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The Effect of Psychotropic Medications on Social Skills in Persons With Profound Mental Retardation.

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**THE EFFECT OF PSYCHOTROPIC MEDICATIONS ON
SOCIAL SKILLS IN PERSONS
WITH PROFOUND MENTAL RETARDATION**

A Dissertation

Submitted to the Graduate Faculty of
Louisiana State University and
Agriculture and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Psychology

by
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Abstract

People with mental retardation exhibit a large number of behavioral excesses and deficits and the full range of psychopathology. As a result, interventions involving psychotropic medications are widely used in the population. However, few conducted studies have examined the effect of psychotropic interventions on the total behavioral repertoire. Most studies examine only the suppression of symptoms or maladaptive behaviors without considering the manner in which medications may alter the positive behavioral repertoire or cause deleterious side effects. This study aimed to address medication effects on the positive behavioral spectrum by examining the effects of these interventions on social skills, adaptive skills, and side-effects profiles. Subjects were placed in 1 of 5 groups that corresponded to their current medication regimes. Individuals who received traditional antipsychotics, atypical antipsychotics, and multiple medications had significantly less social and adaptive skills and higher side-effects scores than individuals receiving anti-epileptic medications and experimental controls. The same groups (traditional antipsychotics; atypical antipsychotics; multiple medications) demonstrated a significant decline in social and adaptive skills among participants receiving the particular medication regime a minimum of three years. Finally, analyses of demographic variables did not delineate significant differences between groups in terms of actual demographic variables or in social and adaptive skills. Clinical implications of this research are discussed with an eye for providing enhanced care for persons with developmental disabilities.

Introduction

Mental retardation has been called by many names and has been the focus of misunderstanding and apprehension in the past century (Goddard, 1928; Kanner, 1948; 1964). Persons with mental retardation have been feared, blamed for society's problems, institutionalized, sterilized, experimented on, and generally treated as beings less than human (Trent, 1994). The defining aspect of mental retardation has always included a below average ability to learn and function in the social arena (Doll, 1941; Grossman, 1983). Deficits in social functioning may be the most important area for service providers to target, as these problems are perhaps the most amenable to treatment. Researchers in the field of social skills training have, through application of the behavioral technology, demonstrated that persons with mental retardation can make significant improvements in social and interpersonal functioning (Dosen, 1993; McFall & Littlesand, 1971).

The normalization movement arose in the early 1970's and advocated the placement of persons with mental retardation into communities through downsizing of institutions with congregate living. The movement gave rise to a number of groups who were diametrically opposed to the use of learning theory techniques for treating behavioral excesses and deficits in this population (Nirje, 1969; Wolfensberger, 1970). These groups stated their primary interest as one of community integration for persons with mental retardation. The movement sought to remove the restrictions placed on persons with mental retardation by eliminating institutional placement. In addition, the force of normalization brought about new schools of thought within institutions and

frequently downplayed the importance of using effective behavioral principles and techniques in the treatment of persons with mental retardation. However, proponents of the movement failed to recognize the need for social and adaptive skills training to facilitate less restrictive placements. As a result, many persons with mental retardation living in communities and institutions either failed in the normalized social milieu due to behavioral excesses and deficits (Matson & Hammer, 1996) or were overmedicated until most of the negative behavioral repertoire was suppressed, even at the sacrifice of much of the positive behavioral skills (Hill, Balow, & Bruininks, 1985).

Despite the large literature concerning the effectiveness of the behavioral technology in treating persons with mental retardation, psychotropic medications are often the most widely used interventions in this population. Since the advent of Thorazine in 1957, psychotropic medications have been used extensively in the developmentally disabled population. Current estimates of psychotropic medication use among mentally retarded persons who reside in public institutions is approximately 50 to 66%, and prevalence rates have ranged from 7 to 74% in persons with mental retardation residing in community based settings (Baumeister, Todd, & Sevin, 1993). These numbers are astounding given the paucity and methodological downfalls of research that exist to support the widespread use of these interventions among persons with mental retardation (Baumeister & Sevin, 1990).

Few methodologically sound studies examining the effect of psychotropic medications on aberrant behavior or psychiatric conditions in persons with mental retardation have been completed. Most studies in this area look only at behavior

suppression variables while completely ignoring drug effects on collateral behaviors (social & adaptive skills) or the onset of deleterious side effects (Matson, et al., in press). As a result, very little is known about the effects of short or long-term use of psychotropic agents on social and adaptive skills. The current investigation was designed to examine the relationship between social skills and psychotropic drug use in persons with mental retardation.

The present work first addresses definitions of mental retardation and traces the development of the field to the present. It then examines the social skills literature including definitions of and methods for assessing social skills. Next is a discussion of psychotropic drug use in persons with mental retardation including evaluation of studies that have been conducted in this area. Finally, the rationale for the current study will be given followed by the method, results, and discussion.

Mental Retardation

Reviews examining the definition of mental retardation often begin with Heber (1959; 1961) or Grossman (1973; 1977; 1983), as they represent attempts to standardize terminology and create a consistent language for professional communication in the field of developmental disabilities. However, to fully understand the confusion that has accompanied the field for many years, it is necessary to first examine some historical definitions and explanations of the disability. While this review is far from exhaustive, it will address many issues that have been the source of conflict in past years.

Mental retardation has been identified since the earliest scientific writings and initially was diagnosed based on the presence of physical anomalies (Sheerenberger, 1982). The forerunner of modern diagnosis and treatment was Itard, who worked with Victor, the wild boy of Aveyron, from 1800 to 1805. Though Itard felt his work had failed, he was able to demonstrate that, with stability and time, persons with mental deficiencies could learn (Sheerenberger, 1982). When institutions were developed for the mentally retarded in the middle 19th century, the condition was diagnosed primarily by physicians. The role of medicine in the field of developmental disabilities stood firm for much of the past 150 years and only recently has been delegated a less prominent role in the diagnosis and treatment of the condition (Trent, 1994). This lessened role of medicine followed the gradual understanding that medical etiology, while important, is not generally prognostic of treatment of the particulars of mental retardation (Luckasson et al., 1992).

Definitions

There have been numerous definitions of mental retardation over the past 150 years. One of the first was proposed by Duncan and Millard (1866). This typology contained 8 classes, of which 1 through 4 correspond with current levels of mild-moderate-severe-profound, and classes 5-8 included individuals whose disability was attributed to the medical causes epilepsy, hydrocephalus, head injury, or some disease during infancy or youth. While these classes represented a beginning, the researchers commented that the classifications lacked sufficient data to be classified as scientific truth (Duncan & Millard, 1866).

In 1910 the American Association for the Study of the Feeble-minded (later the American Association for Mental Deficiency; then the American Association on Mental Retardation) adopted a classification system based solely on the results of intellectual test (Goddard, 1921). This system, though informal, classified persons with a mental age of less than 3 years as idiots; persons with mental age between 3 and 7 years were designated imbeciles; and persons who scored in the 8 to 12 year range were labeled morons. Formal adoption of this system followed in 1920 (Goddard, 1921).

Goddard (1928) re-examined the 1920 definition due to lack of clarity in terminology used to describe persons with developmental disabilities. In his new explanation of the condition, Goddard stated that individuals previously classified as idiots or imbeciles be called “mental defectives” or “mental cripples” to account for disabilities due to factors other than low intelligence. This new system retained the term “moron” but specified that these individuals were not hopeless and incurable

mental defectives, but instead were capable of becoming members, in a limited way, of the normal social group (Goddard, 1928).

Five years later, Lewis (1933) established two broad divisions of feeble-mindedness. The first of his divisions, called subcultural (cultural-familial) mental defectives, included individuals who had normal appearance but came from “socially inferior” homes. The second division, called pathological mental defectives, consisted of persons with known organic lesions or medical conditions and were considered to be a normal fluctuation of human genetics. This classification system was short lived, as Doll (1935; 1936) introduced and championed a new classification system for the American Association on Mental Deficiency (AAMD).

Edgar Doll (1935) argued that social incompetence due to arrested mental development should be definitive of mental retardation. Doll argued that scores on intellectual tests were not enough, alone, to diagnose mental retardation and suggested his social maturity scale as an appropriate measure of the construct. The following year, Doll’s presidential address to the AAMD further protested the use of intellectual test alone to diagnose mental retardation (Doll, 1936). He proposed that social inadequacy and arrested development were also essential elements of the condition being diagnosed. Later in his address, Doll stated that mental retardation should be defined exclusively by social criteria. For example, the idiot could not protect himself from ordinary dangers and had few communication skills. The imbecile could protect himself from ordinary dangers and had some communication skills; however, this person was unable to read or write and could not perform simple work task with

supervision. Finally, the moron was capable of some degree of literacy and could perform some unskilled industrial tasks. Conversely, the moron could not perform task that required higher order thinking and was not able to independently earn a living or support a family.

That same year (1936) the medical profession attempted to assume a larger role in the diagnosis and treatment of mental retardation. This medical definition of mental retardation proposed the condition as a branch of medicine devoted to the study and treatment of developmental deficiencies which could appear in various combination of physical, intellectual, and social aspects of the organism. Under this medical model, all cases of mental retardation had tendencies that resulted in reduced social efficiency (Humphrey, 1936).

The year 1941 saw other explanations of mental retardation. One definition stated that mental deficiency was simply a mental condition resulting from a subnormal rate of development of some or all mental functions (Kuhlman, 1941). Yepsen (1941) further examined the concept of mental deficiency and considered the four essential features of mental deficiency to be ineffective integration, tendency to react on a affective vs. cognitive level, perseverative tendencies in action, and problems discerning relationships which were considered elemental in social functioning.

Discussion concerning the description of aments (persons with mental deficiency) continued in 1947. In that year, Tredgold described two classes of persons with retardation, the mental defective and the mental deficient, whose conditions were chronic and enduring. Mentally defective persons were described as those in whom

innate potential was so limited that independent survival was impossible regardless of education and training. Persons who were mentally deficient, on the other hand, were in a state of arrested cerebral development or restricted potential that rendered the individual incapable of adapting to the environment sufficiently enough to maintain without external supports. In examining both of these classes, Tredgold rejected the use of any intellectual measure and stated that social criteria alone defined the condition. Kanner (1948) proposed a new, pragmatic explanation of mental deficiency that contained three distinct classes. The first classification, named “absolute feeble-mindedness”, contained persons whose deficits were so marked that they would stand out as defectives in any civilization. The most carefully planned educational or therapeutic situations would not allow these persons to function independently in society, and persons with disability of this magnitude would be in need of custodial care from parents or appropriate institutions. The second classification included persons with “relative feeble-mindedness”. These persons were easily identified in competitive scholastic situations but might distinguish themselves with assets not measured by intelligence test. Kanner suggested that intellectual deficiency, not mental deficiency, was the hallmark of this classification. Finally, Kanner proposed a group consisting of persons whose intelligence scores appeared limited due to “problems” in other areas. Individuals in this class, called “apparent or pseudo-feeble-mindedness”, were limited due to problems seeing, hearing, learning disabilities, negativism, emotional blocking, seizures, medication effects, schizophrenic withdrawal, or other medical and psychiatric conditions that could occur (Arthur, 1947).

With the publication of the first Diagnostic and Statistical Manual of Mental Disorders (DSM), mental retardation was classified under two major headings (APA, 1952). The first, called Mental Deficiency, contained three categories. Mild mental deficiency referred to IQ in the 70-85 range and functional impairment. Functional impairment requiring special training in conjunction with IQ scores in the 50-70 range characterized moderate mental deficiency. Severe mental deficiency referred to functional impairment requiring custodial and protective care and contained individuals with IQ scores of 50 or less. The second major heading for mental retardation in DSM-I was chronic brain syndrome and was applied to cases of mental retardation whose etiology was known to be organic. The same specifiers regarding level of deficit were applied to these cases.

The fifth definition of mental retardation for the American Association on Mental Deficiency was formulated by Heber (1959). The condition was defined by subaverage intellectual functioning during the developmental period that was associated with impairments in maturation, learning, or social adjustment. Additionally, Heber classified levels of mental retardation based on the number of standard deviations a persons scored below the mean on tests of intellectual and adaptive functioning. For example, intellectual level was defined as Level V (persons scoring 1.01 to 2 standard deviations below the mean), Level IV (persons scoring 2.01 to 3 standard deviations below the mean), and Level III (persons scoring 3.01 to 4 standard deviations below the mean). Adaptive functioning was classified using 4 levels. Level 4 included individuals scoring 1.01 to 2.25 standard deviations below the mean; Level 3 held

individuals scoring 2.26 to 3.5 standard deviations below the mean; Level 2 contained persons scoring 3.51 to 4.75 standard deviations below the mean, and Level 1 individuals scored 4.76 or more standard deviations below the mean. It is interesting to note, however, that no adequate measures of social behavior existed at that time. As a result, the call for standardized assessment of adaptive behavior was optimistic at best (Heber, 1959).

Two year later (1961) Heber modified the AAMD definition of mental retardation to include the words *deficits in adaptive behavior* manifested by deficits in maturation, learning, or social adjustment. Adaptive behavior referred to the effectiveness of the individual in adapting to the social and natural demands of the environment. Additionally, the terms borderline, mild, moderate, severe, and profound replaced the Levels V-I due to opposition to these categories. These subtle changes in the definition served to widen the scope concerning what actually constituted mental retardation and adaptive behavior (Sheerenberger, 1982). This revision, along with the 1959 definition, attempted to increase uniformity in classification and terminology to incorporate behavioral and medical aspects in the diagnosis of mental retardation. While this definition was successful in helping distinguish mental retardation from other behavior disorders, it also increased the population that could be diagnosed from 2 to 14% (700% increase) (Heber, 1961).

At roughly the same time as the 5th AAMD definition, another classification system based solely on IQ score was published (Perry, 1960). This system retained cases called borderline in Heber's definition but changed Heber's classification of

severe (IQ 30/35-50) to Moderate (IQ 36-51). Perry's new explanation of the levels of mental retardation added confusion in classifying IQ scores in higher functioning persons with mental retardation, especially those classified as educable or trainable (Rychlak & Wade, 1963).

DSM-II (APA, 1968) attempted to facilitate clarity in the area by adopting the definition offered by Heber (1961). Mental retardation referred to subnormal general intelligence, originating in the developmental period, associated with impairment of learning, maturation, social adjustment, or combinations of the three. The levels of mental retardation included Borderline (IQ 68-83), Mild (52-67), Moderate (36-51), Severe (20-35), and Profound (20 and below). The individual's level of adaptive functioning was ascertained from clinical judgement in this definition (APA, 1968).

The sixth definition of mental retardation offered by AAMD was authored by Grossman (1973). As professional sentiment demanded a more conservative measure of mental deficiency than the one standard deviation rule offered in earlier definitions, the 1973 AAMD definition added the word "significantly" to qualify subaverage intellectual functioning and the two standard deviations below the mean criterion was reinstated for diagnosing the condition. Additionally, the developmental period in which the condition could be diagnosed was changed from the first sixteen to the first eighteen years of life. Grossman (1977) also authored the seventh edition of the definition, which made only minor corrections but extended the upward end of mental retardation to IQ "around" 75.

Grossman (1983) continued his work by authoring the eighth edition of the AAMD manual. The changes in the definition of mental retardation were designed to coincide with widely used diagnostic manuals of that time (DSM-III). Additionally, the 1983 definition considered standard errors of measurement for the first time and allowed for more flexibility at the borderline levels of mental retardation. The resulting levels of mental retardation included mild mental retardation (IQ 50-55 to approximately 70), moderate (35-40 to 50-55), severe (20-25 to 35-40) and profound (20-25 and below). The 1983 classification also purported that the definition applied to *present functioning only*; therefore, one could meet criteria for mental retardation at one time but not at another. However, no data were offered in support of the “present functioning only” claim.

The changing of the upper limits of mental retardation in Grossman’s 1983 definition was the source of much controversy in the field of developmental disabilities. By raising the upper limit of mild mental retardation to IQ = 70-75, the notion of flexibility in clinical assessment and judgement became paramount. The change was problematic in that some persons with IQ of 75 could be classified as mildly mentally retarded, while others having IQs in the range of 65-70 may not be classified in the spectrum. Grossman extended the upper limit to 75 to include individuals, especially in school settings, who need but would not receive special services if an IQ score of 70 was the steadfast cutoff. However, while increasing the number of people who receive special services based on IQ scores, raising the upper limit also increased the number of false positives for whom special services or placements were inappropriate. While this

debate raged for some time, Grossman's solution was simple. He simply stood by his original 1983 definition and IQ cutoffs, as the ceiling proposed in the definition appeared to be the best compromise between over and under identification and most likely to access services for those who needed them (Grossman, 1983).

The 9th edition of the AAMR manual and definition of mental retardation was authored by Luckasson et al. (1992) and represented a shift in the terminology used to characterize the disorder. This reconceptualization stated mental retardation as "substantial limitations in present functioning characterized by 1) significantly subaverage intellectual functioning; 2) related limitations in two or more areas including a) communication, b) self-care, c) home living, d) social skills, e) community use, f) self-direction, g) health, h) safety, i) functional academics, j) leisure, and k) work; and 3) manifestation before age 18."

