internalization" to refer to the intrapsychic process in which a child integrates the selfobject functions into his own self structure. Transmuting internalization is dependent upon "optimal frustration" during selfobject experiences. According to Kohut, there are two necessary components of optimal frustration. The first component is an empathic caregiver who is attuned enough with the child to recognize when the child's frustration tolerance is imminent and provide the needed selfobject function. In other words, the caregiver must be able to accurately determine how high to set the expectation in order for the child to succeed without becoming affectively overwhelmed. The second component of optimal frustration is the capacity in which the caregivers can tolerate the discomfort of watching the child struggle or fail at autonomously achieving the functions that the parent could provide for the child easily. Accordingly, in order for children to develop frustration tolerance and mastery, they must be given opportunities to challenge themselves. However, there must be a balance between encouraging the child to succeed at tasks that are minimally challenging and setting a child up for a task that is beyond their capacity.

Although the first few years are the most significant for the formation of psychic self configurations and a cohesive self, throughout life the organizational structure of the

self is always evolving. Kohut et al. (1984) described the narcissistic self as being connected to the tension arc between the three poles, the Grandiose Self, Idealized Parent Imago and Alter Ego, with the child's innate skills and talents mediating in the center of the poles. If there is weakness in one pole, the other two poles will attempt to compensate by strengthening. Kohut (1977) asserts that if there are deficits within all three of the poles, a child is a great risk for pathology, as the narcissistic self will be forced to re-internalize the original narcissistic configurations without their "passage through the parents," or transmutation, the step in which the configurations are realistically shaped and given positive emotional value. As a result, the child will continue to seek selfobject gratification in pathological efforts to maintain his regressed and fragmented sense of self throughout his life, until he is able to develop a therapeutic relationship with appropriate transference selfobject experiences.

In the theory of self psychology, Kohut (1977; Kohut et al., 1984) assumes that both the child and the selfobjects have the cognitive and perceptual capacities to engage in this complex, evolving, and unconscious system. However, the NLD child's specific neurological assets and deficits may hinder the process of cohesive self development at various stages, despite a "good enough" empathic selfobject environment. If the child can not even perceive the gratifying selfobject functions, he will never be able to integrate them. "Whenever the growth of talents and skills fails to occur in the normal time frame, the result is self-depletion, fragmentation, shame, and social and emotional difficulty" (Orenstein & Levin, 2002, p. 30). Without adequate cognitive capacities, skills, and talents mediating the tension arc of Kohut's three poles, a child may be at risk for

developing a fragmented or defective sense of self, leading to maladaptive behaviors and psychopathology (Palombo, 2001).

According to Kohut et al. (1984), the greatest stressor to humans is the threat to the cohesion of the sense of self, and therefore individuals will always prioritize preservation of the self, even if there are seemingly self-defeating consequences. Kohut asserts that throughout life, no matter how mature or cohesive the self may be, the self structures and organization will always be susceptible to fragmentation or regression if selfobject needs are not maintained or are threatened. Even if the self is arrested at a primary narcissistic state, the self preservation of this "defective" state is instinctual, which is one of the reasons why treating patients with narcissistic personality disorder or behaviors can be so challenging.

> Just as a tree will, within certain limits, be able to grow around an obstacle so that it can ultimately expose its leaves to the life-sustaining rays of the sun, so will the self in the developmental search abandon the effort to continue in one particular direction and try to move forward in another" (Kohut et al., 1984 p. 205).

In consequence, this unconscious self preservation instinct can obstruct further self development, as individuals will vehemently resist opportunities for improvement or change and may maladaptively defend against perceived narcissistic injuries.

According to Kohut (1977), "disintegration anxiety" refers to the emotional state triggered by the fear of losing self cohesion or sense of who one is. The self creates "disintegrative byproducts," or defensive and compensatory structures, to attempt to fulfill unresolved selfobject needs. Rage represents one of the disintegration products of a fragmented self. It can emerge as a defensive structure when a child's healthy assertion is not validated by his selfobjects. A fragmented child may feel as if his very existence is in

question, and fear his own annihilation. He is in despair and feels unprotected and hopeless and thus defends against this state with aggression (Kohut et al., 1984)

Self Psychology, Mindsharing and Learning Disabilities

Mindsharing

Drawing from Kohut's (1971, 1977; Kohut et al., 1984) theory of selfobject functions and Daniel N. Stern's (2004) theory of intersubjectivity, Joseph Palombo (2001, 2006, 2008) developed the concept of "mindsharing" to describe the socioemotional development of children with learning disabilities. According to Palombo (2008), mindsharing is:

> a form of intersubjectivity in which one person provides psychological functions that complement, and are essential to maintenance the integrity of, the sense of self of the other person…A form of mental state sharing and tuning (that) serves not only to complement but also to transform the inner state of another person (p. 144).

Although empathy is the essential component of mindsharing, in his study of children with learning disabilities Palombo (2001, 2006) specifically emphasizes another aspect of mindsharing in which caregivers perform "complementary functions" for their children. Building on Kohut's (1971) theory of selfobject needs, complementary functions are the psychological functions a person provides for another person in order to maintain mental well-being and self-cohesion (Palombo, 1993).

Palombo (2008) describes three types of complementary functions in mindsharing: transitional object functions, selfobject functions, and adjunctive functions. Transitional object functions are based upon Winnicott's (1953) concept of children finding security in inanimate objects, such as a teddy bear, when separated from their

mothers. The child transfers the psychological functions provided by the mother onto the teddy bear and thus experiences those functions as part of himself (through the teddy bear selfobject), despite being separated from the original source of the functions. Selfobject functions are identical to Kohut et al.'s (1984) three poles of the narcissistic self: mirroring (admiration, approval), idealization (regulation of arousal states) and twinship (common bond with liked-minded others). Palombo's (2001) adjunctive functions are similar to selfobject functions, but lack the emotional component and are rarely internalized. Relevant to NLD, parents provide adjunctive functions to their child in order to balance ego deficits or delays that threaten the child's self-cohesion. For example, a mother provides an adjunctive function when she prepares her NLD child for transitions or breaks down large tasks into smaller jobs, as without this support, the child's frustration may grow to be intolerable.

According to Palombo (1993, 2001), parents of children with learning disabilities often are perceived by others as being too overprotective, enmeshed with, or lenient with their child, but realistically the parents are often providing necessary complementary functions for their child's ego deficits so as to help the child avoid fragmentation. Unfortunately, this can lead to a symbiotic attachment, and therefore, when the child is inevitably separated from the parents, the child is unable to function independently. Palombo (1993) also notes that for some children psychiatric medication can be viewed a complementary function. For instance, for a child with ADHD, a medication for attention and focus, may allow for the child, who is more regulated, to experience and internalize selfobject functions such as self-regulation or approval.

Similar to Kohut's (1977) concept of internal compensatory structures, Palombo asserts that, in addition to complementary functions provided by others, children with neurological or other ego deficits often are able to develop their own compensatory functions to help themselves. For example, children with NLD may compensate with their weaknesses in nonverbal processing by 'talking themselves through' nonverbal tasks or rehearsing verbally before entering new situations. Similarly, a teenager who is unable to internalize his parent's nonverbal mirroring of his Grandiose Self may seek out validation and acceptance through an online role-playing game in which he has greater control over how he is perceived and in which all of the communication is verbal or written.

Conclusion

Self psychology provides a valuable framework for evaluating how an NLD child's cognitive strengths and weakness may factor into the development and maintenance of a cohesive self. This theory highlights the importance of selfobject and complementary functions, which are primarily supplied by the caregiver through nonverbal communication. Since the cognitive limitations of NLD can impede the effective processing of nonverbal information, these children may be at risk for repeated selfobject failures, which may contribute to their development of socioemotional problems. In his writings, Kohut (1971, 1977; Kohut et al., 1984) adopted a parent-blaming stance towards empathic failures, which he believed were caused by neglect or abuse. However, it is more likely that empathic failures and subsequent socioemotional disturbances for children with NLD equally originate with the parents' inability to

recognize the children's unique cognitive limitations and the children's inability to recognize the parents' nonverbal empathic communications. In addition, in efforts to cope with these cognitive deficits and empathic failures, NLD children acquire interim compensatory strategies based upon their strengths, and parents attempt to supply adjunctive functions to avert self fragmentation. Unfortunately, these strategies and functions may be just as debilitating, since they can inhibit the attainment of more adaptive and autonomous skills. In consequence, children with NLD grow up without adequate coping mechanisms and with a poor capacity for self-regulation, in addition to a fragmented sense of self, manifested by low self-esteem and ungratifying internal attachment representations. Subsequently, children with NLD are vulnerable to the development of socioemotional disturbances as they get older.

CHAPTER VI

DISCUSSION AND RECOMMENDATIONS

Overview of Chapters III-V

The objective of this theoretical thesis is to explore how the theories of developmental neurobiology and self psychology may explain the influence of Nonverbal Learning Disability (NLD) on socioemotional development in children and adolescents. Chapter III introduced the phenomenon of NLD, a relatively unknown subtype of learning disabilities in which individuals have deficits in the domains of visual-spatial perception, complex motor skills, academic functioning and socioemotional functioning. Individuals with NLD have difficulty processing information that is not presented verbally or auditorily, such as nonverbal cues (facial expressions, gestures, prosody, proximics) or spatial relations (maps, orientation, right versus left). These individuals commonly have strengths in verbal skills, auditory perception and rote memory. Research has also shown that individuals with NLD are at a greater risk for social alienation, anxiety, depression and suicide.

