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Psychometric validity for the Matson Evaluation of drug side effects and the akathisia rating of movement scale

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PSYCHOMETRIC VALIDITY FOR THE MATSON EVALUATION OF DRUG SIDE EFFECTS AND THE AKATHISIA RATING OF MOVEMENT SCALE

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ABSTRACT

Akathisia is a movement disorder characterized by a sense of restlessness and increased motor activity. Movement disorders are primarily an iatrogenic result of mediation use. In the case of akathisia, this syndrome is easily misdiagnosed as a psychiatric disorder. As a result, there is a need to development greater awareness and encourage research on akathisia and the movement disorder field at large. Accordingly, the APA has included research criteria for the movement disorder syndromes in the *Criteria Sets and Axes Provided for Further Study* of Diagnostic and Statistical Manual since the fourth revision. The purpose of this project was to investigate the validity of two best researched and most commonly used akathisia scales for assessing individuals with intellectual disability. Participants were selected for one of three groups, a control group or one of two quasi-experimental groups. Analyses of mean differences and correlations were completed to detect the differences between groups scores earned on the two scales. Results from this study are interpreted as support for the use of these scales as a valid means to assess and monitor akathisia in a population of individuals with intellectual disability.

INTRODUCTION

Individuals with intellectual disability (ID) often present with significant behavioral excesses and deficits (Baumeister, Todd, & Sevin, 1993). As a result, treatment of these behavioral challenges regularly includes psychotropic medications, which historically have been used incorrectly in this population, thereby placing people at risk (Lipman, 1970). However, all medications whether used correctly or incorrectly place people at increased risk for developing iatrogenic adverse reaction. One class of these iatrogenic effects of medication is the medication-induced movement disorders (e.g., parkinsonism, neuroleptic malignant syndrome, dystonia, akathisia, tardive dyskinesia, and tremor). These disorders can be uncomfortable, debilitating, and lethal. Thus, concerns for using these medications are warranted. Important to maximizing the best quality of life for the recipients of these medications is recognizing the risk and impact that medication adverse reaction present.

Interest in these iatrogenic reactions has been continual since the discovery of this risk shortly after the introduction of the first neuroleptic medication, chlorpromazine, in 1952. In recent years, the APA has recognized a need for increased research in these iatrogenic effects and has prompted clinicians and researchers to develop the field. To aid in the development of this field the APA has set forth criteria for research in the Appendix B of the DSM-IV, Criteria Sets and Axes Provided for Further Study (APA, 1994; 2000). This section of the DSM is designed to recognize clinical presentations and syndromes that have an insufficient body of literature to support inclusion in the DSM diagnostic compendium. Comprised in the appendix are proposals for new categories and axes along with criteria to meet when formulating research designs.

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Initial interest in the medication-induced movement disorders began with tardive dyskinesia but attention to the other disorders has spread. Many researchers have begun examining akathisia (Gualtieri, 1993; Sachdev, 1995a). Some of these researchers have also begun to investigate akathisia as it occurs in those with ID (Bodfish, Newell, Sprague, Harper, & Lewis, 1997; Branford & Hutchins, 1996; Ganesh, Rao, & Cowie, 1989; Gross, Hull, Lytton, Hill, & Piersel, 1993). Researchers examining this population have been presented with particular challenges in providing assessment and treatment of individuals with ID. Some researchers have addressed these challenges and developed assessment scales (Bodfish et al., 1997; Matson & Baglio, 1998).

Successful resolving akathisia will undoubtedly increase the quality of life of the individual with ID as symptoms range from uncomfortable or debilitating. Specifically akathisia includes both a subjective feeling of irritability or restlessness and an objective behavioral manifestation of continuous movement and inability to remain still (Sachdev, 1995a). However, and especially in individuals with ID, the symptoms of akathisia need to be considered early in the development of appropriate treatment packages because akathisia can be easily misdiagnosed. Often, it may be perceived as a psychiatric disorder or a non-social challenging behavior (Brune & Braunig, 1997; Ferrando & Eisendrath, 1991; Hirose, 2001; Marsalek, 1997).

The identification of medication-induced disorders is clinically applicable to providing the best possible quality of life for persons with ID. In effort to attain and preserve quality of life, authors of best practice guidelines hold that appropriate and accurate diagnoses are essential for providing best practice treatments (Bailey & Pyles,

1989; Pyles & Bailey, 1990; Pyles & Bailey, 1992; Pyles, Muniz, Cade, & Silva, 1997). Pyles and colleagues' offer a paradigm called Behavior Diagnostics to help arrive at appropriate and accurate diagnoses when a person with ID presents with aberrant behavior. In their paradigm an examination of medical factors is the primary focus, ahead of psychiatric or environmental factors. This emphasis on medical factors is especially useful when addressing movement disorders. Following the Behavior Diagnostic paradigm for a case of adverse reaction to medication the, first step in treating this concern is ruling out medical factors via an examination of the medication regimen for offending agents. If a concern arises from this examination, assessment and monitoring will follow. Then, by resolving the adverse reaction to medication, presumably the aberrant behaviors will abate.

Misdiagnosing akathisia is of concern and is more common in individuals with ID due to the confounding factors of diminished cognitive and language skills (Bodfish et al., 1997). Particularly susceptible to misinterpretation are the subjective symptoms because of the lack of effective communication. However, the objective symptoms of continuous movement and inability to remain still are also commonly overshadowed, associated with the presentation of ID, and overlooked as symptoms of akathisia. Symptom overshadowing is especially prominent in cases where other challenging behaviors are observed (Reiss, Levitan, & Szyszko, 1982). Nevertheless, due to high rates of neuroleptic drug use, assessment and identification is needed despite the difficulties presented by this population (Lipman, 1970; Matson, Bamburg, & Mayville, 2000a; Matson, Bamburg, & Mayville, 2000b; Matson, Bielecki, Mayville, & Matson, 2003; Matson, Luke, & Mayville, 2004; Singh, Matson, & Cooper, 2005; Sprague &

Baxter, 1978). The establishment of valid assessment methods to identify long-term

adverse reaction of neuroleptic medication is therefore of great concern for researchers,

clinicians, and the recipients of medication.

REVIEW OF INTELLECTUAL DISABILITY LITERATURE

<u>Intellectual Disability</u>

Intellectual disability has been an enduring construct present throughout the history of humankind (Biasini, Grupe, Huffman, & Bray, 1999; Kanner, 1964). Recorded accounts of ID have been reported for centuries. Written references to this construct, for example, can be found in Egyptian papyri dated to 500 B.C. (Sheerenberg, 1983). The texts from this era describe disabilities of the mind and body due to brain damage.

How an intellectual disability has been conceived and the manner in which individuals with ID have been treated has been dependent on the customs and beliefs at that time (Ollendick, Oswald, & Ollendick, 1993). Early cultures did not recognize individuals with ID as persons. For example, infanticide was common in ancient Greece and Rome. Attitudes toward individuals with ID have become more humane over time though, albeit slowly. By 200 A.D., infanticide was practiced less however; it was common practice for individuals with disabilities to be sold for use as entertainment (Sheerenberg, 1983). The conceptualization, treatment, and care of individuals with ID remained relatively unchanged until the beginning of the Middle Ages.

The Middle Ages (476-1799 A.D.) saw significant changes in how individuals with ID were viewed. Change was evident in the growing concern of the era for compassionate treatment and care for the impaired, sick, and poor. During this period, the Christian movement was noted for its contribution to the practice of caring for others in need. However, many children were still sold or abandoned. In the latter part of this era, John Locke's writings had a substantial impact on the view and positive treatment of individuals with ID. He introduced the idea of the tabula rasa, or blank slate, in which

people were believed to be born without innate ideas and therefore needed to be trained and educated. His writings were the first to distinguish between ID and mental illness, and he advocated the idea of separate approaches to treatment (Doll, 1962). Locke's influence resulted in an increase in the quality of life for individuals with ID during this era because of the emphasis on training and education.

In the 1800's, the work of Jean-Marc Gaspard Itard and his student Edouard Seguin significantly influenced the care and treatment of individuals with ID. Theirs was the first documented attempt to treat a person with ID. Sheerenberg (1983) writes that Itard developed an educational program to treat a deaf and mute 12-year-old boy found living on his own in the mountains. Influenced by the writings of John Locke and Etienne Condillac, Itard's goal was to develop the boy's senses, intellect, and emotions. Seguin, supervised by Itard, went on to develop a comprehensive educational program for children with ID known as the Physiological Method. This training began with the senses and extended to self-care and vocational skills training (Sheerenberg, 1983). Seguin moved to the United States and became influential in the movement for appropriate care of individuals with ID. In 1876, he founded and became the first president of the Association of Medical Officers of American Institutions for Idiotic and Feeble-Minded Individuals. Later which became the American Association for the Study of the Feebleminded by 1910, the American Association for Mental Deficiency by 1961, then the American Association on Mental Retardation (AAMR) by 1973. His training model serves as the basis for our modern training and care of individuals with ID.

<u>Definitions and Severity Levels</u>

During the history of ID the definition and severity levels of the disorder have seen much change. Our understanding of ID has continually developed. At times there has been disagreement on the details of ID. This construct has been renamed and redefined many times, often due to controversy surrounding old terms perceived as discriminating or pejorative (Matson, 1995). Despite controversy, three core features have remained constant over the last century: an onset in developmental age, difficulties in learning, and impaired functioning (Luckasson et al., 2002).

Alfred Frank Tredgold, in 1908, proposed the first definition (Biasini et al., 1999). His criterion was rudimentary; any individual with an identified ID by an early age that resulted in the inability to complete expected duties met the criterion. By 1910, the American Association for the Study of the Feebleminded (later the AAMR) informally adopted the first severity levels. This level system classified people based on age equivalents of maturity. Three levels of impairment were provided: idiot, imbecile, and moron. The term idiot described a person whose maturity was equivalent to a child up to 2 years old; imbecile was used for a person whose maturity was equivalent to a child aged 2 to 7 years old; and moron described a person whose maturity was equivalent to a child aged 7 to 12 years old (Sheerenberg, 1983).