Luckasson stated that the new definition of mental retardation was different in that it attempted to express the changing understanding of what mental retardation was, formulated what ought to be classified as well as how to describe the systems of supports people with mental retardation require, represented a paradigm shift from a view of mental retardation as an absolute trait expressed solely by a person to an expression of the interaction between the person with limited intellectual functioning and the environment, and attempted to extend the concepts of adaptive behavior another step by describing specific particulars of adaptive skills areas. Additionally, the 1992 definition abolished all terminology referring to levels of mental retardation which had been considered and included in explanations of mental retardation for over 150 years.

Luckasson trumpeted the new definition proclaiming that it intended to “express the contemporary understanding of mental retardation” (Luckasson, 1992).

Many valid criticisms were raised concerning the 1992 AAMR definition. First, the definition appeared to give precedence to assessment and diagnostic procedures that were not based in science. For example, persons who were diagnosed with mental retardation were stated to have deficits in two or more adaptive areas from the list of 11 previously mentioned. However, no standardized assessment of adaptive skills that targets these areas has been utilized, or even developed, to date. Also, the new definition presented a shift in who could actually diagnose mental retardation. According to the definition, only interdisciplinary teams (IDTs), not physicians or psychologists alone, could confer the diagnosis of mental retardation. Luckasson’s committee stated that the disorder was not completely medical or psychological in nature although it could be coded in a medical classification of diseases or in a classification of psychiatric disorders. In its simplest form, this definition removed the traditional associations with relevant professions working with the mentally retarded, allowing only Interdisciplinary teams to assign the diagnosis.

In 1994 the American Psychiatric Association published the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (APA, 1994). With regard to mental retardation, the DSM-IV integrated Luckasson’s 1994 definition with past research. Four levels of mental retardation, which corresponded to Grossman’s 1983 definition, were retained to indicate an individual’s degree of intellectual and adaptive impairment. DSM-IV also included the classification Mental Retardation, Severity

Unspecified to describe individuals for which there is a strong assumption of mental retardation but are untestable with standard testing instruments. For lack of a better system, the DSM-IV also adopted the AAMR's 11 adaptive skills areas for assessing excesses and deficits in adaptive functioning. Although the AAMR failed to develop a psychometrically sound assessment instruments for any of the eleven areas, other measures such as the Vineland Adaptive Behavior Scales (Sparrow, Balla, Cicchetti, 1984) have considerable overlap with these areas and can be used to make a reliable assessment of adaptive functioning.

In 1996 the Editorial Board of the APA Division 33 (Mental Retardation) formulated a definition that restored the foundation of scientific work in the field of mental retardation (Editorial Board, 1996). This definition was reflective of many years of scientific study in the field of mental retardation and served as an alternative to the AAMR's 1992 revisionary work. According to the Editorial Board, mental retardation was characterized by significant limitations in general intellectual functioning and significant limitations in adaptive functioning existing concurrently with onset prior to age 22. Significant limitations in intellectual functioning were represented by a score of 2 or more standard deviations below the mean on a valid and comprehensive, individually administered measure of intelligence which was to be interpreted by a qualified practitioner. Comparable deficits in adaptive functioning were assessed using standardized measures of adaptive behavior with the same criterion of 2 or more standard deviations below the mean serving as the cutoff. Additionally, the Editorial Board specified that intellectual impairments in absence of adaptive impairments,

adaptive impairments in absence of intellectual impairments, or impairments in one of the areas in conjunction with maladaptive behavior was not sufficient to confer a diagnosis of mental retardation (Editorial Board, 1996).

The Editorial Board also included and re-established the well researched and validated concept of levels of mental retardation (mild to profound). Tables identifying behaviors typical of individuals at each level of mental retardation were added for ages 4, 7, 10, 12, and 16 years, and the levels of mental retardation were delineated and organized to assist in diagnosis and tracking of problem behavior across the developmental years (Editorial Board, 1996).

Finally, the Editorial Board commented on the notion of decreased mild mental retardation after school age and years. In making this distinction, the board stated “Researchers commonly observe a downward trend in the presence of mild mental retardation after school years and infer the trend to reflect successful, independent functioning and fulfillment of familial and vocational roles in various environments. However, few data are available to support this interpretation and this notion should be abandoned until sufficient data concerning the inference are presented” (Editorial Board, 1996).

The controversy that abounds in the scientific literature concerning the definition of mental retardation is readily evident. Although the American Association on Mental Retardation (AAMR, formerly the AAMD and the American Association for the Study of the Feeble-minded) has been the primary authority for many years, the credibility of this organization and their explanation of mental retardation has recently

been questioned by a number of prominent researchers in the field (Matson, 1995a; Gresham, MacMillan, & Siperstein, 1995). It appears at this point that the definitions of mental retardation offered by the APA Division 33 Editorial Board (1996) and the DSM-IV (APA, 1994) are better delineated and offer a working explanation of the disorder that is consistent with the history of the field. The next section will discuss the definition and assessment of social skills in persons with mental retardation.

Social Skills

Social skills research has grown in importance due to the potential for widespread applications in a variety of populations (Phillips, 1985; McFall, 1982). With respect to children of normal intelligence, social skills have been related to poor peer relationships, academic underachievement, school maladjustment, dropping out of school, juvenile delinquency, aggression, and psychopathology later in life (Elliot & Mckinnie, 1994; Margalit, 1991; Bullock, 1992; McCord, Tremblay, Vitaro, & Desmarais-Gervais, 1994; Volling, MacKinon-Lewis, Rabiner, & Baradaran, 1993; Bellack & Muesser, 1993).

The importance of appropriate social skills is also readily apparent in adults. With respect to this population, social skills deficits have been related to alcohol abuse, drug addiction, sexual dysfunction, dating anxiety, marital problems, unemployment, child abuse, depression, and mental retardation (Hover & Gaffney, 1991; Van Hasselt, Hersen, & Milliones, 1978; Lobitz & LoPiccolo, 1972; Curran, 1977; Eisler, Miller, Hersen, & Alford, 1974; Greenspan & Schoultz, 1981; Denicola & Sandler, 1980; Bell-Dolan, Reaven, & Peterson, 1993; Marchetti & Campbell, 1990). Thus, social behavior is, and should be, a central issue for psychologists to address.

While considerable research has been conducted on assessing and training social skills to persons with mental retardation, very little research has examined the importance of other pertinent variables on the social repertoire. One such variable is psychotropic medication. The need for research in this area is especially pressing for a number of reasons. First, clinicians should be able to recognize situations in which

symptoms and aberrant behavior are effectively reduced and social behaviors are increasing, versus those in which the medication in question suppresses the entire behavioral repertoire. Additionally, the field must establish ways, given the number of persons on medication, to determine that persons receiving medication are maintaining or increasing the social repertoire while taking medication. This information is essential, as the social repertoire greatly effects individual's community adjustment (Christoff & Kelly, 1983). The current study was designed to examine the effect of various classes of psychotropic medications on social skills in persons with mental retardation. In the sections that follow, the rubric of social skills, including the past and recent definitions, link to mental retardation, and assessment techniques are discussed.

Definitions

One of the most difficult tasks facing researchers in the area of social skills is the lack of a universally accepting definition of social skills (Marchetti & Campbell, 1990). The term "social skills" has been used to explain a large number of motor and cognitive behaviors that are assumed to be necessary to perform competently in social situations. Additionally, and at the expense of greater confusion, terms such as adaptive skills, social competency, heterosexual social skills, heterosocial skills, assertiveness, and interpersonal skills have been used interchangeably or in addition to "social skills" (Conger & Conger, 1986). Given the large number of terms used to describe this repertoire of behaviors, it is easy to understand the inconsistencies and confusion in this area (Conger & Conger, 1986).

Social skills have been defined in a myriad of ways over the years. Libet and Lewinsohn (1973) defined social skills as the ability to respond in a manner that receives positive or negative reinforcement while refraining from displaying responses which are punished or extinguished. Combs and Slaby (1977) refined this definition to exclude inappropriate behavior while interacting with others in a given social context in specific ways that are valued and accepted by society and beneficial to self, others, or mutually. While this definition was accepted by some researchers for a short period of time, the definition continued to evolve over the years in different research camps.

The definition of social skills was soon expanded to include cognitive processes such as perception (Lieberman, Vaughn, Atchison, & Falloon, cited by Curran, 1979). They suggested that nonverbal behaviors such as interpersonal communication, content of conversation, and reciprocity in communication were essential in social skills. This definition further purported that receiving, processing, and generating adequate and appropriate social responses in each of these nonverbal domains must be considered. That same year the definition was expanded by including social responses in context (i.e., antecedents, consequences) (Foster & Ritchey, 1979). These researchers stated that social skills were behaviors that increased the individuals's opportunities to produce, maintain, or enhance situation-dependent adaptive behaviors. They further suggested that the presence of positive behaviors, not just the absence of aberrant responses, was essential for establishing social competence (Foster & Ritchey, 1979).

As research in the area of social skills progressed, the scope of the term continued to systematically broaden. Recognizing this, Curran (1979) coined the term

“megaconstruct” to describe the rubric of social skills, and perceived social skills as social response capabilities inferred from overt, motoric behavior that did not include nonbehavioral constructs. Other researchers also attempted to limit the behaviors included in the rubric of social skills by focusing solely on interpersonal or interpersonal problem solving skills (Bernstein, 1981; Shure, 1981). However, the understanding of what actually constituted social skills remained controversial in the scientific literature.

Gresham (1981) distinguished between failure due to lack of social skill and failure due to emotional arousal interfering with acquisition and/or performance of the skill. Gresham and Cavell (1987) attempted to move to a broader application of social skills, proposing two ways of evaluation. They suggested a popular person as socially skilled, a model referred to as a peer acceptance model of social skills. Another method is to evaluate the presence of behaviors determined *a priori* to indicate social skill. This model reflects a behavioral influence in the definition of social skills.

Matson and colleagues have consistently presented a molecular view of social skills which typifies behavioral approaches in defining social skills in children and persons with developmental disabilities. Andrasik and Matson (1984) presented social skills as those behaviors that encompass interpersonal behavior, and purported that those who can put others at ease in social situations and make others feel good during and after interactions are socially skilled. Four years later, Matson and Ollendick (1988) refined the definition and stated that socially skilled persons could adapt well and avoid verbal or physical conflict by communicating with others. Matson and

Hammer (1996) stated succinctly that “social skills are measurable interpersonal behaviors, excluding items referring to internal mental events or psychic conflict”. This definition also excluded adaptive skills such as dressing and eating, as these behaviors lack the interactive sense to be considered social. Keeping with the behavioral tradition, this definition focused solely on those behaviors that could be clearly identified, defined, and measured, and focused on the meaning of the behaviors within a defined social context.

Gresham (1986a, 1986b) identified three general classes of social skills definitions which were based on the type of assessment methodology used to measure the skill in question. Peer acceptance definitions of social skills view skills in terms of peer acceptance but lack description of an appropriate definition of “acceptance”. The behavioral definition includes as social skills those behaviors that increase the probability of reinforcement and decrease the likelihood of punishment or extinction in specific social context. This definition is amenable to objectivity, operationalization, and measurement, but provides no proof that the behaviors measured are socially important. Finally, social validity definitions identify behaviors that, within a particular social context, predict important social outcomes. This definition designates behavioral deficiencies deemed important based upon relationships to socially important outcomes (peer acceptance; teacher acceptance) and recognizes the interdependence of definition and assessment of social skills.

Chadsey-Rusch (1992) offered a definition of social skills that categorized social behaviors as goal oriented, rule-governed, learned behaviors that are situation

specific and vary according to social context. This operational definition involved both observable and unobservable cognitive and affective elements that assisted in eliciting positive or neutral responses while avoiding negative responses from others. The implication of this definition was that social skills were learned, included acceptable and unacceptable behaviors, and judged as competent or incompetent by others (Chadsey-Rusch, 1992).

Despite the large number of definitions of social skills that have been offered over the years, the rubric of social skills has not been refined such that all components can be specified and operationalized (Chadsey-Rusch, 1992). To date, a consensus on the definition of social skills has yet to be reached. All definitions provide a general idea of what constitutes social skills, but the skills needed for social competence have not been empirically determined and remain unclear. Determining whether a skill is appropriate is a complex process; depending on the social context insufficient or excessive behaviors may be troublesome while moderate levels of behavior can be socially skilled (Matson & Ollendick, 1988). Nevertheless, the debate concerning the definition of social skills rages forward.

Researchers have proposed that the definitional problems of social skills could be clarified by making a distinction between social competence and social skills. In this model, social competence is “a general evaluative term referring to the quality or adequacy of a person’s overall performance in a particular task”, whereas, skills are “the specific” abilities required to perform competently at a task” (McFall, 1982). Using this definition, competence reflects a judgement of whether an individual’s

performance is adequate based on certain criteria, and some amount of consistent performance within a task is expected. McFall further suggested that physiological, cognitive, and motor responses be included under the rubric of social skills.

Gresham (1986) and Gresham and Elliot (1987) conceptualized social competence for children as being comprised of adaptive behavior and social skills. Adaptive behavior would include independent functioning skills, physical development, language development, and academic competencies. Social skills included those interpersonal, self-related, and task-related behaviors (expressing feelings, ethical behavior, accepting authority, conversation skills, cooperative behaviors, play behaviors, attending behaviors, completing tasks, following directions, independent work) required to sustain in age appropriate social situations. Like McFall's concept of social competence, this definition of social competence suggests an interdependence among cognitive, adaptive, and social domains.

Social Skills and Mental Retardation

The association between social behaviors and mental retardation has been recognized for a number of years (Marchetti & Campbell, 1990). The earliest conceptualization of mental retardation highlighted a lack of social competence, and the importance of social behaviors for persons with mental retardation was seen in literature as far back as the early 1800s (Christoff & Kelly, 1983; Greenspan, 1981). However, the push towards deinstitutionalization and normalization resulted in push to further cultivate programs of social skills training and research with this population (Christoff & Kelly, 1985). The need for research in this area was also the focus of a mandate

issued by the American Association on Mental Deficiency (now the AAMR). This directive called for the consideration of adaptive behavior, which includes social functioning as a component, in diagnosing mental retardation (Grossman, 1973). As a result of this declaration, a substantial amount of research assessing the relationship between social skills and mental retardation has taken place (Marchetti & Campbell, 1990).

Persons with mental retardation have been shown to be deficient across a broad spectrum of social behavior, generally exhibiting many more problems than persons of normal intelligence (Marchetti & Campbell, 1990; Matson, Compton, & Sevin, 1991; Matson & Ollendick, 1988). Frequently seen inadequacies include conversational skills, eye contact, appropriate affect, sharing, helping others, assertiveness, and a variety of attending behaviors (Matson & Ollendick, 1988). Inappropriate social behavior in persons with mental retardation is of great concern, as social skills deficits and excesses affect many areas predictive of successful community integration, independent living, behavior problems, and psychopathology (Meyer, Cole, McQuarter, & Reichle, 1990; Matson, Smiroldo, & Bamburg, 1998).

Researchers have suggested that persons with mental retardation most often lose their jobs due to poor social skills, not poor production (Meyer et al., 1990). Greenspan and Shoultz (1981) found that mentally retarded workers involuntarily terminated from competitive employment displayed high levels of social incompetence suggesting a correlation between this factor and subsequent work failure. Over half of the sample lost their jobs primarily due to social ineptness (inappropriate interpersonal behavior;

emotionally disturbed behavior, antisocial behavior) rather than inefficient production, health problems, or economic layoffs.

Researchers have also found a relationship between social competence and community adjustment; therefore, the development of friendships and acceptance of the individual by others with intellectual deficits is greatly affected. Disabled persons living with their family are less likely to develop peer appropriate friendships, as their support system is primarily limited to family members (Chadsey-Rusch, 1992). Surveys of individuals who work with persons with mental retardation illustrate that vocational, social, and personal skills are considered significantly more important for successful community placement and functioning than leisure or academic skills (Lovett & Harris, 1987). These findings exemplify the importance of social behaviors for individuals with mental retardation.

As a result of the emerging research on social skills in the field of mental retardation, a movement towards incorporating social competence into the definition of the disorder emerged (Siperstein, 1992; Greenspan & Granfield, 1992). These researchers advocated that the definition of mental retardation represent "a condition marked by deficits in three broad areas of intelligence: social, practical, and conceptual". This conceptualization is somewhat benign because it suggests that mental retardation consists of global traits, disregards the influence of environmental variables, and does not offer behavioral descriptors of each area. Despite these problems, the authors insisted that deficiencies in social, practical, and conceptual assessment should be assessed by information on an individual's past and current

functioning to determine the extent of support services required for the individuals (Greenspan & Granfield, 1992). Although this idea has not been adopted globally by professionals in the field of mental retardation, it does demonstrate the critical role that social behaviors play in the adjustment of individuals with the disorder.

Although considerable research on social skills and mental retardation exists, further study in the field is still warranted. Outcome literature has repeatedly demonstrated that persons with mental retardation can be taught the specific interpersonal behaviors needed for functioning more independently (Marchetti & Campbell, 1990; Matson & Ollendick, 1988; Wolfolk, Fucci, Gelzayd, & Manz, 1991). However, the exact skills that are valuable in persons with mental retardation have only recently begun to be identified and standardized methods of assessing and teaching these skills have only recently been developed.

Assessment of Social Skills

For many years it has been accepted that social skills, roles, and responsibilities differ at various developmental periods (Heber, 1959, 1961; Editorial Board, 1996). Assessment of social skills is needed for individuals in infancy, childhood, or adulthood and the assessment techniques at these different developmental levels vary significantly. Therefore, as different circumstances require the expression of different social skills or roles, assessment techniques must reflect these differences.