Chapter IV first reviewed the neurobiological origin of NLD, which is thought to be caused by dysfunctional white matter fibers located in the right hemisphere. This chapter discussed specific brain functions localized in right hemisphere that correlate with deficits seen in individuals with NLD, including cognitive flexibility, organizing or

integrating complex or novel information, visual-spatial perception, processing of emotions, social perception, and nonverbal communication. The chapter then reviewed Rourke's (1989) Neurodevelopmental Model of NLD, which details how primary neurological assets and deficits lead to the secondary and then tertiary assets and deficits that are characteristic of the disorder. Finally, this chapter looked at the impact of early attachment relationships on the maturation of the experience-dependent right hemisphere, which in terms of neural growth is dominant during the first two years of development.

Chapter IV explored Kohut's (1971, 1977; Kohut et al., 1984) theory of self psychology and how early attachment experiences may shape the development of a cohesive self. According to Kohut, in order to develop a mature, stable and cohesive self, children need an empathic selfobject milieu in which their Grandiose, Idealized Parental Imago, and Alter Ego selfobject needs for mirroring, idealization and twinship are gratified and integrated into the self organization through the process of transmuting internalization. This chapter also reviewed Palombo's (2001, 2006, 2008) theory of mindsharing in children with learning disabilities, in which caregivers provide empathic complementary functions to children throughout development to balance their neurological deficits and assist them in maintaining mental well-being and self cohesion.

This discussion chapter will begin with an analysis of the socioemotional development of individuals with NLD through the lenses of developmental neurobiology theory and self psychology by means of a theoretical examination of a hypothetical case illustration. This case illustration is a conglomeration of details and characteristics of multiple NLD children I have worked with in the past. Following this case analysis, I will posit my own theory for understanding the socioemotional development of children

with NLD, through a synthesis of the information discussed in the previous chapters. Lastly, I will discuss the implications for social work practice and offer recommendations for individual therapy, family therapy, and schools.

Case Illustration: Kathy's Story

Introduction and Mental Status

I first met Kathy when I was working as an individual and family clinician at a long-term state-funded residential treatment program for adolescents with major mental illnesses. Kathy had been referred to the program because she had been in and out of psychiatric hospitals over the previous two years, due to suicidal ideation, depression, school refusal and paranoid delusions. Just prior to her admission to the residential treatment program, Kathy had been running away from home and had become involved in prostitution ring.

Kathy was a petite 16-year-old Irish-Catholic Caucasian female. She grew up with her mother, father, two older brothers and two older sisters in a middle-class neighborhood in the suburbs of Boston. Due to her frail appearance and her soft voice, she appeared much younger than her age. In addition, although she was very talkative, Kathy was remarkably socially awkward. She spoke bluntly, almost cruelly, and seemed unresponsive to humor. Similarly, she was difficult to assess, as she commonly hid her expressionless face behind her long bangs and avoided eye contact. In our sessions, she was fully oriented and generally presented with a depressed mood and affect, only brightening when talking about her pets at home. Her thought process was coherent but

obsessional, with fixed paranoid delusions about her parents wanting to kill her. Her judgment and insight were very poor.

History

Kathy was born via scheduled C-section at 39 weeks, with no reported complications, weighing 7lbs 5oz and 21 inches in length. During the pregnancy, Kathy's mother, who had a history of epilepsy, reported having two grand mal seizures, but was otherwise healthy. Kathy was described as a "colicky" baby and she had some initial feeding problems, which resolved somewhat when she was transitioned from breastfeeding to a bottle at 3 months. Initially, her parents recount that Kathy was a very "fussy" infant and that she was nearly inconsolable once she started crying, but she responded very well to swaddling, a calming technique of being wrapped tightly in a blanket up to her chin. "She loved it," stated her mother, "I almost felt guilty when I had to change her diaper, because then I had to unwrap her and she would get so hysterical." According to her parents, Kathy was not a very engaging baby and she seemed happier playing with her own hands and feet than looking at toys or interacting with other people.

Kathy reached all of her milestones generally on time. She was a little slow to walk at first, because she often fell or bumped into things when she lost her balance. "She was so clumsy; I thought the doctor was going to think I was abusing her!" her mother conveyed. Much to her parents' delight, Kathy's verbal skills and vocabulary grew rapidly at a young age, which seemed to give her the freedom to ask her mother to bring her the things she wanted instead of ambulating around herself. "She didn't like to explore things like my other kids had, but she wanted to know the word for everything. It was her favorite game – point at something and then wait for me to tell her the name."

Kathy was very dependent on her mother when she was a toddler, and her mother reports that Kathy had difficulty whenever she was left with a babysitter or in a playgroup. “She would cry so hard and wouldn’t let anyone but me console her. I think her Dad felt a bit rejected sometimes and I know that the other kids were jealous of the attention I gave her.” Socially, as a toddler Kathy got along well with her brothers and sisters, but was very shy around her peers and tended to play by herself or gravitate to a familiar adult. Her father described her as, “a little know-it-all, always impressing people with how smart and talkative she was.”

Due to Kathy’s separation anxiety, her parents almost kept her home an extra year before kindergarten, but chose to send her at the age of 5, per the recommendation of her pediatrician who had been impressed by her advanced verbal skills and concerned about the enmeshment between Kathy and her mother. The transition to school was very hard, as Kathy often had “meltdowns” in the mornings and throughout the school day, but after a few months she seemed to be settling in and even made few friends. Overall, Kathy did very well for the first few years of elementary school. She excelled academically, especially in reading and spelling, and was placed in the advanced track program at her school. However, her parents report that the other students often teased Kathy, “She was a weird kid. She just didn’t seem to get what was going on around her.” Teacher’s commented that although Kathy had many academic strengths and seemed able to memorize things very easily, her motor skills were somewhat delayed. She had difficulty holding and utilizing her pencil and scissors accurately and she was often teased in gym class and recess because of her poor coordination. In addition, the school nurse, who was concerned about Kathy’s visual acuity and depth perception, requested that she go for an

eye exam, due to her frequently bumping into things, unknowingly getting into people's personal space, and getting lost in the hallways of the school building.

By the third grade, Kathy's parents report that she appeared to start losing interest in the things that she had been previously excelling at. She broke ties with all of her friends, because, "they refused to 'listen' to her and 'didn't follow the rules' when playing games." They started getting reports that she was rude and disrespectful with her teachers and she was sent to the principal's office on a few occasions for aggressive behavior. Teachers complained to her parents about Kathy's laziness, manipulativeness and entitlement. One teacher wrote in her progress note to the parents, "Kathy does not seem to care about the feelings or thoughts of anyone besides herself. She shows no remorse when she says or does something hurtful to another person."

After Kathy's grades began to decline, especially in math, the school completed psychological and academic testing. The tests showed that Kathy had an average to above average IQ, and, although there was a 25-point discrepancy between her Performance IQ and her Verbal IQ, she did not appear to have any significant learning disabilities. The school psychologist subsequently diagnosed Kathy with Oppositional Defiant Disorder, attempted to implement a behavioral plan in her classroom, and recommended that the parents take parenting classes to learn how to better manage her behavior. Following this, Kathy's parents report that she started to avoid going to school in the mornings and often went to the school nurse during the day, complaining of headaches and stomachaches. At home, she began fighting more with her brothers and sisters, who were complaining about her tantrums and her attempts to "control" the family. "We didn't know how to punish her. Nothing seemed to work," her mother stated. "It was so draining, because

every decision we made about anything turned into a fight or a tantrum. A lot of times we would just give in and let Kathy have her way, because we were too exhausted."

By junior high, Kathy's parents were very concerned about her well being and her future, "We had thought that it was just a phase and that she would grow out of it. We figured it might be because she was the youngest kid in the family, or something." However, Kathy did not appear to be "growing out of it". Her mother reports that she had started socializing with, "The bad crowd - you know, the messed up kids – the ones that wore weird clothes, had piercings and listened to Marilyn Manson." They were worried that she had started smoking, drinking or doing drugs, although Kathy always denied it. She avoided interacting with anyone the family (except the cats and dog) and holed herself up in her room playing on the computer or text messaging. Her mother reports, "She was obsessed with text messaging. She would even text me or her father instead of talking with us in person!" In the 8th grade Kathy's grades dropped so low that she had to go to summer school. Her mother commented: "The confusing thing is I think that she had really been trying very hard to avoid summer school - she had been able to get it together the year before, but she just couldn't get organized and motivated. She would leave assignments until the very last minute and then panic and rage out against anyone around her. If I tried to help her at any point she would scream at me and say that she was too stupid. I felt so helpless."

Her family was at a loss for how to help Kathy. They questioned the school about redoing the academic and psychological testing, but the school told them that Kathy was "spoiled" and "just doesn't like to work hard." Her parents noticed that Kathy seemed incapable of doing anything without reminders and coercion. Her father commented, "We

were always on her back, scolding her, reminding her of something she forgot, telling her she was doing something wrong, but if we didn't keep on her she got overwhelmed and then would just shut down." According to her parents, Kathy blamed everyone else for her difficulties, never taking responsibility or acknowledging how her behaviors were affecting others. "It was always my fault, or her sister's fault or the teacher's fault. She thought the world was out to get her. Everything was so black and white. I either had to give her what she wanted, or she was convinced that I hated her," her mother reported.