Not until the AAMR's sixth edition (Heber, 1961) were the terms in the early classification system revised to terms that fit the current American Psychological Association (APA) diagnostic criteria. Heber conceptualized ID based on adaptive functioning and included a three-part definition: an IQ below 85, impaired adaptive functioning, and age of onset before 16 years. He devised a five-level classification

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system to replace the previous one. In order of highest to lowest functioning, levels included borderline, mild, moderate, severe, and profound ID.

In 1973, the AAMR definition was revised by Grossman and later in 1977 and again in 1983. Grossman's changes included the levels of severity, an increase in the age criteria, and a decrease in the IQ requirement. His least controversial change to Heber's definition was to eliminate the borderline classification from the levels of severity. Other changes resulted in greater criticism. Specifically, Heber's 1961 classification system criteria were broad; ID could only be diagnosed as late as age 16, which helped to narrow the range but an IQ score below 85 made the range broad. Much criticism emerged about Heber's definitions. Specific criticism focused on the high cutoff score as too inclusive in the diagnosis of mental retardation, particularly in minority populations. Grossman therefore increased the age requirement by two years to age 18 and reduced the required IQ score to below < 70. Grossman's changes, however, resulted in another concern. The lower IQ cutoff of 70 significantly reduced the number of individuals who met the criteria for mental retardation. Such a reduction resulted in a dramatic decrease of the number of individuals who could receive services from 16% to 2%. Consequently, many children who might have benefited from special assistance were now ineligible for such services. Grossman (1977) conceded to a higher IQ boundary. He wrote that a small number of individuals with scores up to 10 points above the IQ boundary may be classified as mildly mentally retarded if their current adaptive skill functioning was significantly impaired. Grossman's eight revision of the AAMR definitions (1983) placed the upper IQ boundary at <70. Nevertheless, the boundary was only a guideline and could be extended to 75 or more.

The most recent set of revisions of the AAMR, the ninth and tenth revisions, were developed by Luckasson et al. (1992, 2002). Luckasson and colleagues' changes are considered substantial and controversial. These concerns are compounded given that she is a lawyer and advocate versus a mental health professional. Among the changes are an increased focus on adaptive skill and the elimination of the severity level system. In their model, adaptive functioning has a greater importance than intellectual functioning. A focus on adaptive function allows for the identification of supports needed, whereas intellectual function does not. Unlike intellectual functioning, predictive validity of these constructs has not been established. They offer the following domains to evaluate adaptive functioning: communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure, and work. A diagnosis of mental retardation, as posited by Luckasson et al. (1992, 2002), should be made on limitations in two or more of the domains. In focusing the definition of ID on a person's functional status Luckasson et al. (1992, 2002) hoped to eliminate the severity level classification scheme.

In the tenth revision, Luckasson and colleagues, moved away from the deficit model completely in favor of the support model. A deficit model emphasizes what an individual cannot do thereby supposedly placing the disability in the person. Conversely, AAMR's support model places the disability outside of the person. More specifically, the disability is placed in interaction the person has with the environment. Following, in the support model, the goal is to provide the needed level and type of support that the person needs to interact with the environment. Four levels of support can be provided: intermittent, limited, extensive, and pervasive support. The type of supports are those

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involving communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure, and work. In applying the support model the AAMR urges the consideration of five assumptions when attempting to provide support for individuals with ID: limitations in functioning are considered in the context of the environment; valid assessments also consider cultural and linguistic differences; limitation coexists with strength; a description of limitations necessarily includes a description of supports; and with appropriate supports, functioning will improve. Luckasson and colleagues' revision represent a distinct conceptualization of ID that is not completely accepted by the American Psychiatric Association's (APA) Task Force authors of the ID criteria.

The authors of the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition - Text Revision (DSM-IV-TR; APA, 2000) and its 1994 precursor chose a similar definition of mental retardation as held by the AAMR. An amalgamated conceptualization of mental retardation was created by combining Grossman (1983) and Luckasson et al. (1992). This resulted in the APA's adoption of Grossman's four level severity classification scheme and an upper-IQ limit of 70. In addition, a fifth level was added, Severity Unspecified, for cases in which intelligence testing was unable to be conducted. Moreover, the APA adopted Luckasson and colleagues' criteria of 2 or more limitations in the 10 adaptive skill areas. Combining both Grossman (1983) and Luckasson et al. (1992) allowed for a compromise, however levels of ID are retained with the I.Q. test, and adaptive behavior scales established many years ago.

<u>Prevalence and Etiology of Intellectual Disability</u>

Prevalence estimates for ID vary based upon research methodology. Researchers mostly vary on issues related to the samples collected. Methods and criteria used to identify samples tend to be different across researchers. For example, when the sample consists of school-age children, the U.S. Department of Education (1994) reported that the rate of ID ranged from 0.3% to 2.5%, based on states where the data was collected. Such a range is accounted for by the criteria used to decide eligibility for special educational services, in which ID is a disorder that is eligible for services along with developmental delay, learning disability, and autism. When researchers base their criteria solely on IQ, the rate of ID is about 3% (Hodapp & Dykens, 1996). This rate drops to 0.9% when adaptive functioning is included in the criteria (Baroff, 1991).

As mentioned above, the construct of mental retardation is divided into levels of functioning: mild, moderate, severe, profound, and severity unspecified. The largest of group adults with ID are in the range of mild ID (Horwitz, Kerker, Owens, & Zigler, 2000). This group constitutes approximately 85% of all individuals with the condition (APA, 2000). In contrast, individuals diagnosed with moderate ID account for approximately 10%, those in the severe range account for 3-4%, and those in the profound range account for 1 to 2%. Researchers for the U.S. Department of Education established similar estimates for students. Children with mild ID consist of approximately 89%, whereas 7% are diagnosed with moderate ID, and 4% fall in the severe to profound range of ID.

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Other factors are also related to the variations in prevalence rates. Some researchers have found that age can account for differences in prevalence rates of ID. McLaren and Bryson (1987) reported that rates of ID increase with age, up through adolescence. They also reported a significant sex difference; more males have been identified with ID than females. Sex linked differences account for a portion of the increased proportion in males, the most prevalent being fragile X syndrome (Dykens, Hodapp, & Leckman, 1994). Furthermore, researchers (Hodapp & Dykens, 1996) have noted aninteraction of socioeconomic status (SES) and severity level of ID. Low SES and minority status has been associated with mild ID; however, SES appears to have little correlation with other levels of ID (Hodapp & Dykens, 1996).

An etiology of ID is often difficult to identify. Consequently, the vast majority of individuals have a diagnosis of ID with an unknown origin. Even with the known etiologies, confidence is limited because the causal relationship is generally only inferred (McLaren & Bryson, 1987). Researchers suggest that the estimates for the known and unknown etiologies appear to vary by level of ID. Hodapp and Dykens (1996) have researched this area and report about the percentage of unknown etiology. They concluded that for individuals with mild ID the number of unknown cased is 50-62% versus 20-40% for individuals with severe ID. McLaren and Bryson (1987) noted that for those with known etiologies, the origin might have multiple causal factors. Specifically, they reported that approximately 50% of the population of individuals with ID with a known etiology had more than one causal factor. Causally related factors include heredity, embryonic damage, environmental influences, mental disorders,

pregnancy and prenatal problems, and general medical conditions acquired in infancy or childhood (APA, 2000).

Some etiologies of ID can be established with more certainty than others. Overall, prenatal factors appear to have the strongest link to known etiologies. Researchers McLaren and Bryson (1987) have cited that chromosomal abnormalities of Down syndrome are more causally related to the development of ID than postnatal infections. In addition, they have added that prenatal factors appear to have an even greater influence than the perinatal factors. Prenatal factors account for 20 to 30% of the individuals identified with severe ID versus 11% accounted for by perinatal factors. McLaren and Bryson (1987) found that postnatal factors such as brain trauma account for the smallest percent, 3 to 12%. Hodapp, Burack, and Zigler (1990) cite that causal factors appear to interact with the level ID. They showed that individuals with biological causes tended to have more severe impairment (i.e., severe and profound ID), whereas those with environmental causes such as malnutrition or toxic exposure were less likely to have severe impairment (i.e., mild and moderate ID).

Historical Treatment and Care

Perhaps the greatest impact on the treatment of ID occurred around the turn and into the early part of the 20th century. During this time, residential training schools were established and intellectual and adaptive assessment measures were developed. By 1892, there were 19 states and nine privately operated training schools (Biasini et al., 1999). In 1905, Alfred Binet developed a measure to test intelligence quotients (IQ), and five years later Henry Goddard published an English translation of Binet's IQ test. In 1935, Edgar Doll developed a measure to assess adaptive living skills for people

suspected of having ID (Doll, 1962). The ability to test IQ and facilities to treat those with low IQ fueled the institutionalization movement. Unfortunately, there was an expectation that proper training would cure ID and that hospital stays would be short. When neither of these occurred, the training schools became overcrowded and the need for community-based supports became evident. Special education classes were developed and the training schools that once focused on education took on a more custodial role (Biasini et al., 1999).

During the middle of the 20th century it was believed that ID and mental illness were mutually exclusive and that the presence of one ruled out the presence of the other (Reiss, 1994). Only for the last 35 years has it been recognized that individuals with ID can express the full range of psychopathology. In the last 10 years, researchers have generally accepted that not only do individuals with ID experience mental illness; they may even experience it at higher frequencies than seen in individuals without ID (Borthwick-Duffy, 1994a; McLean, 1993). According to Holden and Gitlesen (2003), there is a link between the occurrence of mental illness and challenging behavior in individuals with ID.

Persistent throughout the history of ID has been the need to treat and control challenging behavior. One hallmark of ID has always been a limited ability to function in the social milieu (Doll, 1941; Duncan & Millard, 1866; Grossman, 1983; Tredgold & Soddy, 1963). A limited ability may manifest in what is called challenging behavior, or behavior that makes social interaction difficult (Emerson, 2001). Such behaviors include self-injurious (SIB), verbal or physical aggression, destruction of property, inappropriate social and sexual conduct, screaming, noncompliance, and ingestion of inedible objects

(pica). Challenging behaviors may be dangerous to the individual, problematic for

caregivers or staff, or unacceptable to the public (Holden & Gitlesen, 2003). Early

attempts to treat any abnormal behavior in individuals with ID were made by those in

the medical field centuries ago.