It is far easier to anticipate the social needs of children and adolescents than for adults. Social repertoires for adults often involve varied interpersonal scenarios such as work relationships, social-sexual relationships, and other advanced interactions needed

for functioning in the normalized world. The Editorial Board (1996) listed adaptive and social skills typical of several age groups (4, 7, 10, 12, and 16 years) at mild, moderate, severe, and profound levels of mental retardation. Noticeably, this effort failed to include the adult population, as the variety and contexts of social skills in the adult population do not lend themselves easily to generalization or categorization. Therefore, each set of social skills for adults must be evaluated on a case-by-case basis.

Assessment of social skills in persons with mental retardation is a difficult task and must be undertaken with a number of issues in mind. First, it is important to identify socially important goals for the individual in question (Kazdin & Matson, 1981). This step establishes a relation between identified skill deficits and desirable social outcomes. This process of social validation normally involves either direct comparison of the subject to an appropriate peer group or subjective evaluation by appropriate individuals (Kazdin & Matson, 1981). As identifying a group that is appropriate for comparison for persons with mental retardation is problematic, subjective evaluation has been the preferred method in this population (Kazdin & Matson, 1981).

The primary objectives in social skills assessment include globally assessing social skills, identifying specific skill areas for treatment, and evaluating treatment efficacy (Marchetti & Campbell, 1990; Matson & Hammer, 1996). Methods for assessing social skills have traditionally fallen into three categories, including sociometric methods, direct observation, and rating scales.

Sociometric methods have been used mostly in the child population and involve the techniques of peer ratings and peer nominations (Kennedy, 1988). Peer ratings ask children to state how much they like, want to work, or want to play with certain peers (Bullock, Ironsmith, & Poteat, 1988; Gresham & Reshley, 1986). Normally, a class roster with a picture of each child in the class is provided and children are asked to rank on a Likert-type scale. Rankings are comprised of the average scores from peers' Likert ratings.

Alternate sociometric methods have peers nominate their three to five most or least favorite peers (Bullock et al., 1988). Nominations are typically viewed in a positive or negative light that is inferred to mean peer acceptance or rejection. Examples of positive ratings include "favorite playmate" or "best friend" (Bullock et al., 1988). Scores from peer nominations among elementary school children have been shown to have only moderate stability across time, probably reflecting the changes in peer relationships through the progression of the school year (Gresham & Stuart, 1992).

Peer generated sociometric procedures provide useful information but are of limited usefulness for persons with developmental disabilities. While these ratings provide good information about which individuals are accepted, rejected, or neglected, they do little to identify behaviors to be used as targets of treatment (Gresham, 1981). Because these methods are time and labor intensive, their use has been mostly limited to research activities (Matson & Ollendick, 1988). Peer ratings and peer nominations yield data which is of limited usefulness in diagnosing, treating, or evaluating treatment

efficacy. Therefore, these techniques are of questionable utility for individuals with mental retardation and have been infrequently used with this population.

Direct observation methods have been used frequently for persons with mental retardation. Methods utilized in direct observation have included both analogue and naturalistic observation (Bellack, 1979; Gettinger & Kratochwill, 1987). These techniques will be discussed in the paragraphs that follow.

Observation in analogue or simulated settings is often used when observation in a natural setting is not feasible. This technique often involves presentation of a role-play or simulated situation in which the individual plays a vital role and responds. Role play normally involves a simulated description of a scene in which a subject's "natural response is recorded (Marchetti & Campbell, 1990). Because this technique is cost effective and amenable to observing low frequency behavior, it has been commonly employed in assessing social skills. However, because of problems with generalization to the natural environment, this techniques is often difficult to employ in clinical practice.

The strengths of analogue observation include opportunity to evaluate low frequency behavior and a relatively cost-effective means of observing the behavior of interest. The setting in which this observation occurs should approximate the normal environment as close as possible to increase the probability of reliable, successful assessment. Settings are constructed to elicit particular target behaviors which can directly recorded including both audio and video-taping (Mueser & Bellack, 1998).

As mentioned previously, these methods often fail to generalize to the natural environment and have little overlap with other measures of social skill. These problems call to question the extent of external and ecological validity of these assessments. In addition, behavior normally seen in role plays is relatively brief and highly structured; therefore, it may not be reflective of real-world behavior (Mueser & Bellack, 1998).

Unlike the contrived settings of analogue assessment, naturalistic observation takes place in the client's regular environment. Seeing the behavior of interest in the environment in which it takes place is ideal for observational assessment. Naturalistic observation requires less interference than other assessment techniques because it occurs in a regular setting and includes behaviors that are operationally defined, recorded by trained observers, and recorded by a specified set of rules (Gettinger & Kratchowill, 1987). These data are also highly likely to generalize to various natural settings (Marchetti & Campbell, 1990). While this method sounds ideal, difficulties do exist in obtaining this measure of social skill. Direct observation is costly and time consuming, and these issues are exacerbated if the behavior in question is low frequency. Additionally, many persons with mental retardation live in state funded institutions or group homes and rarely have contact with new adults. Therefore, the presence of an observer can cause reactivity with subjects who may not exhibit their normal behavior.

Direct observation can involve either standardized, predetermined social situation or standardized naturalistic conditions in which a person's discrete behaviors are recorded (Taylor & Harris, 1995; Sigafos, 1995). Behaviors of interest in these

situations could include but are not limited to eye contact, voice tone, engagement with others, and appropriate assertiveness (Matson & Hammer, 1996). Behavior can be rated as either occurring / not occurring or on a Likert type scale which is completed during the observation. Observation of problematic behavior or inappropriate social skills typically focuses on frequency, intensity, and/or duration of the target behavior.

Rating scales have been used extensively in the evaluation of social skills in children, adults, and persons with mental retardation. These scales are relatively quick, inexpensive, amenable to studies of reliability and validity, and useful in the development of target behaviors and treatment packages. Additionally, repeated measures with social skills checklists are also an effective way to evaluate treatment efficacy. While there are a number of checklists available for evaluating social skills, very few are skill and population specific and have been scrutinized in research. The following paragraphs focus on scales that have met these criteria.

The Social Performance Survey Schedule-SPSS (Lowe & Cautela, 1978) is a 100 item psychometrically sound self-report measure of social skills used with adults. The scale contains 50 positive and 50 negative items and is scored on a 5 point Likert scale. Initial studies provided internal consistency ($\alpha = .88$) and test-retest reliability $r = .87$. Numerous studies have been conducted with this scale which has demonstrated good psychometric properties, predictive validity, and correlation with social perception (Lowe, 1985; Miller & Funabiki, 1984; Fingeret, Monti, & Paxson, 1983).

The SPSS was revised and developed for use with adults functioning in the mild to moderate range of mental retardation (Matson, Helsel, Bellack, & Senatore, 1983). Twenty-two subjects with mild or moderate mental retardation were utilized in the initial study of this instrument. The revised SPSS was completed by a direct care staff person who had worked with the client for at least one year. Items retained in this new version of the scale were those that correlated .30 or greater with the total score. The new version of the SPSS was comprised of 28 positive and 29 negative items, which was significantly shorter than the original scale which contained 100 items (50 positive; 50 negative). Correlations for items in the new scale ranged from .30 to .82, with a mean of .57. The original scoring format, a Likert-scale methodology, was retained in the new version.

Matson et al., (1983) further developed the new SPSS by completing a principal components factor analysis on scores from 207 adults with mental retardation who lived in both community and institutional settings. From these data four factors emerged including Appropriate Social Skills, Communication Skills, Inappropriate Assertion, and Sociopathic Behavior. The new scale significantly differentiated clients on high or low doses of medication on the Appropriate Social Skills Factor, but not on the other factors (Matson, Kazdin, & Senatore, 1984). Further, Helsel & Matson (1984) found significant correlations between SPSS scores and scores on measures of depression in 99 developmentally delayed adults. The SPSS is currently the only available checklist, with both standardization and norms, developed for evaluating social functioning in adults with mild or moderate mental retardation (Matson & Hammer, 1996).

Another measure of social skills in persons with mental retardation is the Measure of Observable Social Skills-MOSS (Farrar-Schneider, 1995). This scale, which is still in development, is a 94 item instrument that covers a range of interpersonal functioning. Two 47 item forms have been developed, and both have demonstrated good internal consistency (Form A, $r=.92$; Form B, $r=.93$) and test-retest reliability (Form A, $r=.89$, Form B, $r=.90$). Interrater reliability was moderate for the two versions, with correlations of .52 and .63 respectively. A factor analysis of the MOSS with 212 subjects yielded two factors (Basic Interpersonal Skills; Friendliness). Lastly, the MOSS correlated adequately with the sociometric ratings of 39 persons given by staff who has relationships with the individual in question and knew the person well.

The Matson Evaluation of Social Skills in Persons with Severe Retardation (MESSIER) is an 85 item measure used for assessing social skills in persons with severe and profound mental retardation (Matson, 1995b). The scale is unique in that it is the only standardized measure of social skill that is specific to this population. The MESSIER includes six subscales including Positive Verbal, Positive Nonverbal, General Positive, Negative Verbal, Negative Nonverbal, and General Negative, and assesses items from a basic range of social skill (makes eye contact; responds to noise or voices) to a more advanced level of social skill (use of sentences; ability to follow multi-step directions). Internal consistency for the MESSIER is generally high for the scale as a whole, as well as for the clinically derived subscales $r = .76-.96$ (LeBlanc,

1996). Test-retest and interrater reliability were adequate as well, $r = .86$ and $.79$ respectively (LeBlanc, 1996).

The factor structure of the MESSIER was recently investigated using a Principal Factor Analysis, with oblimin rotation, to determine if the proposed factor solution was valid (Paclawskyj, Rush, Matson, & Cherry, 1999). The instrument was administered to 805 persons with severe or profound mental retardation who resided in an institutional setting. Results of the factor analysis yielded two categories (positive and negative behaviors) that corresponded to the general division of the clinically derived subscales. The results of this factor analysis, corresponding to the general division of the clinical subscales, are promising for assessing social skills in this population (Paclawskyj et al., 1999).

Matson, Smiroldo, and Bamburg (1998) investigated the relationship between social skills as measured by the MESSIER and psychopathology in 846 persons with severe or profound mental retardation. A linear regression analysis was performed and indicated that increases in psychological symptoms was related to increases in negative social behaviors. These findings were important in that they held implications for both behavioral/psychological and pharmacological treatments in persons functioning in the severe or profound range (Matson, Smiroldo, & Bamburg, 1998). The findings of this study yielded two interesting hypotheses. First, the study indicated that social competence was inversely related to both inappropriate behavior and psychological symptoms; that is, increased social competence could mean decreased inappropriate behavior and psychological symptoms. A second idea was that effective management

of psychological symptoms would result in a lower number inappropriate social behaviors and a greater degree of social competence.

Matson, Carlisle, and Bamburg (1998) investigated the convergent validity of the MESSIER and the Vineland Adaptive Behavior Scales (Sparrow et al., 1984). The scales were administered to 892 individuals with severe or profound mental retardation residing in a state-operated institution. The MESSIER subscales were compared to equivalent subdomains from the VABS that have been demonstrated through research to be both reliable and valid. Significant positive correlations were found between corresponding MESSIER subscales and VABS subdomains on social behaviors. This pattern of correlation remained constant when comparing both verbal and nonverbal social behaviors (Matson, Carlisle, & Bamburg, 1998).

Current practice in the assessment of social skills in persons with disabilities involves individual target behaviors typically chosen for their face validity. Examples of pertinent behaviors include eye contact, appropriate speech content, conversational skills, greeting skills, and appropriate assertion (Bellack, 1979; Matson & Hammer, 1996). The MESSIER is currently the only available standardized checklist for evaluating social skill in persons with severe or profound mental retardation (LeBlanc, 1996). Therefore, the MESSIER was chosen and utilized in the current study.

Psychopharmacology and Mental Retardation

Aberrant behaviors or symptoms of psychopathology are the most salient features of the behavioral repertoire for many persons suffering from mental retardation. Behavior problems such as aggression, self-injurious behavior, tantrums, property destruction, stereotypies, pica, and rumination are exhibited by upward of 40% of individuals in institutional placements (Baumeister, Todd, & Sevin, 1993). Additionally, the prevalence of psychopathology in persons with mental retardation has been estimated at 4-6 times that of the general population (Borthwick-Duffy, 1994). As these conditions are readily observed by caregivers and professionals alike, they are often the primary focus of treatment and at the forefront of programmatic services for persons with the condition.

Treatments that address behavioral excesses or psychiatric symptoms in persons with mental retardation can generally be classified into the broad categories of behavioral and pharmacological. Behavioral interventions have been well documented in research as an effective means of treating aberrant behaviors (Scotti, Evans, Meyer, & Walker, 1991). However, due to problems in implementing behavioral treatments (e.g., labor intensive and require considerable technical skill) and some agencies' unwillingness to apply these methods, many treatment teams have turned to pharmacological interventions as the primary means of treating maladaptive behaviors. The same is true for symptoms of psychopathology characteristic of various psychological disorders. Common practice is to treat most disorders with psychotropic medication alone, despite numerous studies suggesting that the combination of

medication and behavioral treatments is most viable for treating many psychological disorders (Psychoses; Depression; Anxiety; Mania) in normal and mentally retarded populations (Sovner & Hurley, 1981).

Reviews of pertinent literature indicate that psychotropic medications are extremely overused with persons with mental retardation. The actual prevalence rates vary for individuals living in institutional versus community based settings. Prevalence rates for persons living in institutional settings have ranged from 50-66%, with most (40-50%) receiving traditional or atypical antipsychotics (Aman & Singh, 1983). For persons residing in community settings, prevalence rates have ranged from 7-74% and neuroleptic medications are the most widely prescribed in the population (Hill, Balow, Bruininks, 1985). Many reasons for high psychotropic drug use exist and include lack of staff, lack of access to professionals, and lack of command of appropriate assessment techniques. However, these or any other reasons are not sufficient to explain the large numbers of persons with mental retardation who take psychotropic medications. Further, these interventions are widely used despite the fact that many drugs are ineffective, suppress behavior generally, and cause a number of lasting, deleterious side-effects (Baumeister & Sevin, 1989). While it is difficult to evaluate the research concerning the use of psychotropic medications in persons with mental retardation due to the significant methodological flaws found in most studies, the following section contains short reviews of the use of psychotropic medications with specific behavior/psychiatric problems. Due to widespread use of pharmacologic agents in the treatment of a variety of behavioral and psychiatric conditions, it is difficult to classify

specific medications with particular debilitating conditions. Therefore, the review that follows will address the use of specific drugs with the most frequently occurring psychiatric and behavioral conditions in persons with mental retardation.

Pharmacology and Behavior Problems

Self-injurious behavior is one of the most frequently occurring behavior problems in persons with severe or profound mental retardation. Approximately 10-20% of persons living in institutional settings evince SIB, and this behavior is positively correlated with other behavior problems such as stereotypy and aggression.

Various medication classes, including neuroleptics and atypical antipsychotics, selective serotonin reuptake inhibitors (SSRIs), antidepressants, beta-blockers, anxiolytics, and mood stabilizers have been frequently prescribed for treatment of self-injurious behavior. However, the majority of studies conducted with pharmacological treatment of SIB are so methodologically flawed that it is difficult to draw the inferences presented by the researchers (Cohen, Ihrig, Lott, & Kerrick, 1998; Davanzo, Belin, Widawski, & Bryan, 1998; Hammock, Schroeder, & Levine, 1995). Examples of the methodological shortcomings include lack of rigorous experimental design, lack of reliability data, and no measure of the medications effect on social skills or other collateral behaviors.

The only studies reviewed that met the following standards for methodological rigor (operationally defined target behaviors, reliable measures, measures of collateral behaviors, measures of side-effects) included the use of the beta blocker naltrexone (Revia) in the treatment of SIB (Benjamin, Seek, Tresise, Price, & Gagnon, 1995;

Buzan, Dubovsky, Treadway, & Thomas, 1995; Crews, Bonaventura, & Rowe, 1993; Garcia & Smith, 1999). The use of naltrexone had stemmed from research indicating that some cases of SIB may be caused by a pain induced release of endogenous opioids (which reinforces the pleasure centers in the brain) and the hypothesis that elevated opioid levels suppress pain (Sandman, Barron, & Colman, 1990). Based on this hypothesis, it seems logical that naltrexone would be a beneficial medication for persons whose SIB for the nonsocial reinforcement gained from the release of endogenous opioids. The literature in this area seems to support this hypothesis. Most of the studies reviewed indicated a significant decrease in SIB for a portion of the subject pool following a trial of naltrexone (Walters et al., 1990, Taylor et al., 1991). However, other studies indicated no change, or even an increase, in SIB following an a drug trial with naltrexone (Willemsen-Swinkels et al., 1995). Additionally, studies that found naltrexone ineffective also reported the presence of side-effects including increased agitation, acting out, nausea, vomiting, decreased appetite, and tiredness. This finding is not surprising, as the overall effectiveness of naltrexone with SIB is probably strongly correlated with behavioral function (Garcia & Smith, 1999). In all, it seems that naltrexone could be a viable medication for some individuals with SIB. However, this medication should be used only after a functional assessment is conducted and the data indicate the function is nonsocial, self-stimulation.