In the winter of 9th grade, Kathy wrote an essay for school in which she described killing herself by overdosing on acetaminophen and her parents finding her dead. She was immediately psychiatrically hospitalized. The clinicians at the hospital diagnosed Kathy with Major Depressive Disorder and Oppositional Defiant Disorder, and listed Pervasive Development Disorder NOS as a possible rule out condition. Kathy returned home and seemed to be doing better for a period of time, even seeing an individual therapist and a family therapist. "We went to all of those family meetings, but they just made me feel like I was spoiling her, that I let her manipulate everyone, and that I was too overprotective," her mother reported. "I began to resent her for making me look bad in front of other people."

By that spring Kathy was doing worse than ever. She had started restricting her food, was purging, and began to cut herself with razors. Her mother comments, "She cried all of the time, saying that she was nobody and she might as well be dead. It was heartbreaking." Her individual therapist hospitalized Kathy again in the summer before 10th grade, due to worsening suicidal ideation and obsessive paranoid delusions. According to her therapist, Kathy was convinced that her parents were lying to her and

that we were trying to kill her. As soon as she was released from the hospital, Kathy ran away from home for three weeks before the police found her. She had been living in a brothel, and had been her allowing her "boyfriend" to pimp her out. After returning to the hospital, she was transferred to the residential treatment center.

Analysis of Kathy's Story

Diagnosis

It is important to note that prior to arriving at the residential treatment program, Kathy had not yet been diagnosed with NLD. Her academic, emotional and behavioral problems were primarily attributed to family dynamics. School staff and mental health providers placed much of the blame on Kathy's mother, who they perceived was unwilling to allow her "youngest baby" to grow up, causing conflict within the family and marital discord between the parents. The closest diagnosis relating to NLD that was given to Kathy was a rule out diagnosis of Pervasive Developmental Disorder, Not Otherwise Specified (PDD NOS). PDD NOS is a blanket diagnosis for behavioral presentations that seem similar to an autism spectrum disorder, such as Asperger's, but do not meet the specific criteria. According to the DSM IV-TR (2000), the criteria for a diagnosis PDD-NOS is:

> …a severe and pervasive impairment in the development of reciprocal social interaction associated with impairment in either verbal or nonverbal communication skills or with the presence of stereotyped behavior, interests, and activities, but the criteria are not met for a specific Pervasive Developmental Disorder, Schizophrenia, Schizotypal Personality Disorder, or Avoidant Personality Disorder. (p. 83)

It is not uncommon for children with NLD to originally be diagnosed with a provisional PDD NOS diagnosis, as the social symptoms of the disorder do fall within the stated criteria and because NLD is not yet listed in the DSM IV-TR. However, the PDD diagnosis is rudimentary, as in its ambiguity it does not take into account the specific characteristics of NLD that are outside of the autism spectrum disorders. Fortunately for Kathy, shortly after arriving at the program, the consulting psychiatrist immediately recognized her symptoms of NLD, interviewed her parents, reviewed her records and after completing psychometric testing gave her a primary diagnosis of NLD and a secondary diagnosis of Major Depressive Disorder, severe and recurrent.

Neurodevelopmental Perspective

Chapter IV introduced Rourke's (1989) Neurodevelopmental Model of Assets and Deficits in NLD, which can be clearly illustrated through Kathy's case history. Consistent with Rourke's model, at a very early age Kathy appeared to have neurological strengths in auditory perception and rote memory, which are both left hemisphere dominant functions. It is unknown if these assets were inherent or if they developed as compensatory functions. As a result of these strengths, she was able to learn language easily by listening to her mother repeat words to her. As she developed her capacity to sustain her attention to her mother for longer periods of time, it became an enjoyable and socially reinforcing game to her. As a result, she developed her receptive and expressive language skills effortlessly and strengthened her talent to rapidly encode and store other types of verbal auditory information in her memory. Due to these excellent rote memory and verbal skills, she excelled in the early years of school in which language

development, another dominant left hemisphere function, is prioritized and academic tasks are often simple and repetitive.

Also consistent with Rourke's model, Kathy appeared to have early neurological deficits in tactile perception, visual perception, complex psychomotor skills and adaptation to novelty. Kathy's difficulty breastfeeding and her response to swaddling, a method of deep tactile proprioceptive stimulation, as well as her difficulty manipulating pencils and scissors once she was older, may all be examples of her early deficits in tactile perception. Her deficits in visual-spatial-organizational perception are less apparent early, although her lack of interest in human faces, which is a trait typically innate in infants, is significant as it may indicate her early difficulties processing nonverbal information, such as facial expressions. By elementary school, the school nurse became aware of her visual perception deficits, but falsely attributed them to related to her eyesight. Kathy's initial difficulties with walking, her clumsiness, and her lack of coordination in gym class illustrate her innate deficits in complex motor skills, as well as her deficits in visual perception. Finally, Kathy's severe separation anxiety from her mother and her difficulty with transitions is evidence of her early deficit in adapting to novel situations. All of these primary deficits seem to have influenced Kathy's capacity to develop secure attachment relationships based on affective attunement, particularly with her parents. Although Kathy's parents attempted to make attachments with their daughter, she was unable to recognize their efforts or appropriately respond, resulting in Kathy's disorganized attachment style. Since she was unable to decode her parents' nonverbal cues, Kathy became fearful of them and possibly, when she was under severe distress, this fear manifested as paranoid delusions about her parents wanting to hurt her.

These primary neurological deficits resulted in Kathy's secondary deficits in exploratory behavior and her poor attention to nonverbal cues. Her wariness of her clumsiness, fear of the unknown, preference for auditory information and tactile sensitivities hindered her from exploring her environment and beginning the separation-individuation process. To adapt, Kathy would demand that things be brought to her and explained verbally, in a manner that she was more able to process. Similarly, because Kathy could learn more efficiently when information was presented verbally, she put less effort into the more frustrating task of decoding nonverbal information and thus did not continue to build upon her visual-spatial-organizational skills.

Subsequently, Kathy developed multiple tertiary deficits, including a deficit in her capacity for memory of information that was not presented verbally or was complex. This was apparent by the middle of elementary school in Kathy's academic weaknesses in the increasingly complicated and abstract subjects, such as mathematics and science. The primary and secondary deficits also resulted in her tertiary deficits in problem-solving skills, the ability to learn from feedback and the capacity to generalize. Kathy responded to all novel situations with the same rote approach, despite its ineffectiveness, inappropriateness or negative feedback from others. She was stubborn and persistent, insisting that her perspective of situations was the only accurate perspective, and perceived anyone who disagreed with her as lying to her or being unfair, which could be seen in her interactions with teachers by the third grade. Consequences did not motivate her to change her behavior, because she could not respond to things any differently than the way she always did. Similarly, because she rarely practiced as a child, Kathy did not know how to evaluate new situations, generalize based on past knowledge and adapt

accordingly. She repeatedly tried to use the same verbal compensatory functions that were successful for her as a young child, but as she got older, she became more and more desperate and hopeless, as she could not understand how to get her needs met or cope with the increasing stressors.

Kathy's primary, secondary and tertiary neurological deficits led to many of her social and emotional difficulties. Because of her immature social skills and restricted capacity for empathy, by the time Kathy was in her teens she had no real social supports or stress outlets. She could not recognize another person's perspective and thus felt constantly misunderstood and rejected, causing her to withdraw from others. Unlike most children, Kathy found interpersonal relationships unrewarding, as she felt that no matter how hard she tried to make people like her, she always seemed to be doing something wrong or feeling criticized.

Kathy was able to develop some compensatory functions. She often talked in therapy about how her pets became her best friends, because they were "good listeners," never got upset with her and were always excited to see her. In junior high, she was able to find some peer acceptance by associating with other "flawed" peers, who she felt understood her better and were more willing to tolerate her bizarre behavior. She offset her weaknesses with nonverbal cues by relying on computers, email and text messaging for her social interactions, but when those were taken away as consequences of her behavior, she lost that compensatory function.

Her frequent failures at home and school resulted in her feelings of low self-esteem and despondency, eventually evolving into clinical depression. She felt helpless to escape from her overwhelming emotional states, which triggered her suicidal ideation.

Kathy had convinced herself that she was worthless, unwanted and a burden upon her family, and without the capacity to problem solve, she felt that death was the only possible escape. Her paranoia about her parents wanting to kill her developed from her black and white interpretation of the impact that her endless failures had on her family. She could not separate her own thoughts and perspective from those of her parents, and since she was conflicted about killing herself she presumed her parents were as well. Terrified of both her family and herself, when Kathy ran away from home she was vulnerable to the manipulations of a pimp. By taking advantage of her low self esteem and her dependency needs, the pimp convinced her that he was her boyfriend, he loved her and would always take care of her. Desperate for the love that she equated with self worth, Kathy believed that if she loved him then she had to do anything he told her to do, including prostitution.

Self Psychology Perspective

Self psychology offers a complementary perspective that can illustrate how NLD may have impacted Kathy's socioemotional development. Even as a newborn, her innate neurological deficits served as obstacles to her attachment relationships. According to her mother, Kathy had difficulty with breastfeeding and would become easily frustrated and exhausted during her attempts, preventing her from continuing. Her family was unsure of the reason for Kathy's difficulty breastfeeding, but noted that it improved when she was transitioned to bottle feeding. Breastfeeding, and subsequently nourishment, is one of the most primary selfobject functions provided by a mother to her infant, and it typically facilitates the attachment bond. Kathy's innate tactile perceptual deficits and difficulties with sensory integration may have hindered breastfeeding, thus delaying attachment.