Significant change in the way the medical field treated individuals with ID has

occurred throughout history. The arrival of the psychotropic medication Thorazine in

1954 denoted the most recent evolution of modern treatment achieved by the medical

field (Healy, 2002). However, sedation and overmedication resulting in further

impairment of adaptive behaviors were common (Hill, Balow, & Bruininks, 1985). Much

has improved since the 1950s in the use and types of medication available. What has

not changed is the need for psychotropic medications to treat the psychopathology that

emerges in individuals with ID. Inherent to the use of these medications is the risk of

unwanted adverse reactions, including somnolence, dizziness, fatigue, etc. Movement

disorders are also a common and sometimes debilitating consequence of psychotropic

use. Akathisia is one such movement disorder and is important to identify because it is

easily misdiagnosed as a psychiatric problem rather than an adverse reaction to the

psychotropic medication (Brune & Braunig, 1997). Due to symptoms of restlessness

and agitation, common misdiagnoses have included agitated depression, manic

psychosis, and obsessive preoccupation (Sachdev, 1995a).

Among the recent significant events of the 20th century is the 1974 Wyatt-

Stickney federal court decision. This landmark class action suit in Alabama established

that persons living in residential facility have the right to treatment. In addition, the court

ruled that mere custodial care was prohibited. Shortly after, the United States Congress

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followed with similar action and established the Education for the Handicapped Act in

1975 (renamed the Individuals with Disabilities Education Act in 1990). Resulting from

this act was a guarantee of appropriate education for individuals with ID and other

developmental disabilities from school age to age 21. In 1986, this law was amended to

include children with disabilities as young as age three and to provide incentives for

states to develop infant and toddler service programs.

BEHAVIOR ASSESSMENT

Considerable research has gone into the development of the assessment of both

adaptive functioning and challenging behavior as they appear in individuals with ID.

Much research has been needed because assessment of this population has been a

particular challenge for researchers (Matson & Bamburg, 1998). Challenges arise from

the lack of self-report method. Some researchers have gone as far as to advocate

against the use of any self-report measures for individuals with the most severe

disabilities (Green, Gardner, & Reid, 1997). Often individuals with ID are limited by

developmental and communication challenges to provide accurate, if any, self report.

Difficulties in receptive and expressive language make self-report information difficult to

obtain and depend on. Without the ability to count on self report, the assessment

process must rely almost exclusively on observable behaviors. Three observational

types of behavior assessment have been developed to overcome the self-report barrier

and are often used together to gather data: direct, experimental, and indirect

assessment.

Direct Assessment

Direct assessment, also known as descriptive assessment, is a simple method

that records observable behaviors. Data is obtained using this method by recording

behavior while the individual is observed in his/her natural environment. Beyond the

individual's behavior, the surrounding environmental and social variables are observed

and recorded. An important distinction regarding direct assessment is that it involves

recording the presence of the target behavior while the individual is observed in a

natural setting. One of the oldest and commonly used direct assessment techniques is

the momentary time sample (Bindra & Blond, 1958). A momentary time sample records behavior at set times, for example every 10 minutes. At the 10-minute mark the observer records the presence or absence of the target behavior. A second example is A-B-C recording pioneered by Bijou, Peterson, and Ault (1968). Bijou and colleagues wrote that behavior could be functionally defined by collecting data on antecedents, behaviors, and consequences surrounding specific behaviors and stimulus events. The authors emphasized the use of objective definitions and systematic recording in functional assessment. A third example of descriptive assessment is the scatterplots technique (Touchette, McDonald, & Langer, 1985). This is a low-effort observation technique that identifies patterns of behavior by examining times and/or activities associated with the increased likelihood of the target behavior. Once direct assessment data is gathered it is used in functional assessment and can provide a quantitative picture of the target behavior and stimuli associated with it.

Experimental Functional Analysis

Another method of behavior assessment that relies on observation is experimental functional analysis popularized by Iwata, Dorsey, Sifler, Bauman, and Richman, (1982). Experimental functional analysis is unique; in this approach, behavior is observed in a contrived yet controlled setting. Contrived or experimental conditions allow for the manipulation of both antecedents and/or consequences in a control way. By manipulating the antecedents and consequences the maintaining variable that elicits the target behavior may be identified. Each observation is designed to test a hypothesis about the occurrence of the target behavior, i.e., the function of the behavior. If the hypothesis is correct, the behavior should only occur in the hypothesized setting and not

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in the other settings of the experiment. A benefit of this method is that it also is not reliant on self-report.

<u>Indirect or Informant Assessment</u>

Indirect or informant assessment is the final assessment method to be discussed. An indirect assessment is different from both direct and experimental assessment in that it uses a structured interview to gather information or data from witnesses of the behavior. Interviews are conducted with informants familiar with the individuals being assessed and consist of questions about the individual's behavior. Using an interview allows for both a quicker and more cost effective approach to gathering data than either the direct or the experimental methods.

Popular and commonly used, indirect assessment measures include behavioral rating scales. Researchers have developed rating scales to assess various constructs such as skills, deficits, psychopathology, behavioral function, and important to this paper, side-effects of medication. Examples of adaptive skills and deficits include the Vineland Adaptive Behavior Scales (Sparrow, Bella, & Cicchetti, 1984a, 1984b, 1985) and the Adaptive Behavior Scale (Nihira, Leland, & Lambert, 1993). Rating scales to assess social skills and deficits include the Social Performance Survey Schedule (Matson, Helsel, Bellack, & Senatore, 1983) and the Matson Evaluation of Social Skills for Individuals with sEvere Retardation (Matson, 1995). Several rating scales have been designed to screen for dual diagnosis including the Aberrant Behavior Checklist (Aman, Singh, Stewart, & Field, 1985), the Behavioral Problem Inventory (BPI; Rojahn, Polster, Mulick, & Wisniewki, 1989), the Reiss Screen for Maladaptive Behavior (Reiss, 1990), the Diagnostic Assessment of the Serially Handicapped-II (DASH-II; Matson, 1995b),

and the Assessment of Dual Diagnosis (ADD; Matson & Bamburg, 1998). Rating scales

to identify variables that influence the development and maintain of challenging behavior

include the Motivation Assessment Scale (Durand & Crimmins, 1988), and the

Questions About Behavior Function (Matson & Vollmer, 1995). Lastly, an example of a

rating scale to obtain information about adverse drug effects is the Matson Evaluation of

Drug Side Effects (MEDS; Matson & Baglio, 1998). All these methodologies have been

applied to the assessment of behavior and behavioral change in individuals with ID.

DUAL DIAGNOSIS

Recognition that mental illness is separate from ID has been an important distinction. Prior to the 17th century, little differentiation was made between mental illness and ID (Rosen, Clark, & Kivitz, 1976). Perhaps the lack of discrimination was owed mostly to the apparent similarities between psychotic symptoms and the behavior of those with more severe ID (Beier, 1964). For example, stereotypic body movements or odd behavior is seen in those with mental illness and also those with ID. As diagnostic systems developed, the core distinction between the two classes of mental disorders was made on intellectual ability, an individual's potential for reasoning and complex thought is not necessary or sufficient to diagnose mental illness (Lewis & MacLean, 1982).

Interest in the field of dual diagnosis began in the late 1860s, declined, and then reemerged in the late 1960s (Menolascino, 1970). Mental illness in patients with ID began to be reported in the nineteenth century. In 1866, Seguin described several cases of psychotic symptoms in children with ID. Similarly, in 1867, Greisinger gave an account of delusions, mania, and depression in children with ID. Later, other researchers, Clouston in 1883 and Hurd in 1888, reported identifying affective disorders in their patient with ID. In 1886, England was the first to make the legal distinction between mental illness and ID (Rosen, Clark, Kivitz, & 1976). Since the late 1960s, research in this area has grown steadily (Matson, 1995, 1997; Menolascino, 1970; Reiss, 1990, 1994). Matson and colleagues were among the first modern researchers to examine mood disorders, anxiety disorders, schizophrenia, somatoform disorders, psychosexual disorders, and eating disorders in person with ID (Matson, 1981, 1982,

1983; Matson & Barret, 1982; Matson & Frame, 1985; Matson, Gardner, Coe, & Sovner, 1991; Matson, Kazdin, & Senatore, 1984; Matson & Sevin, 1988).

Recognition that mental illness can occur in individuals with ID represents advancement in conceptualization of both mental illness and ID. Movement away from the misconception that mental illness and ID were the same was significant. However, the resulting response was that ID could not cooccur with mental illness was in a sense the pendulum swinging in the opposite direction. Szymanski and Gross (1984) pointed out that once the separation of mental illness from ID was made the tendency became to view the two disorders as non-overlapping. However, researchers in dual diagnosis have found that individuals with ID evince the full range of psychopathology seen in those without ID (Charlot, Doucette, & Mezzacappa, 1993; Matson 1995b). In fact, researchers have found that individuals with ID are at a higher risk of developing a mental illness (Borthwick-Duffy, 1994b; Matson & Barrett, 1993; Matson & Frame, 1985). Borthwick-Duffy (1994b) found that mental illness occurs at a rate of 10-40% for individuals with ID, whereas the percentage is considerably lower for individuals without ID. Of those who are dually diagnosed, individuals with less severe ID are more likely to have mental illness (Borthwick-Duffy & Eyman, 1990). In their study, Borthwick-Duffy and Eyman (1990) reported rates of mental illness in individuals with ID at 54% for mild ID, 26% for moderate ID, 11.5% for severe ID, and 8.5% for profound ID. The authors found that the best predictors of dual diagnosis are more aggression and depression, greater cognitive ability, and poorer social skills. However, this may be due to increased difficulty in identifying mental illness as severity increases. Specifically, communication and physical limitations in individuals with more severe ID hinder accurate assessment.