Aggression represents one of the most serious behavior problems for persons with mental retardation. It has been estimated that approximately 30-55% of persons in state institutions for the developmentally disabled display physical aggression, and the

behavior is a frequent reason persons lose community placements (Baumeister & Sevin, 1990). Aggression is the primary reason that individuals are admitted or readmitted to institutional settings and appears to be the primary reason why persons with mental retardation are placed on psychotropic/behavior control medications (Baumeister, Todd, & Sevin, 1993). Despite the large number of persons with mental retardation on medications for control of aggression, surprisingly little research has been conducted in this area in the past 10 years.

The bulk of the studies examining the effectiveness of medication on aggressive behavior utilized either traditional or atypical antipsychotics as the treatment drug (Hardan, Johnson, Johnson, & Hrecznyj, 1996; Horrigan & Barnhill, 1997; Horrigan, Barnhill, & Courvoisie, 1997; Kiernan, Reeves, & Alborz, 1995). However, result of these studies are much the same as those for SIB. The majority of the studies are open trials in which the antipsychotic agents are added to a pre-existing medication regime. While most of the studies did use some standardized method of collecting data, typically there were no reliability checks of the data and no information was given concerning the individual's collateral adaptive and social behaviors (Matson, Bamburg, Pinkston, Mayville, Kuhn, Bielecki, Smalls, & Logan, in press).

Besides these shortcomings, most of the studies failed to separate drug effects on aggression from effects of other aberrant behaviors such as SIB and hyperactivity. To the credit of several studies, they do contain information indicating that the use of the antipsychotic agent increased scores on side-effects measures and, in cases, caused conditions that severely impeded learning (Gross, Hull, Lytton, Hill, & Piersel, 1993;

Hanzel, Kalacknik, & Harder, 1992; Diaz, 1996; Carpenter, Cowart, McCallum, & Bell, 1990; Dent, 1995; Beale, Smith, & Webster, 1993; May, London, Zimmerman, & Thompson, 1995; Gedye, 1998). It is highly likely that these medications are suppressing aggression in persons with mental retardation, but the medications are also suppressing collateral behaviors, prosocial behaviors, learning, and causing other serious side-effects.

Based on the literature review from the past 10 years, there does not appear to be sound evidence that medications are effective in treating aggression in persons with developmental disabilities. However, aggression remains the most medicated problem behavior among individuals residing in institutional settings. Until such time as solid research indicating the efficacy of these treatments is conducted, professionals should not consider it consistent with current best practices to medicate individuals with aggression and should consider alternate ways of managing or treating this behavior (Beale, Smith, & Webster, 1993).

The studies reviewed that attempted to treat stereotypies, tics, and hyperactivity with psychotropic agents (antipsychotic medications, antidepressants, SSRIs) mostly yielded results that indicated reductions in the target behavior after the drug trial (Brasic & Barnett, 1997; Brasic, Barnett, Kaplan, Sheitman, Aisember, Lafargue, Kowalik, Clark, Tsaltas, & Young, 1994; Garber, McGonigle, Slomka, & Moteverde, 1992; Ghaziuddin, Tsai, & Ghaziuddin, 1992; Lewis, Bodfish, Powell, & Golden, 1995; Rosenquist, Bodfish, & Thompson, 1997; Scotti, Schulman, & Hojnacki, 1995; Singh, Landrum, Ellis, & Donatelli, 1993). This finding is consistent with research over the

past 15-20 years and is widely believed and accepted in the field of psychiatry (Aman & Singh, 1983). However, these studies, too, must be interpreted with extreme caution. First, researchers regularly added the psychotropic agent to an existing medication regime that was different for every subject. Therefore, it is very difficult to ascertain which drug or drugs actually affected rates of aberrant behavior. Additionally, no mention was made of collateral adaptive behaviors in the studies reviewed. Finally, significant side-effects were reported for a number of individuals in the studies including hypertension, sedation, and impaired operant learning. Irreversible side-effects appear to be an extremely high price to pay for decreasing the rate of stereotypic or hyperactive behavior, especially if the behavior does not interfere with the individual's adaptive training or mealtime skills.

As with the previously discussed areas, literature on treating hyperactivity, stereotypies, or tics with psychotropic medication is mixed at best. While it is possible that these conditions may respond effectively to psychotropic medication, more research is needed in each area to ensure that use of the medication brings about suppression of aberrant behaviors, improvement in adaptive behavior, and no serious side-effects (Matson et al., in press).

Pharmacology and Psychiatric Illness

A considerable amount of research has been conducted on the use of psychoactive agents in the treatment of the autistic spectrum of disorders. A large number of studies in this area have utilized traditional or atypical neuroleptics for treatment behavioral excesses associated with the autistic spectrum (e.g., Rubin, 1997;

Purdon, Lit, Lbelle, & Jones, 1994; Potenza, Holmes, Kanes, & McDougale, 1999; Nicholson, Awad, & Sloman, 1998; McDougale, Holmes, Carlson, Pelton, Cohen, & Price, 1998; McDougale, Holmes, Bronson, Anderson, Volkmar, Price, & Cohen; Horrigan & Barnhill, 1997; Gordon, Rapoport, Hamburger, State, & Mannheim, 1992) . All but one study reviewed reported significant improvement after use of the antipsychotic agent. The final study, however, indicated that the individual presented with a clinical picture similar to akithesia after the trial with medication. The medications included in the studies were being used to treat a wide range of behavioral disturbances including SIB, aggression, hyperactivity, agitation, and trichotillomania. As a result, these studies are only different from those mentioned previously in that the individuals included happened to have a diagnosis of autism or pervasive developmental disorder. Therefore, best practices dictate that the behavioral disturbances associated with autism are better treated with adaptive skills training and other behavioral methods versus antipsychotic medications (Matson et al., in press).

Three studies with autistic individuals utilized SSRIs (2) and tricyclic antidepressants(1) as treatment (Brasic, Barnett, Kaplan, Sheitman, Aisemberg, Lafargue, Kowalik, Clark, Tsaltas, & Young, 1994; Cook, Rowlett, Jaselskis, & Levanthal, 1992; Ghaziuddin, Tsai, & Ghaziuddin, 1991). Both studies utilizing SSRIs were open trial studies where the new medication was added to a number of pre-existing medication regimes and behavioral interventions. Although both studies indicated improvements in overall global clinical impression ratings, it is difficult to know which behaviors (adaptive or aberrant) were specifically affected and which

medication(s) brought about the effect. Further, both studies indicated moderate to marked side-effects resulting from the medication regimes. The study using the tricyclic antidepressant with autistic individuals indicated improvements in anger management, repetitive behavior, and compulsive behaviors when compared to another antidepressant and placebo groups. However, this study did not include reliability or follow-up data and reported sleep disturbance, constipation, and mild tremors as side effects. As a whole, the studies do not provide solid evidence of the effectiveness of medication for treating autistic symptoms. There are a number of treatments that have been proven effective in treating the autistic spectrum of disorders. However, the majority of these treatment studies are behavioral in nature. Until such time as sound research is presented to indicate the overall effectiveness of medications for persons functioning in the autistic spectrum, the practice of medicating these individuals should be avoided and treatments should be behavioral in nature and based in the science of functional analysis (Matson et al., in press)

Five studies using traditional and atypical antipsychotic agents for the treatment of psychosis in persons with mental retardation were evaluated for this review (Suzuki, Knba, Nibuya, & Shintani, 1992; Myers & Pueschel, 1994; Diaz, 1996; Sperner, Czeipek, Gaggi, Geissler, Speil, & Fleischhacker, 1998) . While these studies did not meet every methodological criteria set forth as best practices in treatment research (lack of collateral behaviors, lack of side-effects measures), most included a large number of the variables and at least utilized a medication that was consistent with the Axis I diagnoses. In 4 of the 5 studies, the neuroleptic agent was used effectively to treat the

positive symptoms (hallucinations, delusions, psychomotor agitation) of the disorder. The final study, which attempted to treat psychotic speech and aggression with a traditional neuroleptic, yielded significantly different results. In this study behavioral treatments were superior to medication in reducing target behaviors.

Overall, antipsychotic agents were effective in reducing positive symptoms specific to the psychiatric condition. While some drug companies have hypothesized that atypical antipsychotics (Risperdal; Zyprexa; etc.) can effect negative symptoms of psychoses, there are no data indicating these effects in persons with developmental disabilities. As the literature base expands to include studies in this area, the treatment of psychosis in persons with developmental disabilities will continue to improve.

Studies examining the effectiveness of psychotropic medications with unipolar and bipolar depression yielded findings consistent with those evaluating drug treatment of psychoses. The studies with unipolar depression yielded significant decreases in symptomology in response to both SSRI and heterocyclic medications (Langee & Conlon, 1992; Ghaziuddin, Tsai, & Ghaziuddin, 1992). While this finding is consistent with literature in the general population, these studies did not generally include a sound research design, good data collection systems, reliability, or follow-up data. Further, the one study utilizing SSRIs found that the medication was not effective in lessening compulsive rituals or stereotypies and reported side-effects including agitation and nervousness. The one study examined looking at treatment of bipolar depression indicated that depakote, a mood stabilizer, was effective in lessening symptoms associated with mania (lack of sleep; pacing) and effectively reduced the frequency and

severity of SIB (Ruedrich, Swales, Fossaceca, Toliver, & Rutkowski, 1999). However, the study was an open trial, the medication was manipulated with medications from 4 other classes, and reliability and side effects data were not assessed.

These issues immediately call to questions the clinical usefulness or validity of the presented findings on medication effectiveness. While the beginnings of research in this area are promising, further work is needed before we can establish which medications safely treat symptoms specific to unipolar and bipolar depression (Matson et al, in press).

Three studies of the effects of psychotropic medication on obsessive-compulsive symptoms were reviewed (Barak, Ring, Levy, Granek, Szor, & Elizur, 1995; Bodfish & Madison, 1993; Howland, 1996). It is important to note that some of these diagnoses could be called to question. The core features of OCD include obsessive, complex thoughts that lead to repetitive patterns of behavior. Many individuals with mental retardation (especially those who are lower functioning) lack the cognitive faculties to perform compulsive rituals in response to ongoing, obsessive patterns of thought. In individuals with mental retardation, it is often the case that diagnoses in the autistic spectrum or stereotypic movement disorder is the correct diagnosis instead of OCD (although the clinical picture can look similar). Nonetheless, two of the studies examined utilized SSRI medications to treat symptoms of OCD (Bodfish & Madison, 1993; Barak et al., 1995). Both studies, which were open trials, reported statistically significant differences for individuals after the medication was introduced. However, these findings represent a good start for research in this area and could be important for

individuals in which OCD is a correct diagnosis. The final study examined the effects of the traditional antipsychotic thiorazine on obsessive compulsive behaviors (Howland, 1996). This study indicated that thiorazine was associated with novel symptoms of the disorder, but no clear treatment effects were reported. Given the overuse of antipsychotics for persons with mental retardation, it appears to be advisable to use these drugs in a very conservative manner (Matson et al., in press).

Few studies have been conducted examining the effectiveness of psychotropic agents on decreasing problematic feeding disorders in persons with mental retardation. Only two studies were found in current research in this area. The first study utilized an SSRI and an opioid blocker to manage the behavioral repertoire of one child with Prader-Willi syndrome (Benjamin & Bout-Smith, 1993). These medications were added to imipramine for the study. The combination of medications resulted in improvements in social interaction, decreased self-mutilation, improved weight control, and continued academic progress in school. At follow-up, the child's weight remained stable, his wounds remained completely healed, and hyperphagia, self-mutilation, and oppositional behavior were all "well controlled". While this study could have benefitted from a sounder design (controlled vs. open label), more objective measures, and measures of side-effects, further research in this area could be beneficial in establishing medication regimes that are successful for individuals with this disorder. The second study, which was methodologically sounder, introduced the traditional neuroleptic mellaril with methylphenidate to assess medication effects on pica (Singh, Ellis, Crews, & Singh, 1995). Individuals in the study displayed lower rates of pica

during placebo phases versus the drug phase. This pattern held true at follow-up. In conclusion, the scientific literature does not support the use of antipsychotic agents in treating pica (Matson et al., in press).

Side Effects

Studies that comprehensively examine side-effects and the part that various psychotropic agents play in their development, exacerbation, and dissipation are rare in the scientific literature. Each study located contained individuals on a minimum of one antipsychotic agent in addition to a myriad of other medications (Brasic et al, 1994; Dent, 1995; Gross et al, 1993). Although these studies, too, had flaws in their designs, the results were consistent for each study. Reductions in the medication regimes (namely the antipsychotic agents) brought about decreases in measured side-effects (akathisia, dyskinesia, and tics) concomitant with decreasing serum blood levels of the drugs. Additionally, results from these studies indicated that neuroleptic agents seemed positively correlated with akathisia and that individuals with a predisposition for catatonia seemed to be at an increased risk for life-threatening conditions such as neuroleptic malignant syndrome. These studies may suggest that use of antipsychotic agents, even for appropriate reasons, can be dangerous and should be monitored closely to establish safety and efficacy. Conversely, use of antipsychotic agents for inappropriate purposes (e.g., treatment of SIB, stereotypies, aggression, autism) is unwarranted, dangerous, and cannot be considered sound practice (Matson et al., in press).

Overview

Intervention with psychotropic medication is, by far, the most commonly selected treatment in clinical practice, both in the community and in institutions for persons with comorbid mental retardation and behavioral or psychiatric disturbances (Baumeister & Sevin, 1990). Despite the conclusions from the above review, professionals continue to medicate individuals under their care despite a lack of a sound research base to support their treatment decisions. While a small amount of research does exist, it is difficult to interpret due to a lack of methodology and scientific rigor. The studies reviewed routinely lack appropriate experimental control, and lack reliable measures of drug effect, collateral behaviors, and side-effects. Methodological controls are far short of psychological treatment in the field with little improvement over previous decades (Baumeister & Sevin, 1990; Baumeister, Todd, & Sevin, 1993).

It is the belief of a large number of professionals that treatment decisions with any intervention, behavioral or psychotropic, should be based in science and shown effective in methodologically sound research. It could be that particular medications are effective in treating any number of behavioral and psychiatric conditions for persons with mental retardation. However, this is an empirical question to be answered using valid scientific research. Until this research is completed and demonstrates the effectiveness of medication in lessening aberrant conditions while improving adaptive behaviors, it cannot be considered good practice to experiment with various medications to treat behavior problems or mental health conditions.

There are clearly those cases in which medication is not only appropriate but necessary. These cases include individuals with a clear psychiatric condition for which certain medications are consistent with the condition and specific to symptoms of the underlying condition. This notion holds true for persons diagnosed with a large number of conditions including psychosis, anxiety disorders, depressive disorders and others. However, the most widely medicated conditions for persons with mental retardation, aggression and SIB, do not specifically respond to psychoactive agents. These cases are clearly problematic from a research and treatment standpoint, as the effect of the psychoactive agent appears to be overall suppression of the behavioral repertoire.

The past 30 years has seen the federal government take an interest in the use of psychotropic medications in persons with mental retardation. While experts readily accept that there are cases in which medication is clearly indicated, they also require that individuals on psychoactive medications have research to support their use, appropriate diagnoses, appropriate methods for tracking medication effectiveness, and regular assessments of medication side-effects. It is the belief of experts for the federal government that having all of these systems in place and making medication decisions from reliable data and the scientific literature often results in only 10-20% of individuals with mental retardation being medicated with psychotropics (Matson et al., in press). However, very few agencies across the United States use adequate research background for treatment decisions or operate according to best practices.

Rationale for the Study

Persons with mental retardation exhibit the full range of psychopathology found in populations without developmental disabilities and do so with higher prevalence rates (Borthwick-Duffy, 1994). Additionally, persons in this population often exhibit behavioral excesses or deficits that are dangerous to themselves, caretakers, or other clients in their proximity. As a result, treatment of these conditions has long been the job of mental health professionals working in the field. Treatments have generally been taken from one of two genres; behavioral or pharmacological. Behavioral treatments have been well documented as effective in the research literature dating as far back as the late 1950s. The same, however, cannot be said for pharmacological treatments. Despite the recurrent themes in treatment literature and mental retardation, pharmacological treatments are far more frequent than traditional therapy or behavioral protocols.

The research that exists concerning the deleterious effects of psychotropic medications on social and adaptive functioning is also lacking (Matson et al., in press). However, some findings do indicate the importance of monitoring the effects of these medications on adaptive functioning. For example, it is known that the traditional antipsychotic medications (thorazine, haldol) have sedating effects and, in the long term, can alter central nervous system functioning and neurotransmitter release, receptor sites, and reuptake. Alteration of central nervous system functioning often leads to long-term side effect conditions such as tardive and other dyskinesias, which can inhibit learning. These short and long term changes can certainly impact the

manner in which an individual engages in social and adaptive activities, as an individual who is disengaged, or in perpetual, disturbing motion, is less likely to display a wide array of socially appropriate skills than a peer without these conditions (Singh et al., 1993).