Kathy may have been overstimulated by a variety of the sensory inputs during nursing, including the physical closeness to her mother, lack of stability in her mother's arms, smell, texture or temperature of her mothers skin, all of which may have been disorganizing for her. Kohut might argue that due to these early selfobject failures in which her mother was unable to protect her from the states of hunger and frustration, Kathy could not perceive her mother as being an omnipotent imago or merge with her, which is necessary for the integration of the idealization selfobject functions into the self.

Kathy's early difficulties with attachment greatly affected her parents, who were surprised by how different she was than her four older siblings. Initially, her parents blamed themselves for Kathy's fussiness, worrying that they were spending too much time with the other children or that they were too old to be raising a newborn. Her mother often talked about "feeling guilty" that she was unable to soothe her child, and that she felt at times that, even as an infant, Kathy was rejecting her. Kohut may have argued that Kathy became a "narcissistic injury" to her parents, who were fearful that she was in some way "defective." However, Kathy's early verbal skills and subsequent rise of attachment interactions (i.e., the word game between her and her mother) seemed to alleviate some of this stress.

Kathy's visual spatial deficits likely continued to impede the internalization of the selfobject functions provided by her parents throughout early childhood. Her inability to process nonverbal cues may have prevented her from recognizing the mirroring selfobject functions, such as approval, admiration and validation, which then affected her self esteem and perception of self worth. By the time Kathy was a teenager, she had internalized a view of herself as unintelligent and unlovable, which may have been due to

her misinterpretations of nonverbal cues and internalization of the repeated failures earlier in her life. Similarly, without the integration of emotional regulating selfobject functions, Kathy was unable to internalize the self-regulating psychic structures, resulting in low frustration tolerance and intense mood states. Moods and feelings were very overwhelming for Kathy, as they she was not able to understand what had triggered them or verbalize them to others. Kathy lacked the capacity to predict or modulate her own emotional states, resulting in a chronic sense of helplessness and being out of control, which may have had an affect upon her depression, self-injury, restricted eating, purging and suicidality as a teenager.

As Kathy grew older, she attempted to preserve the cohesiveness of her self, despite its immature and narcissistic state. As her self was already so fragile, due to her lack of self regulating psychic structures and repeated failures, Kathy constructed a complex matrix of defenses and compensatory functions, many of which were maladaptive desperate attempts to fulfill her selfobject needs and adapt to her neurological deficits. Initially, when Kathy was young, the disintegrative byproduct to threats of self fragmentation, such as narcissistic injuries of criticism or rejection, appear to have been rage towards others, manifested by her temper tantrums, aggression, disrespect to her teachers, and attempts to control people around her. As she grew older, the shame associated with the externalization of her rage may have become too overbearing, resulting in her eventual internalization of the rage by targeting it towards herself. This likely contributed to her depression and ultimately to her suicidal ideation.

Fortunately, it appears that in some instances Kathy's parents were very attuned to her needs and provided the appropriate complementary functions. For example, they

discovered that as an infant Kathy was soothed by being swaddled, and despite her mother's guilt, they provided optimal frustration opportunities when they took her out of the swaddling to change her diaper. Similarly, it appears that Kathy came to depend on her mother's complementary functions at a very young age, as evidenced by her separation anxiety. Therefore, Kathy may have been able to internalize some of the idealization selfobject functions, although her low tolerance for frustration would have been a continuing obstacle. However, it appears that as Kathy grew up, she was unable to keep up with the expectations of her family and school, both of which were not fully aware of her deficits. Without appropriate interventions and accommodations, Kathy's sense of helplessness became more intense, leading to her desperate hunger for mirroring selfobjects and a merger with a "perfect" object. When this hunger could not be satisfied, suicide (or annihilation of a defected self) became the only conceivable release for her chronic distress.

Synthesis of Neurodevelopmental Theory and Self Psychology

According to Schore (1997, 2009), neuropsychoanalysis, or the synthesis of neuroscience and psychoanalysis, is the theoretical model of identifying the biological underpinnings of the human unconscious. Based upon this framework, in this analytic discussion I suggest that the synthesis of the theories of neurodevelopmental psychology (Chapter IV) and self psychology (Chapter V) could create a biopsychosocial model outlining the development of the organic brain-based structures that represent the implicit self. The synthesis of these theories might be referred to as neurodevelopmental self psychology. So far, these theories have highlighted the importance of empathic early life

experiences in both the maturation of the right hemisphere of the brain and also in the development of a healthy and cohesive self. The majority of the neurological deficits seen in NLD are related to right hemisphere dysfunction. Usually unaware of neurological deficits in children with NLD, primary caregivers and educators instead falsely accredit the child's difficulties entirely to psychosocial issues. Without appropriate and adequate interventions, accommodations and understanding, educators and caregivers can unknowingly reinforce these children's maladaptive behaviors and fragmented sense of self. In addition to primary neurological deficits, children with NLD subsequently suffer from distorted sense of self, low self-esteem, feelings of alienation, and depression. Thus, by applying a synthesis of the neurodevelopmental and self psychology perspectives to current knowledge about NLD, the impact of early life experiences on the socioemotional development of this population can be better elucidated.

Studies have suggested that the unconscious self described by Kohut can be located within the right hemisphere of the human brain (Devinsky, 2000), and therefore it could be argued that neurological deficits in the right hemisphere, as in NLD, may result in development of a fragmented self. The right hemisphere, which is dominant for the processing of nonverbal information (facial expressions, prosody, gestures), is dependent upon emotionally-laden social experiences during the first two years for continued growth and development of neural connections (Schore, 2009). According to Kohut (1977), these emotionally-laden social interactions are selfobject experiences, which become incorporated in the self through the process of transmuting internalization. Schore (2002) argues that the transmuting internalization, or neural growth and organization, occurs through the unconscious, nonverbal, affective "right hemisphere to

right hemisphere" communication between the brains of the infant (self) and the caregiver (selfobject). Therefore, it can be argued that a child with NLD whose right hemisphere deficits can not efficiently and accurately process nonverbal information, such as the empathic expressions on his mother's face, may not experience these types of affective interactions, which may further limit the neural growth and prevent the development of additional intricate neural pathways and connections in the right hemisphere necessary for abstract and high order skills and processes. The NLD child's innate right hemisphere deficits may increase and the child may not be able to internalize and further develop the tension regulating psychic self structures.

Through the neurodevelopmental self psychology perspective, it may also be possible to identify the neurobiological basis of the socioemotional challenges of children with NLD. Kohut (1977) asserted that all children incorporate the psychological functions provided through interactions with selfobjects into enduring psychic self structures, and that, "for the rest of the lifespan unconscious working models of the attachment relationship encode strategies (unconscious guides/filters) of affect regulation for coping with stress, especially interpersonal stress" (Schore, 1999, p. 51). According to Schore (2003), these unconscious working models, or psychic self structures, are located in the orbitofrontal cortex in the right hemisphere, the area of the brain that is responsible for self-regulation of arousal, and in the limbic system, which is responsible for emotional processing. If these areas are poorly developed, a child may be more susceptible to autonomic hyperarousal, causing intensely overwhelming feeling states and 'fight or flight' reactions to even low levels of stress (Schore, 2009). Therefore, it can be argued that the temper tantrums, low frustration tolerance and other losses of self control

as well as the emotional processing deficits in children with NLD, may be explained by the underdevelopment of their orbitofrontal cortex in the right hemisphere. This neurological underdevelopment can also explain the child's failure to develop attachment relationships, and the child's inability to recognize and internalize the psychological functions provided by caregivers.

Strengths and Weaknesses

One great strength of this theoretical exploration of the socioemotional development in children with NLD is that it offers a more comprehensive biopsychosocial perspective than most other writings about the topic. The bio-psycho-social perspective necessitates factoring in all of the various contributing dynamics to individual development. This analysis illustrates how the manner in which NLD manifests in each individual is greatly influenced by biological, cultural, constitutional, environmental, and situational factors. Thus any treatment or services provided to these children and their families, whether it be through the school or through mental health providers, must take into consideration all of these factors. It would be negligent to assess or treat children with NLD without considering every possible contributing factor.

There are a few areas of weakness in this analysis as well. For one, the paper assumes that all children with NLD will have some degree of socioemotional problems, which may not be the case. Some children, especially those with less marked neurological deficits, may be able to adapt adequately and function on a normal level. The responses of the caregivers to their child's neurological deficits may also vary. Second, although this paper offers a biopsychosocial perspective, it only looks at NLD

through two theories and there are a number of other possible perspectives through which to examine this population. For example, Palombo (1993, 1996, 2006) offers a rich perspective of the socioemotional problems of individuals with NLD through self psychology and narrative theory, exploring the incongruence between a NLD child's shared and personal narratives. Finally, the use of a case illustration as a method of analysis is inherently ungeneralizable, particularly since this case illustration is a conglomeration of aspects of multiple children with NLD.