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Assessment of Dual Diagnosis

In recent years, researchers and clinicians have dedicated a substantial amount of attention to the assessment of dual diagnosis (Sturmey, 1998). Assessment has been difficult (Sturmey, 1996). An indication of the difficulty is the disagreement demonstrated by the diverse prevalence rates reported in the earlier literature, which ranged from 15% to 100% (Borthwich-Duffy & Eyman, 1990). A determination of dual diagnosis is made difficult by several factors that Borthwich-Duffy and Eyman (1990) point out. First, they posit that even emotionally well-adjusted individuals with ID, by virtue of impaired functioning, are likely to evince many of the same challenging behaviors as those that have a psychiatric disorder. Second, the referral process is marred by the caregiver's attribution of the challenging behavior as typical behavior for a person with ID. Third, the assessment of mental illness is made difficult by the lack of provisions for assessing individuals with multiple disabilities, limited verbal skills, and/or impaired performance on intelligence tests. The result is often an assessment of questionable validity that rarely adequately addresses the cognitive features of mental disorders. Fourth, the diagnosis process is marred by clinicians that believe that the presence of ID decreases the diagnostic importance of the challenging behavior, also referred to diagnostic overshadowing (Reiss et al., 1982). Finally, research studies are limited to small sample sizes and data collected largely from people that are referred to clinics. Sampling limitations of this kind muddle the interpretation of the available prevalence data.

Dual diagnosis researchers have steadily worked on ways to overcome some of the challenges in assessing individuals with ID. The Isle of Wight study (Rutter & Graham, 1970), the Aberdeen study (Birch, Richardson, Baird, Horobin, & Illsley, 1970)

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and the studies of Corbett (1979) are examples of improved sampling techniques. Other researchers have developed techniques to achieve diagnoses that are more reliable. One technique is the paper-and-pencil assessment scale. Unfortunately, few paper-and-pencil instruments with sound psychometrics have been developed to assess psychopathology in individuals with ID. Of those with good psychometrics are the DASH-II (Matson, 1995), the ADD (Matson, 1997), and the Reiss Screen (Reiss, 1990). Among this group, the DASH-II has special significance because it was the first scale designed to assess psychopathology in individuals with severe and profound ID.

Medication and Dual Diagnosis

Psychotropic medication is often included as part of the treatment of mental illness in individuals with dual diagnosis (Matson et al., 2003). As expected, the use of psychotropic medication is encouraged where indicated. However, there still remains a problem of overuse, misuse, and abuse. The widespread use of psychotropic medication, particularly the traditional neuroleptics (thioridazine, haloperidol, chlorpromazine), has received the most criticism because of the iatrogenic adverse reactions (McGillivray & McCabe, 2004). Concern has been raised about over-prescription of psychotropic medication lacking both diagnostic precision and efforts to use less restrictive interventions (Fleming et al., 1996). In 1967, one survey found that more than 50% of individuals with ID were using psychotropic medication (cited in Kalachnik et al., 1998). This amount is far greater than current expert consensus. In another sampling of psychotropic medication use in residential settings, Aman and Singh (1991) found that between 30% and 50% of individuals with ID had received antipsychotic medication. When contrasted with Borthwick-Duffy's (1994b) report of

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prevalence rates of 10-40% for mental illness in individuals with ID, there is clearly a significant portion of individuals with ID receiving medication without psychiatric diagnoses (Robertson, Emerson, Gregory, Hatton, Kessissoglou, & Hallam, 2000). Researchers have found similar results in the United Kingdom (Branford, 1996; Robertson et al., 2000) and in Australia (Jauerning &Hudson, 1995; Ryan, 1991; Sachdev, 1991).

Concern has also been raised over the use of psychotropic medications for this population especially with dopamine antagonists because the neuropsychiatric effects are controversial (Brasic, Barnett, Zelhof, & Tarpley, 2001). Use of psychotropic medications is associated with a range of adverse reactions from mild to life threatening including diabetes and cardiac difficulties (Aman, Sarphare, & Burrow, 1995; Baumeister, Sevin, & King, 1998; Emerson, 2001; Rinck, Guidry, & Calkins, 1989). Manufacturers claim that the newer medications have fewer adverse reactions but continued research is needed to examine long-term effects. An example is the atypical antipsychotics. Developers claim that these drugs result in fewer extrapyramidal symptoms such as tardive dyskinesia than first generation antipsychotic medications (Connor & Posever, 1998; Tollefson, Beasley, Tamura, Tran, & Potvin, 1997). However, researchers continue to caution their use based on recent evidence (Friedlander, Lazar, & Klancnik, 2001). Another concern is that some individuals with ID show differential responding to medication. For example, in a meta-analysis of medication efficacy, Didden, Duker, and Korzilius (1997) reported that only about 27% of individuals with ID were treated effectively with medication while 47% were treated fairly effectively, 23.5% with intermittent success, and 2.9% could not be treated effectively. Thus, the use of

psychotropic medication for this population should be carefully and thoughtfully considered.

McGillivray and McCabe (2004) report that polypharmacy is a common concern when prescribing psychotropic medication for this population. Polypharmacy occurs when the individual receives more than one different type of drug (i.e., interclass polypharmacy) or more than one drug from the same drug class (i.e., intraclass polypharmacy). Caution is advised with this practice since polypharmacy increases the risks of adverse reactions associated with drug interactions (Sommi, Benefield, Curtis, Lott, Saklad, & Wilson, 1998). Sommi and colleagues (1998) cite polypharmacy-related concerns unique to individuals with ID. They state that individuals with ID are at a greater risk of harm from polypharmacy due to an abnormal metabolism brought on by genetic factors. Abnormal metabolic rates may lead to inadequate removal of the medication that in turn increases the level of the medication in the body and toxicity. In addition, Sommi et al. (1998) note that individuals with ID are often prescribed more than one drug at a time due to coexisting medical conditions, such as seizure disorders, gastrointestinal difficulties and cardiovascular problems. The overall effect is that once a psychotropic medication is administered it may result in the creation of a drug cocktail (McGillivray & McCabe, 2004). However, there are cases where polypharmacy may be appropriate. Some individuals with ID display a complex array of emotional and behavioral disturbances that may benefit from multiple drug therapy (Sommi et al., 1998).

As-needed medication or *pro re nata* (PRN) is also a concern for several reasons. First, it commonly results in polypharmacy (McGillivray & McCabe, 2004).

Second, it may indicate that the type or dose of the current psychotropic drugs is ineffective (Craig & Bracken, 1995). Third, it is particularly vulnerable to abuse. Suresh (1998) points out that some PRN medication is used indiscriminately or for staff convenience. There are appropriate, albeit limited, uses for PRN medication. International consensus guidelines opinion that a PRN medication is reserved for behaviors that occur infrequently as there is a greater risk of adverse reaction with continuous medication use (Kalachnik et al., 1998). Another situation where a PRN is appropriate is when challenging behavior occurs without provocation and does not quickly diminish in intensity. However, various researchers question the evidence that support the use of psychotropic medications to treatment of challenging behavior (Baumeister et al., 1998; Brylewski & Duggan, 1999; Matson et al., 2000).

According to McGillivray and McCabe, (2004) the concerns associated with prescribing psychotropic medication to individuals with ID suggest a need for ongoing review and research. They suggest that a particular focus be placed into the reasons for use and the efficacy of the drugs on the target symptom. In addition, researchers need to conduct studies examining the type and level appropriate for individuals with ID. Despite misuse, many individuals with ID do need daily medications to treat the high prevalence of epilepsy, psychiatric disorders, and other serious disease (Beange, McEldoff, & Baker, 1995; King, 2002; McGillivray & McCabe, 2004; Matson, 1995).

Medication Adverse Reactions

Beyond medication misuse, medication adverse reactions are a serious concern (Wilson, Lott, & Tsai, 1998). All medication carries the risk that the individual taking the medication may experience effects not intended by the manufacturer. Such effects are

often called side effects. However, side effects are not necessarily untoward and deleterious (Wilson et al., 1998). Some medication may be prescribed for the side effect. For example, it is often the case that a medication is prescribed for its sedating side effect. Medication adverse reactions on the other hand are not the goal of the prescribing clinician. Adverse reactions may be life threatening, harmful, and at the least unpleasant (Wilson et al., 1998).

Researchers continually focus on the unintended effects of medication. One important conclusion drawn by the extent literature is that the occurrences of side effects are common in both populations of individuals with and without ID. Additional concerns are raised for the population of those with ID because, as a group, they tend to use more medications and have a greater susceptibility to adverse reactions because of medical concerns. As research continues and reports of additional adverse reactions occur in the literature the understanding of medication profiles grows.

NEUROLEPTIC-INDUCED AKATHISIA

Haskovec first described akathisia in 1902 (Nelson, 2001). Akathisia is defined as a cluster of unpleasant symptoms that can manifest both internally and externally (Sachdev, 1995b). The internal symptoms include tension, panic, irritability and impatience (Halstead, Barnes, & Speller, 1994). Other authors described a sense of "inner restlessness," which is a sensation of mental restlessness that leads to a state of "inner agitation" (Sachdev & Loneragan, 1991). The externalized behaviors are described as an inability to keep physically still or maintain a static posture for an extended period (Sachdev, 1995b). Akathisia, derived from the Greek *akathemi,* is translated to mean "not/never to sit" (Ayd, 1995). Individuals affected by akathisia are acutely aware of their urge to remain in a state of constant motion, and in severe cases are unable to suppress their urge voluntarily. Often, individuals with akathisia feel very fidgety and have a strong urge to change their body position repeatedly. Examples include constantly shifting body position while sitting, continuous rocking motions, constantly crossing and uncrossing legs, and constantly swinging legs (Chung & Chin, 1996). Individuals may suddenly jump out of their seat or raise and sit often. In a standing position, individuals may constantly shift from one foot to the other foot and pace about the room quickly as if driven (Adler, Angrist, & Reiter, 1989). Akathisia is linked to a variety of severe challenging behaviors including aggression (Stubbs, Hutchins, & Mountjoy, 2000), suicide (Drake & Erlich, 1985; see Hansen, 2001) and homicide (Schulte, 1985).

Important to this paper is neuroleptic-induced akathisia (NIA), an iatrogenic medication adverse reaction caused by long-term use of dopamine antagonizing agents

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(DAA). The most common DAA's are neuroleptic medications. Other medications are also associated with akathisia. They include serotonin receptor antagonists, lithium, levodopa, calcium channel blockers, phenothiazine antiemetics (Bodfish et al., 1997) opiates, certain antiepileptics, anticholinergics, benzodiazepines and beta-blockers (Young, Piovesan, & Biglan, 2003).