Much of the same is true for the newer atypical antipsychotics (risperdal, zyprexa), medications created to affect positive and negative symptoms of psychoses while having cleaner side-effect profiles. These medications have similar sedating effects as the traditional antipsychotics, may alter learning, and, with long term use, can alter functioning of the central nervous system to the point of enduring side-effects (Sperner et al., 1998). However, these medications are said to cause fewer long-term side effects and have properties similar to the selective serotonin reuptake inhibitors, which should cause an individual to be less withdrawn, have a more appropriate affect, and be more socially appropriate and engaging (Rubin, 1997). Perhaps individuals receiving atypical antipsychotics would have a larger social repertoire than those receiving traditional neuroleptic medications (Purdon et al., 1994). However, this latter point has been presented primarily by the drug companies who manufacture the medications, and has yet to be demonstrated in research (Matson et al., in press).

The anti-epileptic drugs (AEDs; depakote; tegretol) can also alter the manner in which an individual learns and functions socially and adaptively, although medications in this class less frequently alter these social and adaptive skills than the more potent antipsychotic class (Ruedrich et al., 1999). The AEDs have sedating effects that are dose dependent and can adversely alter social and adaptive skills (Ruedrich et al.,

1999), especially when used at levels sufficient to obtain anticonvulsant effects.

However, most persons receiving this class of medication are taking smaller doses for behavior control and do not suffer from the sedating effects. These medications can also have a large number of gastrointestinal, cardiovascular, hematologic, and genitourinary effects (Matson et al., in press). The result of any one or combination of these defects can be poor physical health which can directly inhibit an individual's social and adaptive functioning. Finally, long term use of these medications can cause behavior altering side-effects. While these side-effects are different from the movement disorders and dyskinesias often associated with neuroleptic medications, agitation and aggression are often associated with long-term AED use. As expected, individuals who are often agitated or aggressive towards peers, family, or care-givers will exhibit less measured social and adaptive skills (McCord et al., 1994).

The use of multiple medication classes for treatment of one individual is also readily seen in persons with mental retardation. While medication regimes vary, the most popular interclass polypharmacy tends to involve the use of a typical or atypical antipsychotic medication in conjunction with another medication for behavior control. It makes sense that persons receiving polypharmacy of this type may experience multiple short and long-term side effect profiles and sedation effects as seen singly in persons receiving only one medication. However, the exact manner in which these medication interact and the resulting social and adaptive skills profiles are unknown and have yet to be examined closely in research.

There is currently a paucity of research evaluating the use of psychotropic medications with persons with mental retardation which has, in turn led to the vast overuse of medication in the population. These findings are probably due to a number of factors. First, psychotropic medications are the product of drug companies and their use is supported by a large and powerful industry. Research that opposes the efficacy of a particular medication or reports the medication's deleterious effects often is not published or, if published, is not widely read by treating professionals (Baumeister, Todd, & Seven, 1993). Second, the use of the medical model of treatment is still widespread for persons with mental retardation. In this model, most problems are referred to a physician with the expectation that a prescription "pill" will alleviate the problem. While this method of treatment is effective with some medical or psychiatric conditions, it is certainly not set in stone for all behavior problems or symptoms. The end result is overuse or misuse of medication. Third, a shift in attitude concerning treatment of debilitating conditions has occurred in the past years. Behavioral treatments are often viewed by certain national advocacy groups as inhumane; therefore, any research pertaining to behavioral techniques is held to a higher degree of scientific rigor and then, many times, not accepted as efficacious (Singh et al., 1993). Drug treatments, on the other hand, involve only giving a pill and are viewed as more humane and "normalized" (Wolfensberger, 1970). The result of this viewpoint is that drug research is held to a lower standard because drug treatments are a more desirable treatment option (Matson et al., in press). Finally, the Food and Drug Administration (FDA) harbors a group of medications known as "orphan" drugs;

that is, drugs that are for the treatment of conditions that are specific or prevalent to a small group or population. Due to a lower demand for these medications, industry does not allot the funds necessary for proper evaluation of their effects. Although persons with mental retardation receive far more attention than they did 30-50 years ago, they are still somewhat of an “orphan” group due to the low prevalence of the condition. As a result, the funding that is necessary for proper evaluation of drug effects in the population is difficult to acquire. Therefore, the amount and quality of research in the area is greatly diminished.

Consequently, even the better studies evaluating psychoactive agents for persons with mental retardation often fail to incorporate necessary items such as measures of collateral social or adaptive behaviors and systematic measures of medication side effects. This study represents an attempt to identify relationships between the use of certain psychotropic medications and resulting social skills excesses or deficits. While a few studies do include measures of collateral behaviors as an aside from the larger picture of medication efficacy, this study is novel in that the focus is the differences in social skills and social skills profiles that remain for individuals with mental retardation who receive a number of different psychotropic medications.

This research hoped to add to the scientific literature by linking particular classes of medications to social skills excesses or deficits in persons with mental retardation. While this link seems sensible, very little research has depicted this link and practitioners continue to ignore the relationship when assessing, diagnosing, and medicating persons with developmental disabilities. This research is important for a

number of reasons. First, it is hoped that identifying the adverse effects on social skills caused by inappropriate use of psychotropic medication will alert clinicians to this danger and cause them to seek different treatment options. Next, the identification of such profiles should change the methods of assessment used by clinicians in this population. That is, clinicians will, perhaps, begin to pay more attention to the assessment of collateral behaviors and side effects in persons with mental retardation and stop focusing solely on the suppression of maladaptive behaviors. Finally, it is hoped that the findings of this research will stimulate further investigation into the effects of psychotropic medications in persons with developmental disabilities.

Individuals in this study were classified according to psychotropic medication regimes that each had received for over three years. The groups were as follows: 1) typical antipsychotics; 2) atypical antipsychotics; 3) mood stabilizing anti-epileptics (AEDs); 4) multiple medications (traditional or atypical antipsychotic and another medication for behavior control); and 5) controls not receiving medication. Once groups were established, pertinent analyses were conducted on social skills, adaptive skills, and the presence of tardive dyskinesia.

Methods

Participants

From an initial subject pool of 858 persons, one hundred participants who reside in developmental centers in Louisiana were used in the study. All participants were classified as functioning in profound range of mental retardation to control for different levels of social and adaptive skills across classes of mental retardation. Participants were chosen and grouped based on the type of psychotropic medication that they received. Five groups of 20 subjects were extracted from the subject pool. The groups were as follows: 1) persons receiving only a traditional antipsychotic medication (e.g., haldol, mellaril); 2) persons receiving only an atypical antipsychotic medication (e.g., risperdal, zyprexa); 3) persons receiving only a mood stabilizing medication (e.g., depakote, tegretol); 4) persons on multiple medications (antipsychotic medication and a medication for behavior control); and 5) controls receiving no medication. Subjects were matched on demographic characteristics and behavior problems to equate group means in these areas. While medication history was an important variable in this equation, subjects were not matched on this variable due to difficulty in obtaining accurate histories. However, to help account for this variable, all subjects included in the medication groups had at least a three year history of psychotropic medication use with the current medication regime.

Measures

Matson Evaluation of Social Skills in Persons with Severe Retardation

(MESSIER): The MESSIER is an 85-item questionnaire designed to assess social

strengths and weaknesses in people with severe and profound mental retardation (Matson, 1995). The MESSIER items are grouped into six clinically derived subscales: positive verbal, positive nonverbal, positive general, negative verbal, negative nonverbal, and general negative. Each item is rated on frequency using a 4-point Likert scale: (0) never occurs, (1) rarely occurs, (2) sometimes occurs, and (3) often occurs. Endorsed items are transcribed onto a scoring profile under their respective subscales. This allows the clinician to examine scoring patterns across subscales. The MESSIER is completed for all clients in the developmental centers as part of a larger functional assessment package.

Vineland Adaptive Behavior Scales (VABS): The VABS, a measure of adaptive skills that consists of 4 domains, 11 subdomains, an adaptive behavior composite, and a maladaptive behavior domain was used as a measure of adaptive skills in the study. The questions are general questions about social skills and maladaptive behaviors and are listed in the order they should be developmentally achieved. Each item on the VABS can receive a score of 2 (yes, usually), 1 (sometimes or partially), 0 (no, never), N (no opportunity), or DK (don't know). Reliability coefficients for internal consistency, interrater, and test-retest estimates are high for the scale, averaging in the .80s and .90s. Measures of construct validity have consistently resulted in coefficients above .70 (Sparrow, Balla, & Cicchetti, 1984).

Dyskinesia Identification System Condensed User Scale (DISCUS): The DISCUS, a standardized measure of tardive dyskinesia in persons with mental retardation, was used to measure medication side-effects. The DISCUS is a 15 item

rating scale designed to identify dyskinetic movements in 7 areas of the body: the face, eyes, oral (jaw, lip), lingual (tongue), head, upper limbs, and lower limbs. Each item is a symptom (e.g., blinking, tongue tremor, pill rolling) that is rated on a five point severity scale, with a score of zero indicating the symptom is not present and a score of four indicating the symptom is severe. Rankings of 1 through 3 reflect severities of minimal, mild, and moderate, respectively. A total score of 5 or greater indicates either probable or persistent tardive dyskinesia, depending on the previous DISCUS score. Normative data for persons with mental retardation is available for this scale, and the DISCUS has also proven reliable and valid with the population (Sprague & Kalachnik, 1991).

Procedure

Direct care staff who had worked with the clients in question for at least six months were used as informants for the administration of the MESSIER and the VABS. Master's level staff psychologists and graduate students in psychology administered the measures to direct care staff as part of a functional assessment battery that is completed yearly. Each examiner received training sessions on the administration and scoring of the MESSIER and the VABS. Administration of the measures required approximately 50 minutes of interview.

The DISCUS was administered by one of four trained raters, all of whom were graduate students in a Ph.D. clinical psychology training program and had been employed at the developmental center for at least one year. Participants were evaluated with the DISCUS as part of a routine quarterly examination for psychotropic

medication side-effects. Evaluations were conducted in a quiet setting at the participant's home or training facility. Administration and scoring time averaged 10 minutes per client.

Demographic information, MESSIER item scores, subscale scores, total score, VABS domain and subdomain scores, and total DISCUS score were entered into a facility wide data base upon completion of the administration and scoring. This data base consisted of a large amount of client information including case number, scores from each scale of the administered functional assessment package, medication regimes and recent changes, and information concerning the client's treatment plan. It is from this data base that the subjects for the study, and their relevant information, were selected. Once subjects were yoked and assigned to groups, all pertinent variables were copied and placed into a computerized statistics package for analysis. Two measures of social and adaptive skills were obtained for each subject in the study. The first measure, Time 1, included measures of social and adaptive skills obtained from a standard psychological assessment conducted in 1997 (three years ago). The second measure, Time 2, included measures of social and adaptive skills obtained from psychological assessments completed in 2000. Obtaining two measures of social and adaptive skills for each individual allowed for a more comprehensive, longitudinal evaluation of drug effects on social and adaptive behavior. Once all pertinent information was collected, the following manipulation checks and hypotheses were generated and the resulting analyses conducted.

Manipulation Checks/Hypotheses

Manipulation Check I

1. It was hypothesized that statistical analyses for demographic variables between the five included groups will not be significantly different. To evaluate the first manipulation check, a MANOVA was conducted that included demographic variables (sex, age, race of participants) to evaluate any differences in these areas. A significant MANOVA resulted in follow-up ANOVAs and post-hoc tests to delineate differences.

Manipulation Check II

2. It was hypothesized that social skills scores and adaptive skills scores would not be differentiated by demographic variables (age, race, sex,). In order to evaluate manipulation check 2, demographic variables were analyzed in relation to MESSIER subscale and VABS subdomain scores using a Multivariate Analysis of Variance (MANOVA). A significant MANOVA resulted in follow-up ANOVAs and post-hoc tests to delineate differences.

Hypothesis I

1. It was hypothesized that social and adaptive skills deficits would be differentiated by the medication class an individual receives. That is, persons receiving multiple medications or typical antipsychotics had lower measured social and adaptive skills than those on other medications (atypical antipsychotics, AEDs) or controls. To begin analyzing hypothesis 1, data from the MESSIER and VABS were analyzed by MANCOVA, in relation to group

membership, to establish if differences in social and adaptive skills existed for persons on no or different classes of medication. To gain further statistical control, the Time 1 measure of social and adaptive skills was used as a covariate and the more recent, Time 2 measure of these skills was the variable of interest.

Hypothesis II

2. It was predicted that persons on antipsychotic medications (typical or atypical) or multiple medications would have a higher degree of measured side effects than those on AEDs or experimental controls. While it has been stated that atypical antipsychotics have cleaner side-effects profiles than typical antipsychotics, most individuals receiving atypical antipsychotics have received years of therapy with traditional antipsychotics before receiving the new medications. In order to better control for the length of time on antipsychotic medication variable, the age range was restricted to 25-55 years. An ANOVA was conducted with group membership as the independent variable and total DISCUS score as the dependent variable to establish if differences in measured side-effects existed across the medication classes. A significant ANOVA was followed with post-hoc tests to delineate significant differences.

Hypothesis III

3. Finally, ecological validity of the study would be established by demonstrating that extended use of particular classes of medication (traditional antipsychotics; atypical antipsychotics) led to decreases in social and adaptive skills. To examine hypothesis 3, a repeated measures MANOVA was conducted with

group membership as the independent variable and the two measures of social and adaptive skills (Time 1 from 1997; Time 2 from 2000) as the dependent variables. A significant MANOVA resulted in follow-up, within subjects ANOVAs and post-hoc tests to further delineate significant differences.

Results

Demographic variables were analyzed to evaluate possible differences between groups with regard to age, race, gender, deafness, blindness, and ambulation vs. non-ambulation. A Multivariate Analysis of Variance with group membership as the independent variable and demographics as the dependent measures failed to yield significant effects (Wilks' Lambda $F(7, 89) = .474, p = .990$). These findings were expected given the matching process utilized in group formulation. No secondary analyses were warranted. Means and percentages for demographic variables are reported in Table 1.

Table 1
Means/percentages for demographic variables by group membership

	<u>Group1</u>	<u>Group2</u>	<u>Group3</u>	<u>Group4</u>	<u>Group5</u>
Age	<u>M</u> = 44.8 <u>sd</u> = 13.9	<u>M</u> = 51.2 <u>sd</u> = 14.6	<u>M</u> = 50.8 <u>sd</u> = 18.1	<u>M</u> = 48.7 <u>sd</u> = 16.1	<u>M</u> = 49 <u>sd</u> = 1.5
Race					
White	70%	70%	65%	65%	70%
Black	30%	30%	35%	35%	30%
Gender					
Male	65%	65%	65%	65%	65%
Female	35%	35%	35%	35%	35%
Deaf					
Yes	0%	5%	0%	5%	0%
No	100%	95%	100%	95%	100%
Blind					
Yes	0%	0%	0%	0%	5%
No	100%	100%	100%	100%	95%
Ambulatory					
Yes	85%	80%	85%	95%	85%
No	15%	20%	15%	5%	15%

Demographic variables were also analyzed in relation to positive subscale scores on the MESSIER (positive verbal, positive nonverbal, general positive) and the behavioral subdomains of the Vineland Adaptive Behavior Scales (communication, daily living, socialization). A multivariate analyses of variance with demographic variables as the independent variables and the social and adaptive scores as the dependent variables was utilized for the analyses. No statistically significant differences emerged on MESSIER subscale scores or VABS subdomains as a function of age, race, gender, deafness, blindness, or ambulation. Results appear in Table 2.

Table 2
Means for MESSIER subscales and VABS subdomains as a function of demographic variables.

	<u>MESSIER Positive Verbal</u>	<u>MESSIER Positive Nonverbal</u>	<u>MESSIER General Positive</u>
Age			
Young (27-39)	15.9	12.7	19.6
Middle (40-52)	16.2	12.9	19.9
Elder (53-65)	15.5	12.2	20.1
Race			
White	21.7	31.1	44.7
African-American	18.9	27.4	39.8
Gender			
Male	17.3	29.4	41.7
Female	16.1	30.8	42.9
Deaf			
Yes	12.9	26.1	36.8
No	14.4	28.7	41.3
Blind			
Yes	12.7	27.1	38.9
No	14.4	29.9	42.3
Ambulatory			
Yes	17.2	30.3	42.3
No	16.1	27.6	40.4

Table 2 (continued)

	VABS <u>Communication</u>	VABS <u>Daily Living</u>	VABS <u>Socialization</u>
Age			
Young	24.9	29.3	45.4
Middle	25.5	31.1	46.5
Elder	24.3	28.9	44.1
Race			
White	46.5	65.9	48.9
African-American	41.6	59.4	45.4
Gender			
Male	41.5	59.1	44.8
Female	40.1	63.6	47.6
Deaf			
Yes	34.6	59.0	46.2
No	40.6	60.3	45.4
Blind			
Yes	38.6	44.4	41.0
No	41.7	51.4	44.8
Ambulatory			
Yes	41.9	62.6	46.2
No	36.1	55.9	40.8

Next, data from the MESSIER subscales and VABS subdomains were analyzed by use of MANCOVA. Two observations were obtained for each social and adaptive category; the Time 1 measure was obtained from psychological testing conducted in 1997 and Time 2 measure from data collected during yearly assessment from 2000. Group membership in each of the five drug classes served as the independent variables in this analyses, and the Time 2 measures of social and adaptive skills were the dependent measures. The Time 1 measures of social and adaptive skills were utilized as covariates in the analyses to obtain a greater degree of experimental control. The multivariate analyses yielded significant results, (Wilks' Lambda $F(6, 90) = 6.29$,

$p < .001$), indicating significant differences in measured social and adaptive skills between drug classifications.