Recommendations

Individual Therapy

Psychotherapy with children diagnosed with NLD can be extremely challenging for both the therapist and the child, largely due to necessity of extensions of typical therapeutic parameters. Even the basic element of psychotherapy, such as the establishment of a therapeutic alliance and the demonstration of empathic attunement, may require a different approach. Despite the children's assets in verbal communication, their other neurological impairments can be a significant obstacle to the classic insight-oriented approach to therapy. According to Rourke, insight-oriented psychotherapy is "counterproductive," and, "…a complete waste of time and economic resources…Stressing the need for (unattainable) insight as an alternative to learning and practicing necessary skills is tantamount to the counterproductive spinning of one's (psychic) wheels" (n.d., para. 3). He argues that the sequence of neurological deficits in children with NLD, as outlined in his Neurodevelopmental Theory (1989), will result in difficulties with problem solving, understanding cause and effect, generalizing, receiving

feedback, seeing the perspective of others, and adapting to novelty, all of which are skills employed during traditional psychotherapy. He contends that simply "talking through" troublesome situations will have little effect on this population, as the children are unable to apply the new knowledge to future events. Therefore, in any similar situations outside of therapy, the children will not be capable of taking into consideration the knowledge gained in therapy, and thus will continue to rely on previous coping strategies, usually the verbal skills that were effective when younger.

While Rourke's concern may be one component of why these children may not benefit from traditional psychotherapy, this thesis has illustrated other potential challenges. For instance, the psychotherapist working with a child with NLD has the complicated task of trying to differentiate the etiology of the child's current and past behaviors. For accurate assessment, the therapist must discern between actions that may have been caused by the neurological deficits of NLD, those that developed in reaction to the NLD, and those that may be completely unrelated to NLD. Thus, to fully understand the child's motives, the therapist must first view all of the child's behavior as a means of communication in need of translation, not as something to judge, modify or fix. Each behavior serves an important function for that child's self-preservation, whether it appears adaptive or self-destructive, and misinterpretations of behaviors could result in empathic failures and the child's fortifying of defenses in fear of fragmentation.

As such, another major impediment to psychotherapy with the NLD children may be the children's capacity to develop a therapeutic attachment to the therapist. These children often have experienced so many selfobject failures and disappointments that their defenses, barricades built to protect them from feelings of rejection and alienation,

have become fixed and unyielding. Their self is composed of internal working models of attachment in which selfobjects are perceived as ungratifying, critical and rejecting and despite the therapist's attempt at mirroring and empathy, NLD children are frequently suspicious. These suspicions can be reinforced during empathic failures in therapy. According to Schore and Schore (2008), the therapist creates a secure therapeutic environment through unconscious affect-laden nonverbal cues in response to the client's nonverbal cues, including: facial expressions; tone, speed and volume of voice; mirroring body posture and movements; and eye contact. Children with NLD not only are unable to read the empathic nonverbal communication of the therapist, but they also cannot send their own nonverbal cues to the therapist as signals of such misattunements. These frequent and unrepaired misattunements during therapy sessions may obstruct the therapeutic attachment relationship, unless the therapist is educated about NLD and vigilant to this deficit, and can modify the usual approaches to establishing an alliance.

Considering all of the challenges of psychotherapy with children diagnosed with NLD, it is understandable why Rourke felt that the practice was unhelpful and unnecessary. It appears that in the absence of additional therapeutic interventions and knowledgeable clinicians, traditional psychotherapy often can be an inadequate intervention for this population. However, the combination of multiple therapeutic interventions, such as individual psychotherapy, family therapy, and school based interventions, may greatly improve the socioemotional development of children with NLD, as long as all of the providers are well educated about the disorder. To be the most effective, individual therapy with a child with NLD must prioritize the development of a restorative empathic selfobject relationship between the child and the therapist. In

addition the therapist must provide specialized adaptive skills training. The role of the therapist is primarily to serve as an empathic selfobject and provide the selfobject needs of mirroring, idealization, and twinship to allow the child with NLD opportunities to internalize self regulating psychic/brain structures and construct a more cohesive self. The individual therapist, as well as all other associated professionals, must use what Amerongen & Mishna (2004) refer to as "informed empathy," or "the empathic understanding informed by a body of knowledge concerning the impact of (NLD) on experience and functioning. It is arrived at through observing and empathizing with the individual child's subjective experience, enriched by knowledge about (NLD)" (p. 34). Through informed empathy, the therapist might help the child modify his behavior and continue to use the security of therapeutic relationship as a foundation for change. Within an informed empathic stance, the therapist may be able to help the NLD child have some insight into the ways that his brain works differently and to make some accommodations based on that insight. The degree of insight achieved by the child may vary depending upon the severity of the neurological deficits and the age of the child in treatment (Rourke, 1989).

Family Therapy

All families with a NLD child could benefit from participating in family therapy, parent meetings or parent counseling in addition to the other therapeutic interventions. Although the family work does not always need to be on a regular basis, in most cases it is essential for both the well being of the child and the other family members. This thesis clearly illustrates the importance of the family providing an empathic milieu for the child's optimal development. Yet maintaining such a consistent empathic stance can be a

challenge for even the most skillful parents, especially during particular developmental stages, such as at the time of the diagnosis or once the child enters adolescence. For instance, when a child is first diagnosed with NLD, his parents may be very relieved to have found a concrete reason for their child's seemingly insensitive and upsetting behavior. However, some parents will need support dealing with the inevitable grief and narcissistic injury of losing their "gifted child" and accepting the diagnosis. Likewise, adolescence is a tumultuous time for any family, but especially for a family with a NLD child, as issues of separation and identity are complicated by the unique complementary needs of the NLD individuals.

One of the goals when working with the parents of a child with NLD should be to maintain an empathic connection with the family while helping them better understand the implications of NLD. By the time parents come to a family therapist for assistance, they often have built up many defenses in response to previous "parent-blaming" experiences with educators, school psychologists, and mental health providers. Some parents, embittered by their inability to modify their child's exasperating behavior without professional help or guilt-ridden by their perceived failures as parents, may question the necessity of family therapy, which they may perceived as a sign of their own vulnerability or hopelessness. Therefore, the family therapist must at all times ensure that the family feels that the therapist has heard, understood and validated their needs and experiences related to the process of family therapy and how NLD has impacted their lives. The family may need reassurance that their reactions are normal or may seek recognition from the family therapists for their efforts and frustrations. The therapist must act as a mirroring and idealizing selfobject for all of the family members and must be

attuned to their needs and vigilantly repair unavoidable misattunements, such as in situations in which the parents feel blamed or dismissed by therapist. The family therapist should always try to empower the parents as the experts on their own child and collaborate with them to gain a better understanding into the meanings of the child's behaviors. The parents may need assistance in breaking the cycle of negativity by recognizing their child's positive qualities as well as learning to reframe their child's behaviors.

The therapeutic intervention of externalization may be useful in family therapy with a child diagnosed with NLD (Whitney, 2002). Externalization, a technique in which the problem is separated from the person, separates the child from the problem, which reduces the associated shame and blame and allows the child to participate more willingly in the treatment (White & Epston, 1990). Although NLD greatly impacts the child's behaviors, it is important to reinforce to the entire family that NLD does not completely define the child. Family therapy can also support the family in creating a supportive and tolerant home environment for the NLD child. Parents may need help adapting their behavioral expectations to accommodate the child's neurological deficits. The therapist can assist the family in developing a behavioral management system with concrete rewards and consequences, compiling a list of rules and expectations, and creating consistent and predictable daily routines.

School

This thesis highlights the importance of the early identification of children with NLD. The sooner NLD children's environment learns to understand their neurological deficits, empathize with their subjective experiences, and make appropriate

accommodations, the greater likelihood of adaptive socioemotional development. In most cases, the symptoms of NLD will first become apparent when the children are separated from their family, such as when they begin going to school. Unfortunately, their symptoms often are overlooked or misinterpreted, as currently most educators are unaware of the NLD diagnosis and thus have limited knowledge about its characteristics and implications, which greatly hinders the likelihood of early identification. As a result, schools need to increase training opportunities about NLD for all educators. This education can provide information about the characteristics of the disorder, effective accommodations and alternative behavioral management techniques, as conventional classroom management techniques have little impact on the behavior of children with NLD. Educators can then facilitate the development of self esteem in all children, not just those with NLD, by creating an empathic classroom milieu and taking advantage of impromptu teaching moments to reinforce appropriate social skills and adaptive coping mechanisms. These trainings should also include a component on how NLD may trigger maladaptive countertransferential reactions, as teachers may perceive the child's behaviors as narcissistic injuries and respond defensively. Just as with individual therapists, parents, and family therapists, educators can use informed empathy when working with these children.

Children with NLD may also benefit from additional school support in social skills and emotional wellbeing. The participation in a therapeutic group with other peers struggling with similar issues can be an ideal intervention, as it not only provides the children with additional guidance and support but it also gives the children the opportunity to experience a sense of belonging and connection with a likeminded peer

group. These twinship experiences could be invaluable for their optimal self-development.

Conclusion

Fortunately, individuals with NLD are able to benefit from therapeutic interventions at any point in their lives. According to Schore (1994), “The patient-therapist-relationship acts as a growth promoting environment that supports the experience-dependent maturation of the right brain, especially those areas that have connections with subcortical limbic structures that mediate emotional arousal" (p. 473). When treating children with NLD, it is vital that clinicians become well educated about the characteristics of the disorder in order to facilitate the development of a secure therapeutic relationship. Within this relationship, the clinician can help both the children and their parents gain insight into the limitations of the disorder and help them build upon their strengths. Nevertheless, further research on the biopsychosocial variables at work in children with NLD is necessary. It is time now for more education and professional awareness of NLD within the social work, education and medical professions.