An important point to clarify is that akathisia may occur spontaneously. Accounts of spontaneous akathisia cases have been reported in the literature since 1901 (Brune & Sachdev, 2002), predating the development of psychotropic medications. Chouinard (2004) offers a classification system of the movement spectrum disorders that helps articulate the difference between NIA and spontaneous akathisia. His distinction between pathophysiologic and neuroleptic induced movement disorders is a way to increase the accuracy of the diagnosis and improve communication among treating clinicians. Pathophysiologic origins of movement disorders include disorders that are spontaneous, inherited, neurodegenerative, consequence of metabolic abnormalities, idiopathic, or secondary to infection. Examples of these disorders include Parkinson and Huntington's disease. Conversely, neuroleptic induced movement disorders have a determined origin. Examples included akathisia, tardive dyskinesia, and dystonia. An indicator of differentiation is the presentation of the dyskinetic movement. Three distinctions are made between movement disorders based on the following: reversible versus persistent movements, hyperkinetic (excessive or involuntary) versus hypokinetic (slowed or absent voluntary), and within hypokinetic movement dystonic (sustained muscle tone) versus nondystonic. Notwithstanding, a distinction between NIA and spontaneous akathisia is difficult if possible to obtain once a neuroleptic is used by

an individual. Logically, the emergence of akathisia following neuroleptic use is assumed that the result of neuroleptic inducement. Since the symptoms of spontaneous akathisia are no different from NIA both will be referred to as akathisia henceforth.

Akathisia is recognized by the APA as a medical disorder. Under the current scheme, a diagnosis of akathisia is listed in the Axis III section of the multiaxial system (Sadler, 1996). However, a distinction between axis to axis is not meant to imply fundamental differences in conceptualization (i.e., that mental disorders are unrelated to physical or biological factors) (APA, 2000). The APA's purpose of the multiaxial system is to encourage thoughtfulness in evaluation and to enhance communication. As for the situation when a medical disorder influences psychological well being, the specifier "...due to a general medical condition" is added thereby moving the disorder from Axis III to Axis I (APA). This allows for a greater focus on the impact of the medical disorder.

Similarly, the articulation of a neuroleptic as the causal pathway for neuroleptic induced movement disorders allows for greater communication and focus on an appropriate treatment. In the last decade, NIA has come into the focus of the APA's diagnostic classification system. Acute NIA appears in appendix B of the DSM, Criteria Sets and Axes Provided for Further Study (APA, 1994, 2000). This appendix provides proposals for new categories and axes suggested for inclusion in the manual but were found to have an insufficient body of literature to support the inclusion. The Task Force, based on expert consensus, offers research criteria to develop the body of literature.

Diagnostic feature for akathisia offered by the APA task force (APA, 1994; 2000) include a subjective complaint of restlessness after exposure and at least one dyskinetic movement. Specific dyskinesia criteria include fidgety movements or swinging of the

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legs, rocking from foot to foot while standing, pacing to relieve restlessness, and an

inability to sit or stand still for at least several minutes. In the most severe cases the

individual is unable to remain in any position for more than a few seconds. Distress is

experienced if one is asked not to move. The individual may make complaints of an

inner sense of restlessness, most often in the legs. Dysphoria and anxiety may also be

present. Symptoms of acute akathisia typically occur within 4 weeks of initiation of a

neuroleptic or dose increase but may also occur with a dose decrease of a medication

used to treat acute extrapyramidal symptoms. The final diagnostic criterion is that the

symptoms are not better accounted for by a mental disorder (e.g., schizophrenia or a

nonneuroleptic substance such as iron deficiency anemia). Unique to all other entries in

appendix B are the DSM diagnostic codes assigned to the Medication-Induced

Movement Disorders. For example, Neuroleptic-Induced Acute Akathisia has the code

333.99.

Nomenclature

The nomenclature used to describe akathisia includes acute, tardive, withdrawal,

or chronic based on the emergence and course of the symptoms (Brune & Braunig,

1997; Nelson, 2001). An additional diagnosis that appears in the literature is

pseudoakathisia (Halstead et al., 1994; Nelson, 2001; Stahl, 1985; Stubbs & Halstead,

2000), which may be considered akathisia not otherwise specified. In pseudoakathisia,

the objective behaviors of akathisia are present but the subjective components are

absent (Stahl, 1985). Acute akathisia emerges immediately following the first use of

neuroleptic treatments, within minutes or days after administration of a single dose

(Adler et al., 1989; Adler & Angrist, 1994; Nelson, 2001). However, some authors

suggest the onset may be up to six months after an increase in the dosage (Barnes, 1989). Tardive akathisia is a delayed onset of about three months, not related to a recent change in drug or dose (Miller & Fleishhacker, 2000; Sachdev, 1995c). Tardive or delayed akathisia may occur up to 6 years following use of a neuroleptic treatment (Sachdev, 1995b). Withdrawal akathisia emerges within six weeks of discontinuation or a significant dose decrease (Miller & Fleishhacker, 2000). Chronic akathisia persists for months to years even after the antipsychotic medication is discontinued (Miller & Fleishhacker, 2000; Sachdev, 1995c).

Epidemiology

Researchers of akathisia who study individuals without ID report a wide occurrence ranging between 20% and 75% (Braude, Barnes, & Gore, 1983; Chung & Chin, 1996; Haskovec cited in Nelson, 2001). This range may be accounted for by the varying diagnostic approaches and differences in study populations. Concerning demographic factors related to akathisia, no evidence suggests race is related to vulnerability and sex overall does not seem to influence the occurrence either (Sachdev, 1995a). However, some researchers have found that acute akathisia and pseudoakathisia are more common in men whereas chronic akathisia is more common in women (Halstead et al., 1994). Age does not have a significant influence on the occurrence of acute akathisia (Miller & Fleishhacker, 2000). The risk of akathisia is increased in higher potency drugs, higher doses, increased rates of dose escalation, the presence of extrapyramidal side effects, and parenteral administration (Sachdev, 1995a; Sachdev & Kruk, 1994).

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Pathophysiology

      Akathisia is generally referred to as a disorder of the dopamine system in the basal ganglia of the cerebrum (Sachdev & Saharov, 1998). An exact pathophysiology of akathisia is not completely understood, but multiple hypotheses have been offered (Casey, 2004). Dopamine receptor supersensitivity is one of the first hypotheses posited. Supersensitivity is based on the law of denervation (Carlsson, 1970). The law states that the destruction of presynaptic neurons results in an increase in sensitivity of the denervated postsynaptic neurons. In the case of antipsychotic medication, denervation is done chemically by blocking the dopamine receptors and causing supersensitivity to the remaining unblocked postsynaptic neurons. A second hypothesis posed is the blockade of serotonin in the mesocortical dopamine system. Newer antipsychotic medications are known to block serotonin-2A receptors in addition to dopamine receptors. Serotonin inhibits dopamine release; therefore blocking serotonin increases the release of dopamine. Positron emission tomography researchers showed that D2 receptor occupancy in the striatum plays a role in akathisia (Farde, Nordstrom, Weisel, Pauli, Halldin, & Sedvall, 1992). A final hypothesis to be advanced is a variation of the supersensitivity model. Casey (2004) proposal of the rapid dissociation model is the newest to be advanced. Rapid dissociation is the binding and quick release of the molecule from the receptor site. This model is based on the putative difference between the newer and older antipsychotic medication. Newer antipsychotics are believed to bind with the receptor sites for a shorter time. A quick binding and then release is believed to be long enough to act therapeutically but not long enough to cause the dyskinesia. Such

an action may explain why the newer antipsychotic medications tend not to elicit movement disorder.

Treatment of Akathisia

Neuroleptic induced akathisia is a pharmacological concern and treatment necessarily begins with the medication regimen (Saltz, Woerner, Robinson, & Kane, 2000; Stanilla & Simpson, 2004). A first step is to reduce the dose or the potency of the medication if clinical possible with the goal to discontinue the medication (Brune & Braunig, 1997; Nelson, 2001; Stanilla & Simpson, 2004). However, when these are not an option, changing to an alternative medication within the same class of medications or considering a newer (atypical) antipsychotic is considered a viable treatment option (Nelson, 2001; Sachdev, 1995a). Alternately, anticholinergic drugs, anticholinergic drugs plus amantidine, benzodiazepines, and beta-receptor blockers may be introduced (Brune & Braunig, 1997; Stanilla & Simpson, 2004).

Clinical Implications

Neuroleptic induced akathisia is easily misdiagnosed as a psychiatric disorder (Brune & Braunig, 1997; Ferrando & Eisendrath, 1991; Hirose, 2001; Marsalek, 1997). Arriving at an accurate diagnosis of akathisia is difficult but important to identifying an appropriate treatment. The experienced clinician may have difficulty differentiating akathisia from tardive dyskinesia (TD) and stereotypic movements (Bodfish et al., 1997; Brune & Braunig, 1997). All three are movement related disorders but are distinguished by topography and origin.

Tardive dyskinesia has a well-defined topography that is distinct from akathisia or stereotypic movements (Kane, 1995). Movements of TD are classified as choreiform,

athetoid, and rhythmic (American College of Neuropsychopharmacology FDA Task Force, 1973). Choreiform movements are rapid, jerky non-repetitive movements. Athetoid movements are slow, sinuous, continual movements. Rhythmic movements are those that are excessively repetitious and lack variety. Using these classifications enable the differentiation between akathisia and stereotypic movements.

Areas of the body that are effects are also distinct. Effected areas include the tongue and muscles of the face, jaw, fingers, arms, toes, legs, and trunk. The most common symptoms of TD are the orofacial dyskinesias, abnormal movements of the tongue, jaw, and muscles of the face often appear rhythmic or writhing (American College of Neuropsychopharmacology FDA Task Force, 1973). When these movements first appear, early in the disorder, they are slow and usually start with mild tongue movements. As the symptoms progress, significant movements are observed in the lips and tongue. These lip and tongue movements include smacking the lips together, licking the lips, puckering of the lips, sucking movements, lower lip thrusting, sticking the tongue out (fly catching), twitching of the tongue, pushing the tongue to bulge the cheeks (bonbon sign), and tonic (hanging) tongue. Additional orofacial dyskinesia includes arching of the eyebrows, grimacing, chewing movements, continuous blinking of the eyes, rapid eye blinking, and wrinkling of the eyebrows.