ANOVAs with Tukey post-hoc tests were then conducted to identify specific patterns of significant relationships between groups on measured social and adaptive skills. Analyses indicated significant results between groups on the positive verbal subscale ($F(4, 95) = 6.6, p < .001$), positive nonverbal subscale ($F(4, 95) = 11.5, p < .001$), general positive subscale ($F(4, 95) = 19.2, p < .001$), communication subdomain ($F(4, 95) = 4.6, p = .002$), daily living skills subdomain ($F(4, 95) = 3.6, p = .009$), and the socialization subdomain ($F(4, 95) = 13.7, p < .001$). Means for social and adaptive measures by group membership are found in Table 3.

Summarizing post-hoc tests, persons receiving traditional antipsychotic medications, atypical antipsychotic medications, and drug regimes including an antipsychotic medication and a mood stabilizer demonstrated fewer measured social and adaptive skills than persons on anti-epileptic medications or experimental controls. Additionally, persons receiving anti-epileptic medications demonstrated less measured positive nonverbal skills, general positive skills, and socialization subdomain skills than experimental controls. Overall, these findings indicate that medication regimes have a significant impact on social and adaptive behaviors.

Table 3**Means for social and adaptive measures by group membership**

	MESSIER PositiveVerbal	MESSIER PositiveNonverbal	MESSIER GeneralPositive
Group 1			
Antipsychotics	7.1 ^{a,b}	23.7 ^{a,b}	32.4 ^a
Group 2			
Atypicals	14.3 ^{c,d}	26 ^c	32.5 ^b
Group 3			
Anti-epileptics	25.9 ^{a,c,e}	31.5 ^{a,d,e}	41.7 ^c
Group 4			
Multiple meds	12.5 ^{e,f}	24.6 ^{d,f}	36.4 ^d
Group 5			
Controls	25.3 ^{b,d,f}	43.1 ^{b,c,e,f}	67.3 ^{a,b,c,d}
	VABS Communication	VABS Daily Living	VABS Socialization
Group 1			
Antipsychotics	25.8 ^{a,b,c}	44.9 ^{a,b,c}	28.5 ^{a,b,c}
Group 2			
Atypicals	41.2 ^{a,d}	51.8 ^d	35.8 ^d
Group 3			
Anti-epileptics	48.2 ^{b,c}	62.5 ^a	45.6 ^{a,c}
Group 4			
Multiple meds	35.9 ^f	68.1 ^b	44.5 ^{b,f}
Group 5			
Controls	54.8 ^{c,d,e,f}	74 ^{c,d}	73 ^{c,d,e,f}

****Same letter superscripts indicate differences significant at $p < .05$ ****

To analyze the next hypothesis, DISCUS scores for the five groups were analyzed through use of an ANOVA. With group membership as the independent variable and DISCUS score as the dependent variable, the analysis yielded significant results ($F(4, 95) = 22.5, p < .001$). Post-hoc tests indicated that individuals receiving traditional antipsychotic medication differed significantly from all other groups with higher DISCUS scores, while those receiving atypical antipsychotics scored higher than only controls who received no psychotropic medication. Similarly, persons receiving

multiple medications had significantly higher DISCUS scores than persons receiving anti-epileptic medications and experimental controls. Results are reported in Table 4.

Table 4
Means for DISCUS scores by group membership

	<u>DISCUS SCORE</u>
Group 1	
Traditional antipsychotics	6.2 ^{a,b,c,d}
Group 2	
Atypical antipsychotics	2.0 ^{a,c}
Group 3	
Anti-epileptics	1.4 ^{b,f}
Group 4	
Multiple medications	3.4 ^{c,f,g}
Group 5	
Experimental controls	0.0 ^{d,e,g}

****Same letter superscripts indicate differences significant at $p < .05$ ****

The final hypothesis and group of analyses sought to investigate differences in measured social and adaptive skills, over time, as a function of membership in each drug group. A repeated measures MANOVA with group membership as the independent variable was used to investigate the hypothesis. The dependent variables were comprised of two levels each of the positive subscales from the MESSIER and adaptive subdomains of the VABS. The Time 1 measures of social and adaptive behavior were obtained from psychological testing conducted in 1997 and Time 2 measures from data collected during yearly assessment from 2000. Means for each level of social and adaptive behavior, by group membership, are reported in Table 5.

The multivariate portion of the analysis yielded significant differences between levels (Time1; Time2) on measured social and adaptive skills (Wilks' Lambda $F(4, 20) = 2.71, p < .001$). Next, repeated measures analyses with Tukey post-hoc tests were

conducted to establish which groups contained significant differences and the variables where the differences occurred. The repeated measures ANOVA, with sphericity assumed, yielded significant within-subjects effects, ($F\{5, 20\} = 3.13, p < .001$). Post-hoc tests indicated significantly less social and adaptive skills at Time 2 (psychological assessment from 2000) for individuals receiving traditional antipsychotic medications, atypical antipsychotic medications, and multiple medications (antipsychotic medication and a mood stabilizer). Interestingly, scores for individuals receiving anti-epileptic medications and experimental controls remained mostly stable over the same period of time.

Table 5
Means for Time 1 and Time 2 measures of social and adaptive skills

	MESSIER PosVer (Time 1)	MESSIER PosVer (Time 2)	MESSIER PosNon (Time 1)	MESSIER PosNon (Time 2)
Group 1*	10.9	7.1	29.1	23.7
Group 2*	18.3	14.1	32.5	26
Group 3	25.6	25.9	31.4	32
Group 4*	15.8	12.4	29.5	24.6
Group 5	25.2	25.3	41.3	43.1
	MESSIER GenPos (Time 1)	MESSIER GenPos (Time 2)	VABS Comm (Time 1)	VABS Comm (Time 2)
Group 1*	42.9	32.3	31.5	25.7
Group 2*	39	32.5	45.8	41.1
Group 3	41.8	41.6	47.9	48.2
Group 4*	42.1	36.3	39.6	35.8
Group 5	67.2	67.4	54.5	54.8

Table 5 (continued)

	VABS Daily (Time1)	VABS Daily (Time 2)	VABS Social (Time 1)	VABS Social (Time 2)
Group 1*	48.8	44.9	32.2	28.5
Group 2*	56	51.7	39.1	35.7
Group 3	62.5	62.4	46.2	45.6
Group 4*	71	68	47.8	44.1
Group 5	74.3	74	73.8	73

(*) indicates significant differences at $p < .05$ between Time 1 and Time 2 for each variable pair.

MESSIER PosVer = Positive Verbal Subscale; MESSIER PosNon = Positive Nonverbal Subscale; MESSIER GenPos= General Positive Subscale; VABS Comm=Communication Domain; VABS Daily = Daily Living Skills Domain; VABS Social = Socialization Domain

Discussion

A relationship appears to exist between medication regimes and social and adaptive skills in persons with profound mental retardation. Additionally, persons in this sample experienced a decrease in social and adaptive behavior as a function of time and medication regime. Finally, individuals in this sample were differentiated on measures tardive dyskinesia as a function of particular medication classifications. Individuals receiving medication regimes consisting of traditional or atypical antipsychotic medications had consistently less social and adaptive skills than those receiving other medications or experimental controls. The same groups also experienced decreases in social and adaptive behavior after receiving particular medications a minimum of three years. Lastly, individuals in the sample who received traditional antipsychotic medications had significantly higher scores of measured side-effects than other medication classes or experimental controls. Demographic variables did not reveal differential response on MESSIER or VABS subscales based on age, race, gender, deafness, blindness, or ambulation. Findings are discussed in greater detail below.

The first manipulation check stated that there would be no statistically significant differences between demographic variables for the five groups. Given the stringent matching techniques utilized in comprising this sample, it was no surprise that no differences were found with regard to groups or skill level as a function of demographic variables.

The second manipulation check stated that social and adaptive skills scores would not be differentiated by demographic variables. No significant differences were found in these analyses. It was surprising that the variable related to age did not produce differences in social and adaptive functioning as well as measured side-effects. One might expect that persons who are of advanced age would have longer history of psychotropic medication use resulting in lower levels of adaptive skills and a higher prevalence of tardive dyskinesia. However, the current findings did not support this idea, and these results may suggest that skill deterioration is similar for individuals who have received medication for periods of time surpassing three years. However, further research is needed before conclusions of this nature can be reached.

Other variables that could have certainly influenced level of social and adaptive skill include verbal skills, ample eyesight, and level of ambulation. In a more diverse population of persons with mental retardation, these variable would probably have been more predictive of differences in skills and abilities. However, given the fact that this sample was comprised solely of persons with profound mental retardation and matched stringently, these variables did not prove predictive of differences in social and adaptive skills.

The first hypothesis, which stated that social and adaptive skills would be differentiated by specific medication class, was supported. Individuals receiving medication regimes including atypical or traditional antipsychotic medications had significantly less social and adaptive skills than persons receiving anti-epileptic medications or experimental controls. Interestingly, persons receiving

traditional antipsychotics, atypical antipsychotics, and multiple medications were not differentiated by MESSIER subscale scores but were differentiated by communication, daily living, and socialization domains of the VABS. This finding is probably explained by the difference in specificity and skill level required between the two scales (MESSIER and VABS) and further suggest that the scales are measuring different constructs.

Another interesting finding was noted with regard to persons receiving anti-epileptic medication. Individuals receiving this class of medication alone demonstrated more social and adaptive behaviors than persons in groups containing antipsychotic medication regimes but a significantly lower skill level than experimental controls. While the literature for psychotropic drugs and mental retardation has not stressed the impact of anti-epileptic medications on social and adaptive behavior, it does appear that these medications can be detrimental to social performance. It could be that the feelings of sedation and physical discomfort often associated with anti-epileptic medications are paramount in decreasing social behavior; however, further research in this area is certainly needed before conclusions may be reached. Whatever the nature of the relationship, these findings indicate that anti-epileptic medications certainly affect the development and presentation of prosocial behavior.

Current findings are consistent with past literature concerning medication effects on prosocial behavior and learning in persons with mental retardation. Antipsychotic medication, in both the traditional and atypical classes, has consistently suppressed behavioral repertoires (appropriate and maladaptive) in persons with mental

retardation (Gedye, 1998; Dent, 1995; Diaz, 1996). However, these medications do not appear viable as first line treatments for behavior problems due to the adverse impact they have on the individual's spectrum of positive behavior. The current findings support this idea, as persons receiving traditional or atypical antipsychotics had significantly fewer social and adaptive skills. There are clearly those cases when antipsychotic medications are not only indicated but necessary in treatment regimes. First, when psychosis is clearly observed and diagnosed, antipsychotic medications are needed for appropriate and effective treatment. Additionally, antipsychotic medications may be indicated for conditions not responsive to other behavioral and pharmacologic treatments. However, these latter cases are few and far between, and prescriptions for medications in this class for problems other than true psychosis should be avoided in most cases (Matson et al., in press).

Much of the same is true for persons receiving anti-epileptic medications (AEDs). While current results indicated that AEDs were not as behaviorally suppressing as the antipsychotic class, they clearly had a significant negative impact on prosocial behavior. While the exact mechanism causing these differences is unknown, it has been hypothesized by many that the sedating properties and stomach discomfort caused by AED use is the culprit in decreased attention, engagement, learning and social behavior (Taylor et al., 1991; Walters et al., 1990). There are those conditions in which medications in this class are necessary for effective treatment. Besides seizure disorders and epilepsy, manic behavior has been shown to respond positively to anti-epileptic medications. However, the most common psychiatric usages of these

medications include impulse control problems and aggression. Ironically, research has not indicated the effectiveness of this class in either condition in persons with mental retardation. Therefore, this practice should probably be avoided except in the most extreme cases.

The second hypothesis, which predicted that persons on antipsychotic medications or multiple medications would have a higher degree of measured tardive dyskinesia than those on anti-epileptics or experimental controls, was partially supported. Participants receiving traditional antipsychotic medications displayed significantly more symptoms of tardive dyskinesia than all other groups. Individuals receiving multiple medications displayed higher levels of measured side effects than each group except those persons receiving traditional antipsychotics. Findings concerning persons on atypical antipsychotics were of note. This group displayed more measured side effects than experimental controls on no medication, but the group did not differ from persons receiving only anti-epileptic medications. As mentioned earlier, persons receiving atypical antipsychotics displayed significantly less measured side-effects than persons receiving traditional antipsychotics or multiple medications. Each of these findings will be discussed more completely in the text that follows.

There is an extensive research base concerning the use of traditional antipsychotic medications and significant side effects, and most studies indicate that extended use of these medications is linked to a higher prevalence of tardive akathesias and dyskinesias, flattened mood and affect, lower levels of social and adaptive skills, and depleted learning (Dent, 1995; Diaz, 1996; Cohen et al., 1998; Brasic & Barnett,

1997). Despite the prevalence of side-effects, these medications are known to be effective in the treatment of psychoses and manic symptoms that are treatment resistant to traditional mood stabilizers. Therefore, there is certainly a need for this class of medication in the treatment of psychiatric illness. However, a number of considerations might be made before traditional antipsychotics are prescribed. First, clinicians should consider if the presenting condition is one that might respond equally well to a medication regime that causes less side effects. If it is, in fact, the case that traditional antipsychotics are indicated, then treatment teams should insure that effective methods of measuring social skills, learning, and deleterious side-effects are used on a regular basis. These data, in conjunction with measures of the prevalence of psychiatric symptoms, are essential for making decisions about medication effectiveness and titration schedules.

Unfortunately for persons with mental retardation, the most frequent reason for use of traditional antipsychotic medication is the presence of aggression or self-injurious behavior. Though this class is not indicated as effective for the conditions, it is frequently employed as a means of suppressing aberrant behavior. While traditional antipsychotics at significant doses might successfully suppress repertoires of maladaptive behavior, the end result is normally suppression of the entire behavioral repertoire leading to decreased learning, less social and adaptive behavior, and higher prevalence of side effects that can be debilitating if not life threatening. As a result, traditional antipsychotics should be used as a first line behavioral intervention only in those rare cases where traditional behavioral techniques (skills training, time-out,

reinforcement paradigms) and other, less sedating medications have proven ineffective in managing the condition in question.

The current findings concerning atypical antipsychotic medication and side effects are both interesting and encouraging. This class of medication, which is still relatively new for American consumers, was marketed on the strengths of causing fewer side effects while treating both positive and negative symptoms of psychosis. While the latter portion of this marketing strategy remains an empirical question, the current data lend initial support to the notion that individuals receiving atypical antipsychotics display a lower prevalence of tardive dyskinesia. However, these data must be interpreted with caution. Early results from unpublished European studies indicate that after 3 to 5 years of use, the difference in prevalence of tardive dyskinesia between atypical and traditional antipsychotics is not statistically or clinically significant. As clinicians and researchers it is important to lend credence to these reports, as the atypical class has been in use in Europe for a significantly longer time than in the United States. Nonetheless, the current data are worthy of facilitating further research in the area.

Although the current results did not indicate a high prevalence of measured side-effects resulting from use of anti-epileptic medications, this class warrants considerable discussion with regard to causing debilitating conditions. The side-effects measure selected for this investigation targeted mainly those symptoms synonymous with tardive dyskinesia. The manner in which the anti-epileptic class affects physiological and central nervous system functioning differs significantly from the action mechanisms of

the antipsychotic classes. Therefore, it is expected that anti-epileptics would not result in significant symptoms of tardive dyskinesia. However, these medications cause a number of conditions that can affect learning, social performance, and physiological functioning. Besides the agitation, sedation, and GI difficulties often associated with anti-epileptic medication, this class is also known to cause major changes in platelet counts and can result in life threatening conditions, such as thrombocytopenia (Trannel et al., 2001). As a result, these medication warrant the same, careful monitoring as the other classes used for behavioral and psychiatric stabilization. Measure of social and adaptive skills, learning, specific psychiatric symptoms, client reports of side-effects or illness, and regular laboratory investigations should be the minimum in protocols evaluating effectiveness and side-effects of anti-epileptic medications.

In summarizing, each class of psychotropic medication results in prevalent but different profiles of negative side-effects. Treatment teams must be aware of all facets involved with particular classes of psychotropic medications in order to make responsible treatment decisions for clients in their care.

The final hypothesis, that social and adaptive skills were sensitive to medication class and time, was supported by the current data. Individuals receiving either traditional antipsychotic medications, atypical antipsychotic medications, or medication regimes containing either traditional or atypical antipsychotics and a mood stabilizer demonstrated significantly less social and adaptive skills after receiving the medication a minimum of three years. Individuals receiving antiepileptic medications and experimental controls did not experience significant change in measured skills over the

same period of time, but instead remained mostly stable over the three year period of measurement. Interestingly, the absence of antipsychotic medication for the latter two groups did not facilitate or ensure acquisition of new skills. This finding may indicate that lack of effective programming as well as the presence or absence of antipsychotic medications is a variable of extreme interest in evaluating the development of new social and adaptive skills.