Update on Kathy

Kathy remained in the residential program for fifteen months, but on her eighteenth birthday she elected to sign herself out and ended up moving into a local homeless shelter, as her parents were not comfortable having her return home unless she officially “graduated” from the program. During her treatment, Kathy had made substantial progress. Initially, Kathy was opposed to the diagnosis NLD, having interpreted it as another injustice in which the doctor had been manipulated by her

deceitful parents. However, over time and with psychoeducation about the characteristics of the disorder, Kathy found some relief in the diagnosis and had begun learning how to accommodate her life to better meet her needs. As she gained more self-control and insight into the reactions of others to her behavior, her depression, anxiety and suicidality decreased. Unfortunately, although she made progress academically and socially and even held a part-time job, Kathy struggled to generalize this new knowledge and insights during home visits with her family, despite the fervent efforts of her parents and siblings. In response to misperceptions at home, she would become rapidly dysregulated and have a "fight or flight" reaction, either having emotional outbursts or running away (usually back to the program). Her family's frustration and disappointment only reinforced these difficulties. After signing herself out, Kathy remained in touch with the program for about a year, occasionally calling for support or just to check-in. By the last time I spoke with her, approximately 18 months after leaving the program, Kathy had moved in with a boyfriend, obtained her GED, and was a full-time student at a local community college renowned for its special education services. She was hoping to get her degree in child psychology and neurobiology, so that she could eventually do research on NLD.

APPENDIX A

Rourke's (Rourke, 2000) Proposed ICD Diagnostic Criteria for NLD

1. Bilateral deficits in tactile perception, usually more marked on the left side of the body. Simple tactile perception may approach normal levels with advancing years, but interpreting complex tactile stimulation remains impaired.

2. Bilateral deficits in psychomotor coordination, usually more marked on the left side of the body. Simple, repetitive motor skills may reach normal levels with age, but complex motor skills remain impaired or worsen relative to age norms.

3. Extremely impaired visual-spatial-organizational abilities. Visual discrimination can reach normal levels with age, particularly when stimuli are relatively simple. Compared to age norms, complex visual-spatial-organizational abilities tend to worsen substantially with advancing years.

4. Substantial difficulty in dealing with novel or complex information or situations. A strong tendency to rely on rote, routinized approaches and memorized responses (often inappropriate for the situation), and failure to learn or adjust responses according to potentially corrective informational feedback. Also, especially frequent use of rote verbal responses in spite of the nonverbal requirements of the novel situation. These tendencies remain or worsen with age.

5. Notable impairments in nonverbal problem-solving, concept-formation, and hypothesis-testing.

6. Distorted sense of time. Estimating elapsed time over an interval and estimating time of day are both notably impaired.

7. Well-developed rote verbal abilities (e.g., single-word reading and spelling), frequently superior to age norms, in the context of notably poor reading comprehension abilities (particularly evident in older children).

8. High verbosity that is rote and repetitive, with content/meaning disorders of language and deficits in the functional/pragmatic dimensions of language.

9. Substantial deficits in mechanical arithmetic and reading comprehension relative to strengths in single-word reading and spelling.

10. Extreme deficits in social perception, social judgment, and social interaction, often leading to eventual social isolation/withdrawal. Easily overwhelmed in novel situations, with a marked tendency toward extreme anxiety, even panic, in such situations. High likelihood of developing internalized forms of psychopathology (e.g., depression) in late childhood and adolescence.

APPENDIX B

NLD Classification rules for 7-8 year olds (Pelletier et al., 2001, Table 2)

1. Target Test at least 1 standard deviation below the mean

2. Two of the WISC Block Design, Object Assembly and Coding subtests are the lowest of the Performance scales

3. Two of WISC Vocabulary. Similarities and Information are the highest of the Verbal scales on the WISC-III

4. Tactual Performance Test Right, Left and Both hand times become progressively worse in comparison with norms

5. Normal to superior Grip Strength versus mildly to moderately impaired Grooved Pegboard Test performance

6. WISC VIQ exceeds PIQ by at least 10 points

7. WRAT Standard Score for Reading is at least 8 points greater than Arithmetic

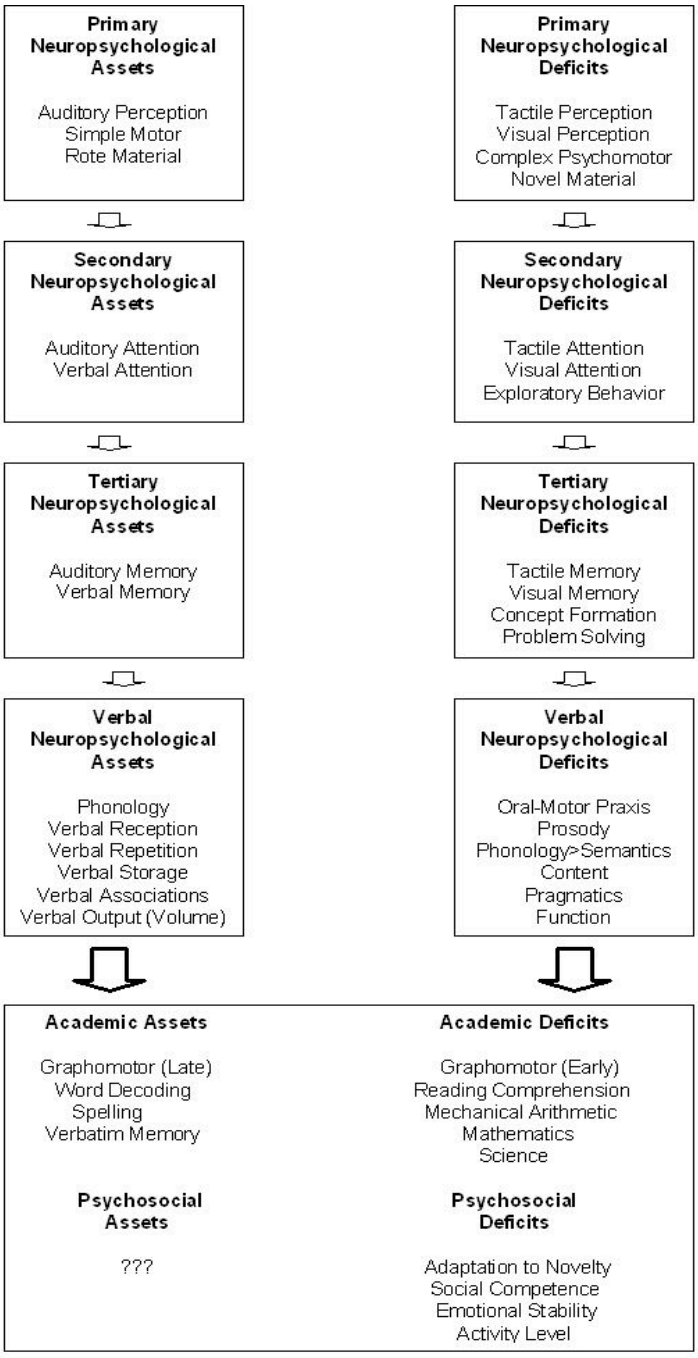
Notes:
(a) For the classification rules for 9-15 year olds, see (Drummond et al., 2005).

(b) Due to the changes implemented in the WISC IV, #6 is no longer applicable and in #2 the Object Assembly Test has been removed. Therefore, additional research must be done to investigate how the changes in the WISC IV can be incorporated into this classification system.

(c) If the subject meets:
- first three rules: Definite NLD
- two of the first 3 rules, and one of 4 and 5: Definite NLD
- rules 4, 5, 6 and 7: probable NLD
- only 2 rules: questionable NLD
- none of the rules: low probability of NLD

APPENDIX C

Rourke's (1989) Neurodevelopmental Model of Assets and Deficits



References

American Psychiatric Association, & American Psychiatric Association. Task Force on DSM-IV. (2000). *Diagnostic and statistical manual of mental disorders : DSM-IV-TR.* Washington, DC: American Psychiatric Association.

Amerongen, M., & Mishna, F. (2004). Learning disabilities and behavior problems: A self psychological and intersubjective approach to working with parents. *Psychoanalytic Social Work, 11*(2), 33-54.

Badian, N. A. (1986). Nonverbal disorders of learning: The reverse of dyslexia? *Annals of Dyslexia, 36*, 253-269.

Badian, N. A. (1992). Nonverbal learning disability, school behavior, and dyslexia. *Annals of Dyslexia, 42*, 159-178.

Bender, W. N., Rosenkrans, C. B., & Crane, M. (1999). Stress, depression, and suicide among students with learning disabilities: Assessing the risk. *Learning Disability Quarterly, 22*(2), 143-156.

Bigler, E. D. (1989). On the neuropsychology of suicide. *Journal of Learning Disabilities, 22*(3), 180-185.

Blonder, L. X., Burns, A. F., Bowers, D., & Moore, R. W. (1993). Right hemisphere facial expressivity during natural conversation. *Brain and Cognition, 21*(1), 44-56.

Blonder, L. X., Burns, A. F., Bowers, D., & Moore, R. W. (1995). Spontaneous gestures following right hemisphere infarct. *Neuropsychologia, 33*(2), 203-213.