Tardive dyskinesia also has distinct leg, arm, trunk, feet, hand, finger, and toe movements (American College of Neuropsychopharmacology FDA Task Force, 1973). Often the movements are rapid and may include wiggling, twisting, and tapping. Abnormal finger movements appear vermicular, wormlike such that it appears an invisible musical instrument is played, or myokymic, jerky, like the fingers are being

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pulled upward as if attached to strings. Abnormal ankles and toes movements include flexing and extending the ankles and toes. Body rocking, twisting, swaying, writhing, flexing, jerking, and stiffening are observed. Hips and shoulder rotation occur. Neck movements include the head snapping back or to the side. Abnormal jerking movements can be present in the belly area and the diaphragm making it difficult to breathe or talk, and may result in grunting sounds.

Stereotypes are common among individuals with ID and distinguishable from both akathisia and tardive dyskinesia. A primary difference is that stereotypies are voluntary and under complete control of the individual. Given that the movements are voluntary, they are susceptible to manipulation. Both reinforcement and environmental alterations may increase or decrease the occurrence of behaviors. Operant conditioning effect the frequency of the movement, for example, a stereotypic movement may be used to gain attention via staff intervention, escape form task demands, or service as self-stimulation. In the latter case of self-simulation, environmental changes may be used to alter the frequency of the behavior. For example, by systematically altering the sensory experience a person receives as in case reported by Rojahn, Hammer, and Kroeger (1997). Rojahn and colleagues reported on a case where hand-flapping was extinguished by placing a loosely fitted bracelet on the arm, which bounced around when the hand-flapped. The stereotyped behavior decreased, presumable because the sensory experience was changed. Alternately, both akathisia and tardive dyskinesia are difficult or impossible to contain. Stereotyped behavior also has distinct topographies that include body rocking, hand clapping, hand postures, repeated vocal noises, and ritualistic manipulation of objects (Rojahn et al., 1997). Each individual appears to have

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a unique set of movements that are nonfunctional and purposeless. Unique to stereotypic movements is self-injurious behavior such as self-biting, self-hitting, head banging, and skin picking. The dyskinetic movements of akathisia and tardive dyskinesia do not produce injury. A final difference is that stereotypies do not originate with the use of medication as both akathisia and tardive dyskinesia (Branford & Hutchins, 1996).

Other common psychiatric differential diagnoses are anxiety, agitation secondary to psychotic symptoms, restless legs syndrome, drug withdrawal states, and neurological disorders (Nelson, 2001). In mild cases of akathisia, the individual may appear anxious and is mistakenly diagnosed as an anxiety related disorder. In severe cases of akathisia, the individual may present as experiencing a mood related disorder. Often the individual appears severely dysphoric, anxious, and/or irritable-symptoms used to diagnosis mood related disorders. Another concern with the identification of akathisia is that inexperienced clinicians may be slow to recognize the symptoms of neuroleptic induced akathisia.

The presence of akathisia has other clinical implications. Since akathisia tends to exacerbate psychiatric symptoms such as psychosis individuals are often distressed by the false belief that their akathisia is a worsening of the psychiatric symptoms (Nelson, 2001). Recognition of the akathisia from the ongoing psychiatric symptoms for which the neuroleptic was prescribed is difficult for the individual (Drake & Erlich, 1985). As a result, researchers have hypothesized that exacerbation of symptoms and erroneous beliefs that symptoms are worsening lead to more despair and suicidal ideation (Brune & Braunig, 1997). Akathisia puts people at an increased risk of developing other

movement disorders such as tardive dyskinesia (Barnes, 1989; Chung & Chin, 1996).

Lastly, other nonclinical challenging behavior may develop including behaviors related

to noncompliance with staff directive to sit or stay in an area, lower thresholds of

frustration tolerance, aggression, and in extreme cases suicide or homicide (Brune &

Braunig, 1997; Gualtieri, 1993).

<u>Intellect Disability and Akathisia</u>

  Kumar (1979) is among the first to describe a case of akathisia in a person with

ID. He treated a man with severe ID who was given thioridazine for aggression. While

using thioridazine the man began having episodes of disrobing, attempts to climb walls,

profuse sweating, and attempts to climb out windows. These symptoms were abated

with amobarbital sodium. Kumar's is one of a few published case studies that exist in

the ID literature.

  A reason for the paucity of research is the difficult nature of diagnosing the

subjective component in a population where communication difficulty is common. For

example, early prevalence researchers Ganesh, Rao, and Cowie (1989) were only able

to examine the motor manifestations of akathisia as "the subjective component of

akathisia was difficult to elicit in this population with difficulties in verbal communication."

Bodfish and colleagues (1997) cautioned about the precarious nature of using akathisia

rating scales intended for individuals without ID. They cite measures that are clearly not

valid for individuals with diminished cognitive skills because the scales emphasize

subjective reports of restlessness that may not be possible to attain reliably.

  Another problem of diagnosing akathisia is the case of pseudoakathisia.

Pseudoakathisia is the term used when the subjective component of akathisia is absent

but the objective behaviors are present (Stahl, 1985). Debate surrounds the use of the diagnosis of pseudoakathisia and persons with ID (Sachdev & Loneragan, 1991). Pseudoakathisia may appear to be a reasonable diagnosis for individuals with ID because of the limitations in assessing the subjective components from individuals with limited expressive communication. However, caution is advised in broadly disallowing the possibility of a complete diagnostic category because of inherent language limitations related to ID. A parallel debate is found in the early dual diagnosis literature. Until recently, it was believed that individuals with ID could not be adequately diagnosed with mental illness because of insufficient intellectual ability. Current dual diagnosis researchers have shown that a person with ID may experience the full range of psychopathology despite the ability to articulate (Borthwick-Duffy, 1994b). The inability to confirm confidently the subjective component of akathisia should not deter the clinician from considering the occurrence of this disorder in individuals with ID. Finally, Sachdev and Loneragan (1991) reported that there is debate over the need for both objective and subjective components of akathisia, i.e., if pseudoakathisia is a necessary distinction.

Researchers are challenged by the difficult nature of investigating akathisia in the intellectually disabled population. One of the few groups to examine ID and akathisia are Ganesh and colleagues (1989). These researchers found that 5 of their 66, less than 8%, participants evinced akathisia. Interestingly, no correlations were found on demographic, clinical, or pharmacological variables but a stepwise multiple regression found that younger age was a predictor of akathisia. In contrast, Bodfish and colleagues (1997) found a 20% rate of akathisia in their sample. Also in contrast they found a

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significant positive correlation between the dose of neuroleptic medication and emergent akathisia were Ganesh and colleagues (1989) did not. An additional difference between these two groups of researchers: no significant relationship between sex or age was found by Bodfish and colleagues. Sex and age are two factors that are commonly related to movement disorders.

Bodfish and colleagues (1997) research was to compare the topographic differences among akathisia, dyskinesia, and stereotypic movements. Interestingly, they found that the presence of akathisia increased the risk of a concomitant dyskinesia by three times. Akathisia was eight times more likely when stereotypic movements were present. They concluded that akathisia, dyskinesia, and stereotypic movements are distinct and orthogonal.

Brasic and Barnett (1997) evaluated a 7-year-old Bangladeshi boy with autistic disorder, unspecified ID, and generalized tonic seizures, presented for hyperactivity, aggression, and disruptive behaviors. Haloperidol and valproic acid were used in an attempt to treat the boy. While observed in a stark environment leg movement and inability to sit still along with hand flapping, jumping, running, spinning, motor and phonic stereotypes typical of autistic disorder were observed. The authors concluded that despite the articulation of subjective distress and a sensation of inner restlessness given his cognitive impairments, the objective picture of constant leg movement and inability to sit still was consistent with akathisia. They conceded that the hyperkinesias might be due to autistic disorder, multiple comorbid conditions, or medications. Further, they urged studies with large populations of medicated and unmedicated children with

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autistic disorder to characterize further the associated movement disorders that may result from neurological disorders and pharmacological treatments.

In another study by Brasic and colleagues (1997), a boy with autistic disorder and severe ID who developed severe dyskinesias, including objective akathisia was treated. Akathisia emerged a month after discontinuation of approximately two years of treatment with a dopamine antagonist. Dyskinesias were reported to subside during a 17-week trial of clomipramine, and returned when the parents abruptly discontinued clomipramine. The dyskinesias gradually subside during two and a half years of follow-up where the boy was off all medication. A hypothesis was offered suggesting that movement disorders such as akathisia can abate after several months free of the dopamine antagonist. An addition of clomipramine may facilitate the abatement process in some boys with autistic disorder and ID.

Brasic and colleagues (2001) sought to characterize the effect of dopamine antagonists on movements and behaviors of persons with ID. Their stance encourages the use of dopamine antagonists as treatment gains were established with minimal adverse reactions. A sample of 9 adults with ID referred to psychiatric clinics was measured on various challenging behaviors. Included among the dyskinesias assessed was akathisia. Two groups were assessed, 5 men treated with dopamine antagonists in a dosage range equivalent to 67-220 mg chlorpromazine, and 2 men and 2 women who had received no medication during the preceding 3 months. The nonmedicated participants showed no difference in akathisia. The authors concluded that dopamine antagonists ameliorate the dyskinesias in some persons with ID and behavior challenge.

However, they caution that beneficial effects of dopamine antagonists must be weighed against adverse effects, including withdrawal symptoms and dyskinesias.

Direct Assessment of Akathisia

The first scale to assess akathisia in individuals with ID was developed by Bodfish et al., (1997). They developed a seven-item scale that assesses only the objective components of akathisia called the Akathisia Ratings of Movement Scale (ARMS). An assessment using the ARMS is completed while the individual is observed sitting and standing. There is an option to include three items that asked the individual to remain lying. However, the lying portion was removed by Bodfish et al (1997) because of difficulties gaining compliance. Sachdev (1994) also found that compliance was difficult to obtain and subsequently omits an observation of the individual lying down. A Likert-like scale of 0 -4 (0 = not present, 1 = minimal, 2 = mild, 3 = moderate, 4 = severe) with a maximum score of 28 and a cut-off score of 4 is used to score the ARMS.