A number of pertinent factors are involved with the extended use of antipsychotic medication in persons with mental retardation. Persons in the population who receive these classes of medication, be it for behavioral or psychiatric stabilization, tend to receive the medication for many years. Most subjects in this study who have received the atypical class for the last three years had a history of traditional antipsychotic use before medications were changed. The implications of extended use on skill level and learning are significant. Research has consistently demonstrated that long term use of antipsychotic medications often results in irreversible changes in the central nervous system and neurochemical functioning (Kiernan et al., 1995). These changes often result in increased side-effects, decreased learning, and chronic oversedation, which are conditions that can certainly affect the acquisition and performance of social and adaptive skills. Additionally, chronic use of antipsychotic medication often perpetuates a vicious cycle of continued medication use at increased doses. Once changes in central nervous system functioning occur as a result of antipsychotic medication, the individual in question invariably requires the medication to maintain a baseline level of functioning. Therefore, the probability of increased side

effects, decreased learning, and oversedation increases exponentially, resulting in lower levels of social and adaptive functioning.

Finally, the age of the individual in question did not predict performance on measures of social and adaptive skills. One might expect that persons who were older with prolonged histories medication usage would perform lesser on measures of social and adaptive skills. However, research in the area of mental retardation and antipsychotic medication indicates that a 3 to 5 year trial of a particular medication, and not the age or medication history of the individual in question, is the best predictor of unfavorable side-effects and decreased skill level (Singh et al., 1993; Rubin, 1997). These new findings support past conclusions and reaffirm the need for valid diagnostic practices, conservative prescribing practices, and ongoing measures of learning and adverse side effects in persons with mental retardation who receive antipsychotic medication.

Synopsis

The significance of the present study is in identifying the effect of psychotropic medications on social skills, adaptive functioning, and levels of measured side effects. The current results indicated clearly that persons receiving more potent, sedating psychotropic medications exhibit lower levels of social and adaptive skills than persons on less potent or no medications. Additionally, length of time on particular classes of medication dictates deterioration in performance of prosocial skills. Finally, the current work demonstrated the need for constant monitoring of learning, skill level, and deleterious side effects in persons receiving any class of mood or behavior altering

medication. Although side-effects profiles differ depending on the prescribed medication, each class of medication can cause individuals to experience physiological distress and a decline in skill level.

The current study has implications for clinicians and researchers alike. Treatment teams should be aware of the cost and benefits associated with each class of medication in order to make responsible treatment decisions. In those cases where medication is clearly warranted, teams must use standardized assessment instruments to ensure that medications are not resulting in suppression of the total behavioral repertoire or causing the individual in question unwarranted physiological distress.

For researchers, the implications of the current study are numerous. Many questions remain about the use of psychotropic medications in persons with profound mental retardation. Most of the research that currently exists in the area is extremely methodologically flawed (Matson et al., in press); therefore, a need exists for a number of studies concerning medication effectiveness, medication effect on prosocial behavior, medication use in conjunction with other treatment techniques, and side-effects profiles resulting from medication use in persons with profound mental retardation. It is hoped that results similar to those found in the current study will result in better treatment decisions and improved quality of life for persons with mental retardation. However, current research protocols and methods of treatment do not suggest that a trend shift to more responsible and conservative prescribing practices is likely in the near future.

REFERENCES

Aman, M.G. & Singh, N.N. (1983). Pharmacological intervention. In J.L. Matson & J.A. Mulick, eds., Handbook of Mental Retardation. New York: Pergamon.

Andrasik, F., & Matson, J.L. (1984). Social skills with the mentally retarded. In M.A. Milan and L.L. 'Abate (eds.), Handbook of Social Skills Training and Research. New York: John Wiley and Sons.

APA (1952). Diagnostic and Statistical Manual of Mental Disorders. Washington, DC: American Psychiatric Association.

APA (1968). Diagnostic and Statistical Manual of Mental Disorders, Second Edition. Washington, DC: American Psychiatric Association.

APA (1994). Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington, DC: American Psychiatric Association.

Arthur, G. (1947). Pseudo-feble-mindedness. American Journal of Mental Deficiency, 52, 137-142.

Barak, Y., Ring, A., Levy, D., Granek, I., Szor, H., & Elizur, A. (1995). Disabling compulsions in 11 mentally retarded adults: An open trial of clomipramine. Journal of Clinical Psychiatry, 56, 459-461.

Baumeister, A.A. & Sevin, J.A. (1990). Pharmacologic control of aberrant behavior in the mentally retarded: Toward a more rational approach. Neuroscience & Biobehavioral Reviews, 14, 253-262.

Baumeister, A.A., Todd, M.E., & Sevin, J.A. (1993). Efficacy and specificity of pharmacologic therapies for behavioral disorders in persons with mental retardation. Clinical Neuropharmacology, 16, 271-294.

Beale, I., Smith, O., & Webster, D. (1993). Effects of chlorpromazine and thioridazine on discrimination learning in children with mental retardation. Journal of Developmental and Physical Disabilities, 5, 43-54.

Bell-Dolan, D.J., Reaven, N., & Peterson, L. (1993). Depression and social functioning: A multidimensional study of the linkages. Journal of Clinical Child Psychology, 22, 306-315.

Bellack, A.S. (1979). A critical appraisal of strategies for assessing social skill. Behavioral Assessment, 1, 157-176.

Bellack, A.S., & Mueser, K.T. (1993). Psychosocial treatment for schizophrenia. Schizophrenia Bulletin, 19, 317-336.

Benjamin, E., & Bout-Smith, T. (1993). Naltrexone and fluoxetine in Prader-Willi syndrome. Journal of the American Academy of Child and Adolescent Psychiatry, 32, 870-873.

Benjamin, E., Seek, A., Tresise, L., Price, E., & Gagnon, M. (1995). Case study: Paradoxical response to naltrexone treatment of self-injurious behavior. Journal of the American Academy of Child and Adolescent Psychiatry, 34, 238-242.

Bernstein, G. (1981). Research issues in training interpersonal skills for the mentally retarded. Education and Training of the Mentally Retarded, 16, 70-74.

Bodfish, J.W., & Madison, J.T. (1993). Diagnosis and fluoxetine treatment of compulsive behavior disorder of adults with mental retardation. American Journal on Mental Retardation, 98, 360-367.

Borthwick-Duffy, S.A. (1994). Epidemiology and prevalence of psychopathology in people with mental retardation. Journal of Consulting and Clinical Psychology, 62, 17-27.

Brasic, J.R. & Barnett, J.Y. (1997). Hyperkinesias in a prepubertal boy with autistic disorder treated with haloperidol and valproic acid. Psychological Reports, 80, 163-170.

Brasic, J.R., Barnett, J.Y., Kaplan, D., Sheitman, B.B., Aisemberg, P., Lafargue, R.T., Kowalik, S., Clark, A., Tsaltas, M.O., & Young, J.G. (1994). Clomipramine ameliorates adventitious movements and compulsions in prepubertal boys with autistic disorder and severe mental retardation. Neurology, 44, 1309-1312.

Bullock, J.R. (1992). Children without friends: Who are they and how can teachers help? Childhood Education, 69, 92-96.

Bullock, M.J., Ironsmith, M., & Poteat, G.M. (1988). Sociometric techniques in young children: A review of psychometrics and classification schemes. School Psychology Review, 17, 289-303.

Buzan, R.D., Dubovsky, S.L., Treadway, J.T., & Thomas, M. (1995). Opiate antagonists for recurrent self-injurious behavior in three mentally retarded adults. Psychiatric Services, 46, 511-512.

Carpenter, M., Cowart, C.A., McCallum, R.S., & Bell, S.M. (1990). Effects of antipsychotic medication on discrimination learning for institutionalized adults who have mental retardation. Behavioral Residential Treatment, 5, 105-120.

Chadsey-Rusch, J. (1992). Toward defining and measuring social skills in employment settings. American Journal of Mental Retardation, 96, 405-418.

Christoff, K.A., & Kelly, J.A. (1983). Social skills. In J.L. Matson and S.E. Breuning (Eds.), Assessing the mentally retarded (pp. 181-206). New York: Grune and Stratton.

Christoff, K.A., & Kelly, J.A. (1985). A behavioral approach to social skills training with psychiatric patients. In L. L'abate & M. Milan (Eds.), Handbook of social skills training and research (pp. 361-387). New York: John Wiley and Sons.

Cohen, S. A., Ihrig, K., Lott, R. S., & Kerrick, J. M. (1998). Risperidone for aggression and self-injurious behavior in adults with mental retardation. Journal of Autism and Developmental Disorders, 28, 229-233.

Combs, M.L., & Slaby, D.A. (1977). Social skills training with children. In B.B. Lahey & A.E. Kazdin (Eds.), Advances in Child Clinical Psychology (Vol. 1, pp. 161-201). New York: Plenum Press.

Conger, J.C., & Conger, A.J. (1986). Assessment of social skills. In A.R. Ciminero, K.S. Calhoun, & H.E. Adams (Eds.), Handbook of Behavioral Assessment (Vol. 2, pp. 526-560). New York: John Wiley and Sons.

Cook, E.H., Rowlett, R., Jaselskis, C., & Leventhal, B.L. (1992). Fluoxetine treatment of children and adults with autistic disorder and mental retardation. Journal of the American Academy of Child and Adolescent Psychiatry, 31, 739-745.

Crews, W.D., Bonaventura, S., & Rowe, F.B. (1993). Cessation of long-term naltrexone for self-injury: A case study. Research in Developmental Disabilities, 14, 331-340.

Curran, J.P. (1977). Skills training as an approach to the treatment of heterosexual-social anxiety: A review. Psychological Bulletin, 84, 140-157.

Davanzo, P.A., Belin, T.R., Widawski, M.H., & Bryan, H.K. (1998). Paroxetine treatment of aggression and self-injury in persons with mental retardation. American Journal on Mental Retardation, 102, 427-437.

- Denicola, J., & Sandler, J. (1980). Training abusive parents in child management and self-control skills. Behavior Therapy, 11, 263-270.
- Dent, J. (1995). Catatonic syndrome following recovery from neuroleptic malignant syndrome. Journal of Intellectual Disability Research, 39, 457-459.
- Diaz, S.F. (1996). Mania associated with resperidone use. Journal of Clinical Psychiatry, 57, 41-42.
- Doll, E.A. (1935). The measurement of social competence. Journal of Psycho-Asthenics, 40, 103-126.
- Doll, E.A. (1936). Current thoughts on mental deficiency. Journal of Psycho-Asthenics, 41, 32-49.
- Doll, E.A. (1941). The essentials of an inclusive concept of mental deficiency. American Journal of Mental Deficiency, 46, 214-219.
- Dosen, A. (1993). Diagnosis and treatment of psychiatric and behavioural disorders in mentally retarded individuals: The state of the art. Journal of Intellectual Disability Research, 37, S1-7.
- Duncan, P.M., & Millard, W. (1866). A Manual for the Classification, Training, and Education of the Feeble-Minded, Imbecile, and Idiotic. London: Longmans, Green, & Co.
- Editorial Board of the APA Division 33. (1996). Definition of Mental Retardation. In J.W. Jacobson and J.A. Mulick (Eds.), Manual of Diagnosis and Professional Practice in Mental Retardation. Washington, DC: American Psychological Association.
- Eisler, R. M., Miller, P.M., Hersen, M., & Alford, H. (1974). Effects of assertive training on marital interaction. Archives of General Psychiatry, 30, 643-649.
- Elliot, S.N., & McKinnie, D.M. (1994). Relationships and differences among social skills, problem behaviors, and academic competence for mainstreamed learning disabled and nonhandicapped students. Canadian Journal of School Psychology, 10, 1-14.
- Farrar-Schneider, D. (1995). The development of the Measure of Observable Social Skills (MOSS). Louisiana State University: Unpublished doctoral dissertation.

Fingeret, A.L., Monti, P.M., & Paxson, M. (1983). Relationships among social perception, social skill, and social anxiety in psychiatric patients. Psychological Reports, 53, 1175-1178.

Foster, S.L., & Ritchey, W.L. (1979). Issues in the assessment of social competence in children. Journal of Applied Behavior Analysis, 12, 625-638.

Garber, H.J., McGonigle, J.J., Slomka, G.T., & Monteverde, E. (1992). Clomipramine treatment of stereotypic behaviors and self-injury in patients with developmental disabilities. Journal of the American Academy of Child and Adolescent Psychiatry, 31, 1157-1160.

Garcia, D. & Smith, R.G. (1999). Using analog baselines to assess the effects of naltrexone on self-injurious behavior. Research in Developmental Disabilities, 20, 1-21.

Gedye, A. (1998). Neuroleptic induced dementia documented in four adults with mental retardation. Mental Retardation, 36, 182-186.

Gettinger, M., & Kratochwill, T.R. (1987). Behavioral assessment. In C.L. Frame and J.L. Matson (Eds.), Handbook of Assessment in Childhood Psychopathology (pp. 131-161). New York: Plenum Press.

Ghaziuddin, M., Tsai, L.Y., & Ghaziuddin, N. (1992). Haloperidol treatment of trichotillomania in a boy with autism and mental retardation. Journal of Autism and Developmental Disorders, 21, 365-371.

Goddard, H.H. (1921). Abnormal Psychology and the study of the subnormal mind. Journal of Abnormal Psychology, 54, 47-50.

Goddard, H.H. (1928). Feeble-mindedness: A question of definition. Journal of Psycho-Asthenics, 33, 219-227.

Gordon, C.T., Rapoport, J.L., Hamburger, S.D., State, R.C., & Mannheim, G.B. (1992). Differential response of seven subjects with autistic disorder to clomipramine and desipramine. American Journal of Psychiatry, 149, 363-366.

Greenspan, S., & Granfield, J.M. (1992). Reconsidering the construct of mental retardation: Implications of a model of social competence. American Journal on Mental Retardation, 96, 442-453.

Greenspan, S., & Shoultz, B. (1981). Why mentally retarded adults lose their jobs: Social competence as a factor of work adjustment. Applied Research in Mental Retardation, 2, 23-38.

Gresham, F.M. (1981). Assessment of children's social skills. Journal of School Psychology, 19, 120-133.

Gresham, F.M. (1986a). Conceptual and definitional issues in the assessment of children's social skills: Implications for classification and training. Journal of Clinical Child Psychology, 15, 3-15.

Gresham, F.M. (1986b). Conceptual issues in the assessment of social competence in children. In P. Strain, M. Guralnick, and H. Walker (Eds.), Children's social behavior: Development, assessment, and modification (pp. 143-186). New York: Academic Press.

Gresham, F.M. & Cavell, T.C. (1987). Assessment of adolescent social skills. In R.G. Harrington (Ed.), Testing Adolescents. Kansas City, MO: Test Corporation of America.

Gresham, F.M., & Elliot, S.N. (1987). The relationship between adaptive behavior and social skills: Issues in definition and assessment. The Journal of Special Education, 21, 167-181.

Gresham, F.M., MacMillan, D.L., & Siperstein, G.N. (1995). Critical analysis of the 1992 AAMR definition: Implications for school psychology. School Psychology Quarterly, 10, 1-19.

Gresham, F.M., & Reschly, D.J. (1988). Issues in the conceptualization, classification, and assessment of social skills in the mildly handicapped. In T. Kratochwill (Ed.), Advances in school psychology (pp. 203-247). Hillsdale, NJ: Lawrence Erlbaum.

Gresham, F.M., & Stuart, D. (1992). Stability of sociometric assessment: Implications for uses as selection and outcome measures in social skills training. Journal of School Psychology, 30, 223-231.

Gross, E.J., Hull, H.G., Lytton, G.J., Hill, J.A., & Piersel, W.C. (1993). Case study of neuroleptic induced akathisia: Important implications for individuals with mental retardation. American Journal on Mental Retardation, 98, 156-164.

Grossman, H.J. (Ed.). (1973). Manual on Terminology and Classification in Mental Retardation. Washington, DC: American Association on Mental Retardation.

Grossman, H.J. (Ed.). (1977). Manual on Terminology and Classification in Mental Retardation. Washington, DC: American Association on Mental Retardation.

Grossman, H.J. (Ed.). (1983). Manual on Terminology and Classification in Mental Retardation. Washington, DC: American Association on Mental Retardation.

Hammock, R. G., Schroeder, S. S., & Levine, W. R. (1995). The effect of clozapine on self-injurious behavior. Journal of Autism and Developmental Disorders, 25, 611-626.

Hanzel, T.E., Kalachnik, J.E., & Harder, S.R. (1992). A case of phenobarbital exacerbation of a preexisting maladaptive behavior partially suppressed by chlorpromazine and misinterpreted as chlorpromazine efficacy. Research in Developmental Disabilities, 13, 381-392.

Hardan, A., Johnson, K., Johnson, C., & Hrecznyj, B. (1996). Case study: Risperidone treatment of children and adolescents with developmental disorders. Journal of the American Academy of Child and Adolescent Psychiatry, 35, 1551-1556.

Heber, R. (1959). Manual on terminology and classification in mental retardation. American Journal of Mental Deficiency, 64, Monograph supplement.

Heber, R. (1961). A Manual on Terminology and Classification in Mental Retardation. Washington, DC: American Association on Mental Deficiency.

Helsel, W.J., & Matson, J.L. (1984). The relationship of depression to social skills and intellectual functioning in mentally retarded adults. Journal of Mental Deficiency Research, 32, 411-418.

Hill, B.K., Balow, E.A., & Bruininks, R.H. (1985). A national study of prescribed drugs in institutions and community residential facilities for mentally retarded people. Psychopharmacology Bulletin, 21, 279-284.

Horrigan, J. P. & Barnhill, L. J. (1997). Risperidone and explosive aggressive autism. Journal of Autism and Developmental Disorders, 27, 313-323.