Borod, J. C., Haywood, C. S., & Koff, E. (1997). Neuropsychological aspects of facial asymmetry during emotional expression: A review of the normal adult literature. *Neuropsychology Review, 7*(1), 41-60.

Bowlby, J. (1980). *Attachment and loss*. New York, NY US: Basic Books.

Bowlby, J. (1988). *A secure base : Parent-child attachment and healthy human development*. New York: Basic Books.

Buchholz, E. S. (1987). The legacy from childhood: Considerations for treatment of the adult with learning disabilities. *Psychoanalytic Inquiry, 7*(3), 431-452.

Casey, J. E., Rourke, B. P., & Picard, E. M. (1991). Syndrome of nonverbal learning disabilities: Age differences in neuropsychological, academic, and socioemotional functioning. *Development and Psychopathology, 3*(3), 329-345.

Collins, D. W., & Rourke, B. P. (2003). Learning-disabled brains: A review of the literature. *Journal of Clinical and Experimental Neuropsychology, 25*(7), 1011-1034.

Cornoldi, C., Rigoni, F., Tressoldi, P. E., & Vio, C. (1999). Imagery deficits in nonverbal learning disabilities. *Journal of Learning Disabilities, 32*(1), 48.

Cozolino, L. J. (2006). *The neuroscience of human relationships : Attachment and the developing social brain*. New York: Norton.

Del Dotto, J. E., Fisk, J. L., McFadden, G. T., & Rourke, B. P. (1991). Developmental analysis of children/adolescents with nonverbal learning disabilities: Long-term impact on personality adjustment and patterns of adaptive functioning. In Rourke (Ed.), *Neuropsychological validation of learning disability subtypes.* (pp. 293-308). New York, NY US: Guilford Press.

Denckla, M. B. (1991). Academic and extracurricular aspects of nonverbal learning disabilities. *Psychiatric Annals, 21*(12), 717-724.

Devinsky, O. (2000). Right cerebral hemisphere dominance for a sense of corporeal and emotional self. *Epilepsy & Behavior, 1*(1), 60-73.

Dimitrovsky, L., Spector, H., Levy-Shiff, R., & Vakil, E. (1998). Interpretation of facial expressions of affect in children with learning disabilities with verbal or nonverbal deficits. *Journal of Learning Disabilities, 31*(3), 286-292.

Drummond, C. R., Ahmad, S. A., & Rourke, B. P. (2005). Rules for the classification of younger children with nonverbal learning disabilities and basic phonological processing disabilities. *Archives of Clinical Neuropsychology, 20*(2), 171-182.

Firth, N., Greaves, D., & Frydenberg, E. (2010). Coping styles and strategies: A comparison of adolescent students with and without learning disabilities. *Journal of Learning Disabilities, 43*(1), 77-85.

Fisher, N. J., DeLuca, J. W., & Rourke, B. P. (1997). Wisconsin card sorting test and halstead category test performances of children and adolescents who exhibit the syndrome of nonverbal learning disabilities. *Child Neuropsychology, 3*(1), 61-70.

Fisk, J. L., & Rourke, B. P. (1987). WISC/WISC-R comparisons in a learning-disabled population: Equivalence of summary IQ measures. *Clinical Neuropsychologist, 1*(1), 47-50.

Fletcher, J. M. (1989). Nonverbal learning disabilities and suicide: Classification leads to prevention. *Journal of Learning Disabilities, 22*(3), 176.

Fonagy, P., & Target, M. (2003). *Psychoanalytic theories : Perspectives from developmental psychopathology*. New York: Brunner-Routledge.

Forrest, B. J. (2004). The utility of math difficulties, internalized psychopathology, and visual-spatial deficits to identify children with the nonverbal learning disability syndrome: Evidence for a visualspatial disability. *Child Neuropsychology, 10*(2), 129-146.

Freud, S. (1914). *Psychopathology of everyday life*. New York, NY US: Macmillan Publishing.

Fuerst, D. R., Fisk, J. L., & Rourke, B. P. (1989). Psychosocial functioning of learning disabled children: Replicability of statistically derived subtypes. *Journal of Consulting and Clinical Psychology, 57*(2), 275-280.

Fuerst, D. R., & Rourke, B. P. (1993). Psychosocial functioning of children: Relations between personality subtypes and academic achievement. *Journal of Abnormal Child Psychology: An Official Publication of the International Society for Research in Child and Adolescent Psychopathology, 21*(6), 597-607.

Galin, D. (1974). Implications for psychiatry of left and right cerebral specialization: A neurophysiological context for unconscious processes. *Archives of General Psychiatry, 31*(4), 572-583.

Goldberg, E., & Costa, L. D. (1981). Hemisphere differences in the acquisition and use of descriptive systems. *Brain and Language, 14*(1), 144-173.

Grace, J., & Malloy, P. (1992). Neuropsychiatric aspects of right hemisphere learning disability. *Neuropsychiatry, Neuropsychology, & Behavioral Neurology, 5*(3), 194-204.

Greenham, S. L. (1999). Learning disabilities and psychosocial adjustment: A critical review. *Child Neuropsychology, 5*(3), 171-196.

Greenough, W. T., & Black, J. E. (1992). Induction of brain structure by experience: Substrates for cognitive development. In C. A. Nelson (Ed.), *Developmental behavioral neuroscience.* (pp. 155-200). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.

Gross-Tsur, V., Shalev, R. S., Manor, O., & Amir, N. (1995). Developmental right-hemisphere syndrome: Clinical spectrum of the nonverbal learning disability. *Journal of Learning Disabilities, 28*(2), 80-86.

Gunter, H. L., Ghaziuddin, M., & Ellis, H. D. (2002). Asperger syndrome: Tests of right hemisphere functioning and interhemispheric communication. *Journal of Autism and Developmental Disorders, 32*(4), 263-281.

Harnadek, M. C. S., & Rourke, B. P. (1994). Principal identifying features of the syndrome of nonverbal learning disabilities in children. *Journal of Learning Disabilities, 27*(3), 144.

Hartmann, H. (2009). Psychoanalytic self psychology and its conceptual development in light of developmental psychology, attachment theory, and neuroscience. *Annals of the New York Academy of Sciences, 1159*, 86-105.

Hartmann, H. (1939). *Ego psychology and the problem of adaptation*. New York: Int. Univ. Press, 1958

Individuals with Disabilities Education Improvement Act, 20 U. S. C. § 1400 (2004).

Johnson, D. J., & Myklebust, H. R. (1967). *Learning disabilities; educational principles and practices*

Joseph, R. (1992). *The right brain and the unconscious: Discovering the stranger within*. New York, NY US: Plenum Press.

Klin, A., Volkmar, F. R., Sparrow, S. S., Cicchetti, D. V., & Rourke, B. P. (1995). Validity and neuropsychological characterization of asperger syndrome: Convergence with nonverbal learning disabilities syndrome. *Journal of Child Psychology & Psychiatry & Allied Disciplines, 36*(7), 1127-1140.

Kohut, H. (1971). *The analysis of the self; a systematic approach to the psychoanalytic treatment of narcissistic personality disorders*. New York: International Universities Press.

Kohut, H. (1977). *The restoration of the self*. New York: International Universities Press.

Kohut, H., Goldberg, A., & Stepansky, P. E. (1984). *How does analysis cure?*. Chicago: University of Chicago Press.

Kohut, H., & Wolf, E. S. (1978). The disorders of the self and their treatment: An outline. *The International Journal of Psychoanalysis, 59*(4), 413-425.

Kowalchuk, B., & King, J. D. (1989). Adult suicide versus coping with nonverbal learning disorder. *Journal of Learning Disabilities, 22*(3), 177-179.

Little, L. (2002). Middle-class mothers' perceptions of peer and sibling victimization among children with asperger's syndrome and nonverbal learning disorders. *Issues in Comprehensive Pediatric Nursing, 25*(1), 43-57.

Little, S. S. (1993). Nonverbal learning disabilities and socioemotional functioning: A review of recent literature. *Journal of Learning Disabilities, 26*(10), 653-665.

Mahler, M. S. (1968). *On human symbiosis and the vicissitudes of individuation*. New York: International Universities Press.

Mapstone, M., Weintraub, S., Nowinski, C., Kaptanoglu, G., Gitelman, D. R., & Mesulam, M. (2003). Cerebral hemispheric specialization for spatial attention:

Spatial distribution of search-related eye fixations in the absence of neglect. *Neuropsychologia, 41*(10), 1396.

Milrod, D. (2002). The concept of the self and the self representation. *Neuro-Psychoanalysis, 4*(1-2), 7-23.

Nelson, C. A., & Bloom, F. E. (1997). Child development and neuroscience. *Child Development, 68*(5), 970-987.

Orenstein, M., & Levin, F. (2002). The emotional impact of repeated cognitive failure on the evolving sense of self, and kohut's tension arc. *Psychoanalytic Social Work, 9*(1), 27-44.

Ostrove, J. M., Simpson, T., & Gardner, H. (1990). Beyond scripts: A note on the capacity of right hemisphere-damaged patients to process social and emotional content. *Brain and Cognition, 12*(1), 144-154.

Ozols, E. J., & Rourke, B. P. (1988). Characteristics of young learning-disabled children classified according to patterns of academic achievement: Auditory-perceptual and visual-perceptual abilities. *Journal of Clinical Child Psychology, 17*(1), 44-52.