Bodfish and colleagues (1997) developed the ARMS based on two existing scales. Items from an akathisia scale developed by Barnes (1989), Rating Scale for Drug Induced Akathisia, were combined with the Likert-like rating system of the Dyskinesia Identification System Condensed User Scale (DISCUS; Sprague, Kalachnik, & Slaw, 1989) to form a scale to be used with an ID population. Psychometric properties were examined by Bodfish et al., (1997) using three groups of individuals with ID (a neuroleptic-maintenance group, neuroleptic-reduction group, and neuroleptic-free group). All participants were individuals with (a) severe or profound ID, (b) were 18 to 60 years of age, (c) were ambulatory, and (d) had normal dental status. In addition to

criteria (a) through (d), the neuroleptic-maintenance group had a minimum of 3 years of neuroleptic-medication treatment, no dosage changes in the past 6 months, were not receiving anticholinergic medication. This group comprised 66 individuals (80% males). The neuroleptic-reduction group met criteria (a) through (d), and comprised 8 (88% males). The neuroleptic-free group also met criteria (a) through (d) but had the additional criteria of no exposure to neuroleptic medication within the past 3 years. This group comprised 20 (65% males).

Each of the three groups was assessed using the ARMS, DISCUS, and the Stereotypy Checklist. According to Bodfish et al., 1997, interrater reliability for the ARMS was collected on 23% of that sample, the Pearson product moment was r = 0.69. Predicative validity was supported by significant t-tests comparisons of the neuroleptic-maintenance and the neuroleptic-free group means, t (84) = 2.1, p < 0.025, and a comparison of the pre and post reduction neuroleptic groups, t (7) = 3.12, p < 0.05. Bodfish et al. (1997) report that akathisia was more prevalent in their persons with neuroleptic medication reduction group. They found 63% of the neuroleptic-reduction group demonstrated at least one symptom of akathisia versus 45% of the neuroleptic-maintenance group and 27% of the neuroleptic-free group. Of those meeting the cut off scores were 25% of the neuroleptic-reduction group, 17% of the neuroleptic-maintenance group and 5% of the neuroleptic-free group. An important note is that the neuroleptic-free group only endorsed two items, fidgety arms/hands and legs/feet. No other symptoms were endorsed. Therefore, raters who are unsure of a medication history may rule out spontaneous akathisia from drug-induced akathisia based on the topography of symptoms.

Other assessment measures have been designed exclusively for assessing akathisia in those without ID and have published psychometrics. They are the Rating Scale for Drug-Induced Akathisia (Barnes, 1989; 2003), the Prince Henry Hospital Akathisia Rating Scale (Sachdev, 1994), and the Hillside Akathisia Scale (Fleischhacker, Bergman & Perovich, 1989). Movement related scales, not specifically for akathisia, designed for those without ID include the Abnormal Involuntary Movement Scale (AIMS; Guy, 1976), the Extrapyramidal side effect rating scale (ESRS; Chouinard, Vainer, Belanger, Turnier, Beaudry, Roy, & Miller, 1980), the Neuropsychiatric Inventory (NPI; Cummings, Mega, Gray, Rosemberg-Thompson, & Gornbein, 1994), the Scale for Targeting Abnormal Kinetic Energy (TAKE; Wojcik, Gelenberg, LaBrie, & Mieske, 1980), Simpson-Angus Scale (SAS; Simpson & Angus, 1970), and the St. Hans Scale (SHS; Gerlach, Korsgaard, Clemmesen, Lauersen, Magelund, Noring, Povlsen, Bech, & Casey, 1993).

Problems with Conducting a Direct Assessment

Researchers have done much to advance the technology used to assess the presences of akathisia in individuals with ID. As mentioned above Bodfish and colleagues (1997) have developed the first such measure, the ARMS. However, administering the ARMS may not be practical in some situation and for some individuals. For example, included in the Bodfish et al. (1997), assessment procedure are sitting and standing portions but physical abilities and compliance to perform such activities represent the ideal situation. Individuals who function in the severe and profound range of ID and also those with sever physical impairment can present a challenge when attempting to conduct an assessment such as the ARMS.

Assessment challenges originate from two assumptions. The first is the presumed ability to stand unassisted. Activities such as this are not possible for all individual. For example, individuals who are confined to a supine position such as those who are bedridden are not able to complete the standing portion of the exam. Accordingly, assessing ambulatory restlessness is obviously difficult. An inability to conduct this portion of the ARMS assessment limits the sensitivity and specificity of this measure and caution is advice when interpreting these scores. The second assumption is that of compliance. Often when assessing individuals with greater limitations, part of the assessment cannot be conducted because compliance is not present. Assessment such as the ARMS calls for the individual to attend to the examiner and perform various tasks. Often maintaining interest in the assessor or the whole assessment process in general can be difficult for the individual. Sometimes the individual may stop the task before the required time has elapsed. Other times an individual will continue a task long after the examiner has asked the individual to move on to a new task, e.g., continuing to standing after being asked to be seated. Sections of the assessment procedures have been removed from the researchers' original expectation for an assessment process. Both Sachdev (1994) and Bodfish et al., (1997) found it difficult to administer part of their assessments because of noncompliant behavior. Bodfish et al. (1997) found that some items could not be administered to 60% of their sample because of noncompliant behavior.

A dual diagnosis may also present a challenge to conducting assessments like the ARMS. For example, a person with a dual diagnosis from the pervasive developmental spectrum disorder may present a challenge to conducting an

assessment. The assessment procedure calls for the individual to interact with and submit to intrusive interaction with a stranger. Sometimes the individuals encounter great distress while engaging in the assessment.

<u>Indirect Assessment of Akathisia</u>

Identification of akathisia in individuals with ID is difficult, as noted above. An additional problem is that the possibility of a disorder is overlooked in individuals with ID because challenging behavior is easily misattributed to the disability (Reiss et al., 1982). Part of this misattribution comes from the limited ability to assess the cognitive aspects of many disorders reliably. Difficulty is inherent when assessing individuals with impaired verbal skills, and the presences of comorbid disorders (Borthwick-Duffy & Eyman, 1990).

MEDS.

The MEDS (Matson & Baglio, 1998), an indirect assessment designed to obtain information about adverse drug effects. Included in the MEDS are a cover sheet, an information sheet, and the items to be assessed. An information sheet allows opportunities to record relevant demographic information, DSM-IV-TR diagnoses, and medications. Scoring the protocol requires the respondent to answer the items along two dimensions, severity and duration. Each item is rated on a three-point Likert-like scale with the additional options to report "don't know" (DK) and "no opportunity" (N). The three points used in the Likert-like scale to indicate severity are "0 = not a problem, not present," "1 = mild or moderate problem," and "2 = severe or profound problem." The three points of the Likert-like scale used to indicate duration are "0 = less than 1 month," "1 = between 1 to 12 months," and "2 =more than 12 months." Scores for both

the severity and duration are tallied to create a total severity and a total duration composite score. All instances of "N" are coded as a score of "1". If the total number of items reported as "DK" exceeds 15%, the evaluation's validity should be considered questionable. Specific to akathisia, the MEDS includes the Central Nervous System Behavioral/Akathisia (CNS-BA) subscale. The CNS-BA subscale includes an item addressing anxiety or nervousness.

Using an indirect assessment is a reasonable approach to assessing individuals with ID. Indirect assessment overcomes to some extent the problem of noncompliant behavior because the individual's compliance is not required to conduct the indirect assessment interview. Additionally, items that assess internal behavior function may be included. The MEDS is an ideal assessment scale as it addresses both the issue of noncompliant behavior and assessment of subjective symptoms. Further, the CNS-BA subscale is the only assessment of akathisia validated to be used with persons with ID that includes a focus on the subjective component of akathisia.

RATIONALE

Many individuals with ID are prescribed psychotropic medications to address psychiatric disorders and challenging behavior. Often therapeutic gains are achieved. However, psychotropic medication use puts the individual at risk of developing a medication adverse reaction, which akathisia is included. Expert consensus guidelines suggest that a system be in place to identify and monitor the emergence of adverse reactions. Identification of adverse reactions in individuals with ID presents a significant challenge, often the symptoms are difficult to detect. Often treatment teams are presented with emerging aberrant behavior with differing opinions of possible etiologies and perpetuating factors. Pyles and colleagues (1997) suggest that attempts to identify possible etiologies and perpetuating factors should begin with attention to the influence of medical variables. Poor medical health, concomitant medical problems, and medical etiologies for aberrant behavior need to be considered before a behavioral intervention is attempted. For persons with ID and a history of psychotropic medication use special attention should be paid to the identification of adverse reactions to medication and consideration for this to be the beginning step to treating aberrant behavior. To this end, Matson and Baglio, 1998 have developed the MEDS to be used in monitoring for adverse reactions.

Subscales of the MEDS assess for the emergence of various medication-induced disorders. One such class of disorders is the movement disorders that include akathisia, dystonia, pseudoparkinsonism, and tardive dyskinesia. Identification of akathisia is of a particular challenge for individuals with ID because of the difficult nature of identifying the symptomology. Ruling out akathisia is an important step in treating aberrant

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behavior because it is easily misdiagnosed (i.e., perceived as a mental illness) (Brune &

Braunig, 1997; Ferrando & Eisendrath, 1991; Hirose, 2001; Marsalek, 1997).

Unfortunately, three factors make assessment of akathisia difficult. First, even before

akathisia can be considered, the differential diagnostic process has to include medical

complications and medication-induced disorders. An inexperienced clinician may

overlook medical etiologies in favor of a psychiatric etiology. Second, there are

limitations in how akathisia may be assessed. Specifically, the subjective aspects of

akathisia are difficult to discern when the individual has limited verbal skills. Lastly, the

assessment procedure itself may be compromised by noncompliant behavior.

Occasionally compliance may be difficult to gain when these procedures are intrusive or

if the individual has had a previous negative experience with similar examiners. As a

result, the assessment of akathisia is difficult but a necessary part of treating aberrant

behavior when medication is part of the treatment.

While difficult, the above-mentioned challenges can be successfully addressed

using a specifically designed indirect assessment. The MEDS is a 90-item,

comprehensive measure of adverse drug reactions in individuals with ID. Included in

this scale is an assessment of akathisia that provides a reasonable solution to each of

the above challenges. First, it can be given to any person receiving medication with

minimal financial cost or time commitment. Therefore, it can be easily included as part

of a routine assessment of all medication. Including the MEDS in this way will then also

include akathisia in the differential diagnosis formulation as well as other medication

adverse reactions. Regarding poor verbal skills and noncompliance, the MEDS uses an

indirect assessment approach that is not vulnerable to limitations in either language

ability or compliance. Given these qualities, the MEDS may prove to be a useful tool in screening for akathisia.