Horrigan, J. P. & Barnhill, L. J., & Courvoisie, H. E. (1997). Olanzapine in PDD. Journal of the American Academy of Child and Adolescent Psychiatry, 36, 1166.

Hover, S., & Gaffney, L.R. (1981). The relationship between social skills and adolescent drinking. Alcohol and Alcoholism, 26, 207-214.

Howland, R.H. (1996). Chlorpromazine and obsessive-compulsive symptoms. American Journal of Psychiatry, 153, 1503-1504.

Humphrey, E.J. (1936). Development deficiencies as the essential problem in mental deficiency. Journal of Psycho-Asthenics, 41, 215-224.

Kanner, L. (1948). Feeble-mindedness: Absolute, relative, and apparent. The Nervous Child, 7, 365-397.

Kanner, L. (1964). A History of the Care and Study of the Mentally Retarded. Springfield, IL: Charles C. Thomas.

Kazdin, A.E., & Matson, J.L. (1981). Social validation in mental retardation. Applied Research in Mental Retardation, 2, 39-53.

Kennedy, J.H. (1988). Issues in the identification of socially incompetent children. School Psychology Review, 17, 276-288.

Kiernan, C., Reeves, D., & Alborz, A. (1995). The use of antipsychotic drugs with adults with learning disabilities and challenging behaviour. Journal of Intellectual Disability Research, 39, 263-274.

Kuhlman, F. (1941). Definition of mental deficiency. American Journal of Mental Deficiency, 46, 206-213.

Langee, H.R. & Conlon, M. (1992). Predictors of responses to antidepressant medications. American Journal on Mental Retardation, 97, 65-70.

LeBlanc, L. (1996). Social skills in adults with severe disabilities. Louisiana State University: Unpublished doctoral dissertation.

Lewis, E.O. (1933). Types of mental deficiency and the social significance. Journal of Mental Science, 79, 298-304.

Lewis, M.H., Bodfish, J.W., Powell, S.B., & Golden, R.N. (1995). Clomipramine treatment for stereotypy and related repetitive movement disorders associated with mental retardation. American Journal on Mental Retardation, 100, 299-312.

Libet, J.M., & Lewinsohn, P.M. (1973). Concept of social skills with special reference to the behavior of depressed persons. Journal of Consulting and Clinical Psychology, 40, 304-312.

Lobitz, W.C., & LoPiccolo, J. (1972). New methods in the behavioral treatment of sexual dysfunction. Journal of Behavior Therapy and Experimental Psychiatry, 3, 275-281.

Lovett, D.L., & Harris, M.B. (1987). Identification of important community living skills for adults with mental retardation. Rehabilitation Counseling Bulletin, 31, 34-41.

Lowe, M.R. (1985). Psychometric evaluation of the Social Performance Survey Schedule: Reliability and validity of the positive behavior subscale. Behavior Modification, 9, 193-210.

Lowe, M.R. & Cautela, J.R. (1978). A self-report measure of social skill. Behavior Therapy, 9, 535-544.

Luckasson, R., Coulter, D.L., Polloway, E.A., Reiss, S., Schalock, R.L., Snell, M.E., Spitalnik, D.M., & Stark, J.A. (1992). Mental Retardation: Definition, Classification, and Systems of Support. Washington, DC: American Association on Mental Retardation.

Marchetti, A.G., & Campbell, V.A. (1990). Social skills. In J.L. Matson (Ed.), Handbook of behavior modification with the mentally retarded (2nd ed., pp. 333-355). New York: Plenum Press.

Marglait, M. (1991). Promoting classroom adjustment and social skills for students with mental retardation within an experimental and control group design. Exceptionality, 2, 195-204.

Matson, J.L. (1995a). Comments on Gresham, MacMillan, and Siperstein's paper "Critical analysis of the 1992 AAMR definition: Implications for school psychology". School Psychology Quarterly, 10, 20-23.

Matson, J.L. (1995b). Matson Evaluation of Social Skills for Individuals with sEvere Retardation (MESSIER). Baton Rouge: Scientific Publishers, Inc.

Matson, J.L., Bamburg, J.W., Mayville, E., Pinkston, J., Bielecki, J., Kuhn, D., Smalls, Y., & Logan, J.R. (In press). Psychopharmacology and mental retardation: A 10 year review. Research in Developmental Disabilities.

Matson, J.L., Carlisle, C.B., & Bamburg, J.W. (1998). The convergent validity of the Matson Evaluation of Social Skills in Individuals with sEvere Retardation (MESSIER). Research in Developmental Disabilities, 19, 493-500.

Matson, J.L., Compton, L.S., & Sevin, J.A. (1991). Comparison and item analysis of the MESSY for autistic and normal children. Research in Developmental Disabilities, 12, 361-369.

Matson, J.L., & Hammer, D. (1996). Assessment of social functioning. In J.W. Jacobson & J.A. Mulick, (Eds.), Manual of Diagnosis and Professional Practice in Mental Retardation. Washington, DC: American Psychological Association.

Matson, J.L., Helsel, W.J., Bellack, A.S., & Senatore, V. (1983). Development of a rating scale to assess social skill deficits in mentally retarded adults. Applied Research in Mental Retardation, 4, 399-407.

Matson, J.L., Kazdin, A.E., & Senatore, V. (1984). Psychometric properties of the Psychopathology Instrument for the Mentally Retarded Adults (PIMRA). Applied Research in Mental Retardation, 5, 81-89.

Matson, J.L., & Ollendick, T.H. (1988). Enhancing children's social skill: Assessment and training. New York: Pergamon Press.

Matson, J.L., Smiroldo, B.B., & Bamburg, J.W. (1998). The relationship of psychopathology to social skills in persons with severe and profound mental retardation. Journal of Intellectual Disability Research, 23, 137-145.

May, P., London, E.B., Zimmerman, T., & Thompson, R. (1995). The study of the clinical outcome of patients with profound mental retardation gradually withdrawn from chronic neuroleptic medication. Annals of Clinical Psychiatry, 7, 155-160.

McCord, J., Tremblay, R.E., Vitaro, F., & Desmarais-Gervais, L. (1994). Boys' disruptive behaviour, school maladjustment, and delinquency: The Montreal prevention experiment. International Journal of Behavioral Development, 17, 739-752.

McDoughle, C. J., Holmes, J. P., Bronson, M. R., Anderson, G. M., Volkmar, F. R., Price, L. H., & Cohen, D. J. (1997). Risperidone treatment of children and adolescents with pervasive developmental disorders: A prospective, open-label study. Journal of the American Academy of Child and Adolescent Psychiatry, 36, 685-693.

McDoughle, C. J., Holmes, J. P., Carlson, D. C., Pelton, G. H., Cohen, D. J., & Price, L. H. (1998). A double-blind, placebo-controlled study of risperidone in adults with autistic disorder and other pervasive developmental disorders. Archives of General Psychiatry, 55, 633-641.

McFall, R.M. (1982). A review and reformulation of the concept of social skills. Behavioral Assessment, 9, 361-377.

McFall, R.M., & Littleland, D.B. (1971). Behavior rehearsal with modeling and coaching in assertion training. Journal of Abnormal Psychology, 77, 313-323.

Meyer, L.H., Cole, D.A., McQuarter, R., & Reichle, J. (1990). Validation of the assessment of social competence (ASC) for children and young adults with developmental disabilities. Journal of the Association for Persons with Severe Handicaps, 15, 57-68.

Miller, L.S., & Funabiki, D. (1984). Predictive validity of the Social Performance Survey Schedule for component interpersonal behaviors. Behavioral Assessment, 6, 33-44.

Mueser, K.T., & Bellack, A.S. (1998). Social skills and social functioning. In K.T. Mueser & N. Tarrier (Eds.), Handbook of Social Functioning in Schizophrenia. Boston: Allyn & Bacon.

Myers, B.A. & Pueschel, S.M. (1994). Brief report: A case of schizophrenia in a population with down syndrome. Journal of Autism and Developmental Disorders, 24, 95-98.

Nicholson, R., Awad, G., & Sloman, L. (1998). An open trial of risperidone in young autistic children. Journal of the American Academy of Child and Adolescent Psychiatry, 37, 372-376.

Nirje, B. (1969). The normalization principle-Implications and comments. Journal of Mental Subnormality, 16, 62-70.

Paclawskyj, T.R., Rush, K.S., Matson, J.L., & Cherry, K.E. (1999). Factor structure of the Matson Evaluation of Social Skills for Individuals with sEvere Retardation (MESSIER). British Journal of Clinical Psychology, 38, 289-293.

Perry, N. (1960). Teaching the Mentally Retarded Child. New York: Columbia University Press.

Phillips, E.L. (1985). Social skills: history and prospect. In L. L'abate and M. Milan (Eds.), Handbook of social skills training and research (pp. 3-21). New York: John Wiley & Sons.

Potenza, M. C., Holmes, J. P., Kanes, S. J., & McDougale, C. J. (1999). Olanzapine treatment of children, adolescents, and adults with Pervasive Developmental Disorders: An open-label pilot study. Journal of Clinical Psychopharmacology, 19, 37-44.

Purdon, S. E., Lit, W., Labelle, A., & Jones, B. D. W. (1994). Risperidone in the treatment of Pervasive Developmental Disorder. Canadian Journal of Psychiatry, 39, 400-405.

Rosenquist, P.B., Bodfish, J.W., & Thompson, R. (1997). Tourette syndrome associated with mental retardation: A single subject treatment study with haloperidol. American Journal on Mental Retardation, 101, 497-504.

Rubin, M. (1997). Use of atypical antipsychotics in children with mental retardation, autism, and other developmental disabilities. Psychiatric Annals, 27, 219-221.

Ruedrich, S., Swales, T.P., Fossaceca, C., Toliver, J., & Rutkowski, A. (1999). Effect of divalproex sodium on aggression and self-injurious behavior in adults with intellectual disability: A retrospective review. Journal of Intellectual Disability Research, 43, 105-111.

Rychlak, J.F., & Wade, I. (1963). American usage of the terms "educable" and "trainable" mental retardates. Journal of Mental Subnormality, 16, 70-75.

Sandman, C.A., Hetrick, W., Taylor, D.V., & Chicz-DeMet, A. (1997). Dissociation of POMC peptides after self-injury predicts responses to centrally acting opiate blockers. American Journal on Mental Retardation, 102, 182-199.

Scheerenberger, R.C. (1982). A History of Mental Retardation. Baltimore: Brookes Publishing Company.

Scotti, J.R., Evans, I.M., Meyer, L.H., & Walker, P. (1991). A metanalysis of intervention research with problem behavior: Treatment validity and standards of practice. American Journal on Mental Retardation, 96, 233-256.

Scotti, J.R., Schulman, D.E., & Hojnacki, R.M. (1995). Functional analysis and unsuccessful treatment of Tourette's syndrome in a man with profound mental retardation. Behavior Therapy, 25, 721-738.

Shure, M.B. (1981). Social competence as a problem solving skill. In J.D. Wine and M.D. Smye (Eds.), Social competence (pp. 158-185). New York: Guilford Press.

Sigafoos, J. (1995). Testing for spontaneous use of requests after sign language training with two severely handicapped adults. Behavioral Interventions, 10, 1-16.

Singh, N.N., Ellis, C.R., Crews, D.W., & Singh, Y.N. (1995). Does diminished dopaminergic neurotransmission increase pica? Journal of Child and Adolescent Psychopharmacology, 4, 93-99.

Singh, N.N., Landrum, T.J., Ellis, C.R., & Donatelli, L.S. (1993). Effects of thioridazine and visual screening on stereotypy and social behavior in individuals with mental retardation. Research in Developmental Disabilities, 14, 163-177.

Siperstein, G.N. (1992). Social competence: An important construct in mental retardation. American Journal on Mental Retardation, 96, iii-vi.

Sovner, R & Hurley, A. (1981). The management of chronic behavior disorders in mentally retarded adults with lithium carbonate. Journal of Nervous and Mental Disturbance, 169, 191-195.

Sparrow, S.S., Balla, D.A., & Cicchetti, D.V. (1984). Vineland Adaptive Behavior Scales. Circle Pines, MN: American Guidance Service.

Sperner, U.B., Czeipek, I., Gaggl, S., Geissler, D., Speil, G., & Fleischhacker, W.W. (1998). Treatment of severe clozapine induced neutropenia with granulocyte colony stimulating factor (G-CSF): Remission despite continuous treatment with clozapine. British Journal of Psychiatry, 172, 82-84.

Suzuki, E., Knba, S., Nibuya, M., & Shintani, F. (1992). Use of pimozide in the Pisa syndrome. American Journal of Psychiatry, 149, 1114-1115.

Taylor, S.J., & Harris, S.L. (1995). Teaching children with autism to seek information: Acquisition of novel information and generalization of responding. Journal of Applied Behavior Analysis, 28, 3-14.

Taylor, D.V., Hetrick, W.P., Touchette, N.P., Barron, J.L., & Sandman, C.A. (1991). Effect of naltrexone upon self-injurious behavior, learning, and activity: A case study. Pharmacology Biochemistry and Behavior, 40, 79-82.

Trannel, T.J., Ahmed, I., & Goebert, D. (2001). Occurrence of thrombocytopenia in psychiatric patients taking valproate. American Journal of Psychiatry, 158, 128-130.

Tredgold, R.F. (1947). Mental Deficiency (7th Ed.). Baltimore: The Williams and Wilkins Co.

Trent, J.W., Jr. (1994). Inventing the Feeble Mind. Berkeley: University of California Press.

Van Hasselt, V., Hersen, M., & Milliones, J. (1978). Social skills training in alcoholics and drug addicts: A review. Addictive Behaviors, 3, 221-233.

Volling, B.L., MacKinnon-Lewis, C., Rabiner, D., & Baradaran, L.P. (1993). Children's social competence and sociometric status: Further exploration of aggression, social withdrawal, and peer rejection. Development and Psychopathology, 5, 459-483.

Walters, A.S., Barrett, R.P., Feinstein, C., Mercurio, A., & Hole, W.T. (1990). A case report of naltrexone treatment of self-injury and social withdrawal in autism. Journal of Autism and Developmental Disorders, 20, 169-176.

Williemsen-Swinkels, S.H.N., Buitelaar, J.K., Nijhof, G.J., & van Engeland, H. (1995). Failure of naltrexone hydrochloride to reduce self-injurious and autistic behavior in mentally retarded adults. Archives in General Psychiatry, 52, 766-773.

Wolfensberger, W. (1970). A brief overview of the principle of normalization. In R.J. Flynn & K.G. Nitch, (Eds.), Normalization, Social Integration, and Community Services. Baltimore: University Press.

Wolfolk, W.B., Fucci, D., Gelzayd, J.F., & Manz, C.C. (1991). Social skills measurement of the mentally impaired. Bulletin of the Psychonomic Society, 29, 220-222.

Yepsen, L.N. (1941). Defining mental deficiency. American Journal of Mental Deficiency, 46, 200-205.

APPENDIX
INSTITUTIONAL CONSENT TO CONDUCT RESEARCH



Edwin W. Edwards
GOVERNOR

STATE OF LOUISIANA
DEPARTMENT OF HEALTH AND HOSPITALS



December 14, 1994


Johnny L. Matson, Ph.D.
Louisiana State University
3333 Woodland Ridge Blvd.
Baton Rouge, LA 70816

Dear Dr. Matson:

Your proposal for a research project entitled "Norming Psychological Assessment Battery for Treatment Plans" has received the approval of the Pinecrest Developmental Center Human Rights Committee. Please submit the results of this study when it is completed to me for presentation to the committee.

Please notify me if any assistance or further information is required. Your coordination of this valuable study is greatly appreciated.

Sincerely,


Margaret Campbell
Liaison, Ad Hoc Committee
Human Rights Committee

MC/agt.

cc: Edwin M. Wright
Human Rights Committee

Office for Citizens with Developmental Disabilities
Pinecrest Developmental Center • P.O. Box 5191 • Pineville, Louisiana 71361-5191
Phone (504) 641-2000
"AN EQUAL OPPORTUNITY EMPLOYER"

VITA

Jerald Wayne Bamburg Jr. was born on September 24, 1970, in Vicksburg, Mississippi. He received a Bachelor of Science in Psychology from Belmont University in Nashville, Tennessee, in 1993, and a Master of Science in Clinical Psychology from Northwestern State University in Natchitoches, Louisiana in 1995. He is currently completing his American Psychological Association approved internship at Austin State Hospital in Austin, Texas. Mr. Bamburg's clinical and research interests include mental retardation and developmental disabilities across the lifespan, psychopathology, psychopharmacology, assessment of special educational needs, and assessment and treatment of children.

DOCTORAL EXAMINATION AND DISSERTATION REPORT

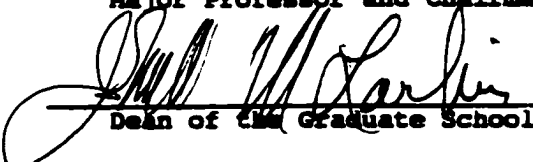
Candidate: Jerald W. Bamburg, Jr.

Major Field: Psychology

Title of Dissertation: The Effect of Psychotropic Medications on Social Skills in Persons with Profound Mental Retardation

Approved:


Major Professor and Chairman


Dean of the Graduate School

EXAMINING COMMITTEE:









Date of Examination:

June 14, 2001