Palombo, J. (1993). Neurocognitive deficits, developmental distortions, and incoherent narratives. *Psychoanalytic Inquiry, 13*(1), 85-102.

Palombo, J. (1996). The diagnosis and treatment of children with nonverbal learning disabilities. *Child & Adolescent Social Work Journal, 13*(4), 311-332.

Palombo, J. (2000). A disorder of the self in an adult with a nonverbal learning disability. *How responsive should we be?: Progress in self psychology, vol 16.* (pp. 311-335). Mahwah, NJ US: Analytic Press.

Palombo, J. (2001). *Learning disorders & disorders of the self in children & adolescents*. New York: W.W. Norton.

Palombo, J. (2006). *Nonverbal learning disabilities : A clinical perspective*. New York: W.W. Norton.

Palombo, J. (2008). Mindsharing: Transitional objects and selfobjects as complementary functions. *Clinical Social Work Journal, 36*(2), 143-154.

Pelletier, P. M., Ahmad, S. A., & Rourke, B. P. (2001). Classification rules for basic phonological processing disabilities and nonverbal learning disabilities: Formulation and external validity. *Child Neuropsychology, 7*(2), 84-98.

Pennington, B. F. (1991). *Diagnosing learning disorders : A neuropsychological framework*. New York: Guilford Press.

Pennington, B. F. (2009). How neuropsychology informs our understanding of developmental disorders. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 50*(1), 72-78.

Petti, V. L., Voelker, S. L., Shore, D. L., & Hayman-Abello, S. (2003). Perception of nonverbal emotion cues by children with nonverbal learning disabilities. *Journal of Developmental and Physical Disabilities, 15*(1), 23-36.

Ross, E. D., & Mesulam, M. (1979). Dominant language functions of the right hemisphere? prosody and emotional gesturing. *Archives of Neurology, 36*(3), 144-148.

Rourke, B. P. (2008). *What are the relationships among NLD, asperger's syndrome (AS), and high functioning autism (HFA)?* Retrieved 1/31/2010, 2010, from http://www.nld-bprourke.ca/BPRA41.html

Rourke, B. P. (n.d.). *Question 23: Why do you not recommend insight-oriented, dynamic psychotherapy for adolescents or adults with NLD*? Retrieved 1/23/2010, 2010, from http://www.nld-bprourke.ca/BPRA23.html

Rourke, B. P., Ahmad, S. A., Collins, D. W., Hayman-Abello, B., Hayman-Abello, S., & Warriner, E. M. (2002). CHILD CLINICAL/PEDIATRIC NEUROPSYCHOLOGY: Some recent advances. *Annual Review of Psychology, 5*3(1), 309.

Rourke, B. P. (1982). Central processing deficiencies in children: Toward a developmental neuropsychological model. *Journal of Clinical Neuropsychology,* 4(1), 1-18.

Rourke, B. P. (1987). Syndrome of nonverbal learning disabilities: The final common pathway of white-matter disease/dysfunction*? Clinical Neuropsychologist,* 1(3), 209-234.

Rourke, B. P. (1988a). Socioemotional disturbances of learning disabled children. *Journal of Consulting and Clinical Psychology, 5*6(6), 801-810.

Rourke, B. P. (1988b). The syndrome of nonverbal learning disabilities: Developmental manifestations in neurological disease, disorder, and dysfunction. *Clinical Neuropsychologist,* 2(4), 293-330.

Rourke, B. P. (1989). *Nonverbal learning disabilities : The syndrome and the mode*l. New York: Guilford Press.

Rourke, B. P. (1995). *Syndrome of nonverbal learning disabilities : Neurodevelopmental manifestation*s. New York: Guilford Press.

Rourke, B. P. (2000). Neuropsychological and psychosocial subtyping: A review of investigations within the university of windsor laboratory. *Canadian Psychology/Psychologie Canadienne, 4*1(1), 34-51.

Rourke, B. P. (2005). Neuropsychology of learning disabilities: Past and future. *Learning Disability Quarterly, 2*8(2), 111-114.

Rourke, B. P., & Fuerst, D. R. (1991). *Learning disabilities and psychosocial functioning : A neuropsychological perspectiv*e. New York: Guilford Press.

Rourke, B. P., & Fuerst, D. R. (1992). Psychosocial dimensions of learning disability subtypes: Neuropsychological studies in the.. *School Psychology Review, 2*1(3), 361.

Rourke, B. P., & Fuerst, D. R. (1996). Psychological dimensions of learning disability subtypes. *Assessment,* 3(3), 277-290.

Rourke, B. P., & Tsatsanis, K. D. (1995). Memory disturbances of children with learning disabilities: A neuropsychological analysis of two academic achievement subtypes. In F. N. Watts (Ed.), *Handbook of memory disorders*. (pp. 501-531). Oxford England: John Wiley & Sons.

Rourke, B. P., & Tsatsanis, K. D. (1996). Syndrome of nonverbal learning disabilities: Psycholinguistic assets and deficits. *Topics in Language Disorders, 1*6(2), 30-44.

Rourke, B. P., Young, G. C., & Leenaars, A. A. (1989). A childhood learning disability that predisposes those afflicted to adolescent and adult depression and suicide risk. *Journal of Learning Disabilities, 2*2(3), 169-175.

Schore, A. N. (1994). *Affect regulation and the origin of the self : The neurobiology of emotional developmen*t. Hillsdale, N.J.: L. Erlbaum Associates.

Schore, A. N. (1997). Early organization of the nonlinear right brain and development of a predisposition to psychiatric disorders. *Development and Psychopathology,* 9(4), 595-631.

Schore, A. N. (1999). Commentary. *Neuro-Psychoanalysis,* 1(1), 49-55.

Schore, A. N. (2002). Advances in neuropsychoanalysis, attachment theory, and trauma research: Implications for self psychology. *Psychoanalytic Inquiry, 2*2(3), 433-484.

Schore, A. N. (2003). *Affect regulation & the repair of the sel*f. New York: W.W. Norton.

Schore, A. N. (2009). Relational trauma and the developing right brain: An interface of psychoanalytic self psychology and neuroscience. *Annals of the New York Academy of Sciences,* (1159), 189-203.

Schore, J. R., & Schore, A. N. (2008). Modern attachment theory: The central role of affect regulation in development and treatment. *Clinical Social Work Journal, 3*6(1), 9-20.

Semrud-Clikeman, M., & Hynd, G. W. (1990). Right hemisphere dysfunction in nonverbal learning disabilities: Social, academic, and adaptive functioning in adults and children. *Psychological Bulletin, 10*7(2), 196-209.

Siegel, A. M.,. (1996). *Heinz kohut and the psychology of the sel*f. London; New York: Routledge.

Snyder, T. D., Dillow, S. A., & Hoffman, C. M. (2009). *Digest of education statistics, 2008. NCES 2009-02*0 National Center for Education Statistics.

Spitz, R. A. (1965). *The first year of life: A psychoanalytic study of normal and deviant development of object relation*s. Oxford England: International Universities Press, I.

Stein, M. T., Klin, A., & Miller, K. (2004). When asperger's syndrome and a nonverbal learning disability look alike. *Journal of Developmental & Behavioral Pediatrics, 2*5, S59-s64.

Stern, D. N. (2004). *The present moment in psychotherapy and everyday lif*e. New York: W.W. Norton.

Stewart, K., & Stewart, K. (2007). *Helping a child with nonverbal learning disorder or asperger's disorder : A parent's guid*e. Oakland, CA: New Harbinger Publications.

Strang, J. D., & Rourke, B. P. (1983). Concept-formation/non-verbal reasoning abilities of children who exhibit specific academic problems with arithmetic. *Journal of Clinical Child Psychology, 1*2(1), 33-39.

Thompson, O. M. (1985). The nonverbal dilemma. *Journal of Learning Disabilities, 1*8(7)

Thompson, S. (1997). *The source for nonverbal learning disorder*s. East Moline, IL: LinguiSystems.

Tsatsanis, K. D., & Fuerst, D. R. (1997). Psychosocial dimensions of learning disabilities: External validation and relationship with age.. *Journal of Learning Disabilities, 3*0(5), 490.

Voeller, K. K. S. (1995). Clinical neurologic aspects of the right-hemisphere deficit syndrome. *Journal of Child Neurology, 1*0, S16-S22.

Vogel, S. A., & Forness, S. R. (1992). Social functioning in adults with learning disabilities. *School Psychology Review, 2*1(3), 375.

White, M., & Epston, D. (1990). *Narrative means to therapeutic end*s. New York: Norton.

Whitney, R. V. (2002). *Bridging the gap : Raising a child with nonverbal learning disorde*r. New York: Perigee.

Winnicott, D. W. (1953). Transitional objects and transitional phenomena; a study of the first not-me possession. *The International Journal of Psychoanalysis, 3*4, 89-97.

Yalof, J. (2006). Case illustration of a boy with nonverbal learning disorder and asperger's features: Neuropsychological and personality assessment. *Journal of Personality Assessment, 8*7(1), 15-34.

Yu, J. W., Buka, S. L., McCormick, M. C., Fitzmaurice, G. M., & Indurkhya, A. (2006). Behavioral problems and the effects of early intervention on eight-year-old children with learning disabilities. *Maternal & Child Health Journal, 1*0(4), 329-338.

Zirkel, P. A., & Krohn, N. (2008). RTI after IDEA. *Teaching Exceptional Children, 4*0(3), 71-73.