In the present research project, the subscale Central Nervous System Behavioral/Akathisia (CNS - B/A) of the Matson Evaluation of Drug Side Effects (MEDS) and the Akathisia Rating of Movement Scale (ARMS) were examined for their ability to identify neruoleptic-induced akathisia in individuals with ID. Analysis included the following, manipulation check, reliability analysis, hypotheses analysis, and follow-up item analysis:

1. Manipulation Check - It was hypothesized that statistical analyses for demographic variables between the groups would not be significantly different.

2. Inter-rater reliability - It was hypothesized that inter-rater reliability would be attained.

3. Hypothesis I - It was hypothesized that MEDS and ARMS scores would differentiate those with akathisia from the other groups. That is, persons with no medication history plus no diagnosis of akathisia and those with a history of medication use plus no diagnosis of akathisia will have lower scores on the ARMS and MEDS than those with a history of medication use plus a diagnosis of akathisia.

4. Item analysis - Follow-up secondary analysis was conducted to identify items that best predict akathisia.

Identification of akathisia is important even though the prevalence estimates of akathisia in this population are preliminary. Despite the preliminary status, it is reasonable to

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suspect that due to the higher rates of medication use among individuals with ID, coupled with concomitant medical conditions, that prevalence rates are equal to if not higher than that found in individuals without ID. Akathisia has a significant impact on a person's quality of life. A component of decreasing this impact is the identification and careful monitoring of this adverse medication reaction. Thus, evaluating the use of an indirect assessment method to assess akathisia in this population is of considerable importance.

METHOD

<u>Participants</u>

All participants were recruited from two developmental centers, either Pinecrest (PDC) in central Louisiana or Hammond (HDC) in south Louisiana. Pinecrest provides services for approximately 545 individuals with ID. Hammond provides services for approximately 290 individuals with ID. Residents of these centers live in individual homes and receive continuous supervision. Overall, the majority of the individuals at both of these developmental centers function in the profound (80%) range of ID. These individuals range from 18 to 80 years of age with a mean age of 53. Males (56%) outnumber females (44%), and Caucasians (76%) are more prevalent than African Americans (23%) or other ethnicities. Approximately 41% of all the individuals living at these centers are diagnosed with an Axis I disorder and about 16% have more than one Axis I disorder. Roughly 19% take psychotropic medication and 35% of these take more than one psychotropic medication.

Based on an a priori power analysis using the statistical program GPOWER (Erdfelder, Faul, & Buchner, 1996) with Alpha set at .05 and Power set at .95, and an Effect size of .5 based on Cohen (1988) a total of 66 participants were included. Of the 66 participants, 51 (77%) of the individuals function in the profound range of ID, 10 (15%) function in the severe range, and 5 (8%) function in the moderate range of ID. No participants in the mild range of ID were included in this sample. These individuals range from 29 to 79 years of age with a mean age of 52 and median age of 50.5 years. Females (54.5%) outnumber males (45.5%), and Caucasians (83%) were more prevalent than African Americans (14%) or Hispanic (3%). Zyprexa (29%) was the most

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common antipsychotic medication used, followed by Risperdal (20%), Abilify (9%),

Seroquel (8%), and Haldol (1%). See Table 1 for demographic information of

participants.

Table 1

Demographic Information

	Total	
	n	*%*
Sex		
Female	36	54.5
Male	30	45.5
Race		
African American	9	13.6
Caucasian	55	83.3
Hispanic	2	3.1
Ambulation		
Yes	66	100
No	0	0.0
Level of Intellectual Disability		
Mild	0	0.0
Moderate	5	7.6
Severe	10	15.2
Profound	51	77.3
Unspecified	0	0.0
Antipsychotic Medication		
Abilify	6	9.1
Haldol	1	1.5
Risperdal	13	19.7
Seroquel	5	7.6
Zyprexa	19	28.8
Age in Years		
29-39	3	4.5
40-49	25	37.9
50-59	29	44.0
60-69	4	6.0

(Table 1 continued)

70-79	5	7.6

Participants were assigned to 1 of 3 groups: 1. diagnosis of akathisia with a history of and current neuroleptic use (experimental group 1), 2. no diagnosis of akathisia with a history of and current neuroleptic use (experimental group 2), and 3. no akathisia and no history of or current neuroleptic use (control group). All participants were diagnosed with ID based on DSM-IV criteria, deficits in intellectual and adaptive functioning before 18 years of age (American Psychiatric Association, 2000) by licensed psychologist. Full-time, board-certified psychiatrists working for the development center made the diagnosis of akathisia for participants in experiment group 1 and the absence of akathisia for participants in experiment group 2 and the control group.

Group participation was based on meeting the criteria for each group. Experimental group 1, diagnosis of akathisia with a history of and current neuroleptic use, was the smallest available pool therefore; the first 22 people identified were selected for inclusion. Once the demographics of the experimental group 1 were identified the remaining two groups, experimental group 2 and the control group, were developed to match the participation in experimental group 1. Matching was used to control for extraneous variance and was based on the following demographic criteria: race, sex, age, ability to ambulate, and level of ID. Random selection was used in cases where more than one participant matched the experimental 1 participant. Demographic variables used to match the participants were collected from a database maintained by each developmental center and verified at the time of assessment. In all cases race,

sex, and ability to ambulate were matched completely, except for two Hispanics who were paired with Caucasians. Age and level of ID were more difficult to match and were done in ranges. With respect to age 42% (28 participants) were matched to the year, 80% (53) were matched within 5 years, 99% (65) were matched within 11 years, and one case was matched within 15 years of the person in experimental group 1. With respect to level of ID 79% (52 participants) were matched to the exact level, 96% (63) were matched within one level, and in three cases were matched within two level of the person in experimental group 1. An example of being matched within one level is the pairing of an individual with profound ID with an individual with severe ID. In three cases, an individual with profound ID was paired with an individual with moderate ID. In no cases were profound and mild ID paired together. See Table 2 for group clusters.

Table 2

Group Clusters

Groupings	Medication	Sex	Age	Age Difference	Ethnicity	Ambulatory	Level of ID
1a	Zyprexa	Male	40	0	Caucasian	Yes	Profound
b	1 Seroquel	Male	44	4	Caucasian	Yes	Profound
c	1 na	Male	40	0	Caucasian	Yes	Profound
	2 Abilify	Male	41	0	Caucasian	Yes	Profound
	2 Zyprexa	Male	41	0	Caucasian	Yes	Severe
	2 na	Male	36	5	Caucasian	Yes	Profound
	3 Seroquel	Male	44	0	Caucasian	Yes	Profound
	3 Risperdal	Male	44	0	Caucasian	Yes	Profound
	3 na	Male	43	1	Caucasian	Yes	Profound
	4 Risperdal	Male	46	0	Caucasian	Yes	Profound
	4 Zyprexa	Male	49	3	Caucasian	Yes	Severe
	4 na	Male	42	4	Caucasian	Yes	Profound
	5 Abilify	Female	47	0	Caucasian	Yes	Profound
	5 Risperdal	Female	46	1	Caucasian	Yes	Profound
	5 na	Female	47	0	Caucasian	Yes	Profound

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(Table 2 continued)

6	Abilify	Female	47	0	Caucasian	Yes	Profound
6	Zyprexa	Female	57	10	Caucasian	Yes	Profound
6	na	Female	47	0	Caucasian	Yes	Profound
7	Zyprexa	Male	47	0	Caucasian	Yes	Profound
7	Zyprexa	Male	50	3	Caucasian	Yes	Profound
7	na	Male	51	4	Caucasian	Yes	Profound
8	Risperdal	Female	48	0	Caucasian	Yes	Profound
8	Zyprexa	Female	54	6	Caucasian	Yes	Severe
8	na	Female	50	2	Caucasian	Yes	Profound
9	Zyprexa	Male	48	0	Hispanic	Yes	Profound
9	Abilify	Male	42	6	Caucasian	Yes	Severe
9	na	Male	43	5	Caucasian	Yes	Severe
1	Seroquel	Female	50	0	Caucasian	Yes	Profound
1	Zyprexa	Female	52	2	Caucasian	Yes	Moderate
1	na	Female	52	2	Caucasian	Yes	Profound
1	Zyprexa	Male	51	0	Hispanic	Yes	Profound
1	Zyprexa	Male	50	1	Caucasian	Yes	Profound
1	na	Male	44	7	Caucasian	Yes	Profound
1	Risperdal	Female	53	0	Caucasian	Yes	Profound
1	Risperdal	Female	68	15	Caucasian	Yes	Severe
1	na	Female	57	4	Caucasian	Yes	Profound
1	Seroquel	Male	53	0	Caucasian	Yes	Profound
1	Zyprexa	Male	51	2	Caucasian	Yes	Profound
1	na	Male	59	6	Caucasian	Yes	Profound
1	Risperdal	Female	55	0	Caucasian	Yes	Severe
1	Risperdal	Female	54	1	Caucasian	Yes	Moderate
1	na	Female	57	2	Caucasian	Yes	Profound
1	Abilify	Female	57	2	African Amer.	Yes	Profound
1	Zyprexa	Female	59	0	African Amer.	Yes	Moderate
1	na	Female	48	11	African Amer.	Yes	Profound
1	Risperdal	Male	67	0	Caucasian	Yes	Profound
1	Zyprexa	Male	75	8	Caucasian	Yes	Moderate
1	na	Male	73	6	Caucasian	Yes	Moderate
1	Seroquel	Female	71	0	Caucasian	Yes	Profound
1	Risperdal	Female	79	8	Caucasian	Yes	Severe
1	na	Female	73	2	Caucasian	Yes	Profound
1	Zyprexa	Female	64	0	Caucasian	Yes	Profound
1	Zyprexa	Female	60	4	Caucasian	Yes	Severe
1	na	Female	59	5	Caucasian	Yes	Profound

(Table 2 continued)

1	Risperdal	Female	53	0	Caucasian	Yes	Profound
1	Zyprexa	Female	47	6	Caucasian	Yes	Profound
1	na	Female	50	3	Caucasian	Yes	Profound
2	Zyprexa	Female	57	0	African Amer.	Yes	Profound
2	Zyprexa	Female	57	0	African Amer.	Yes	Profound
2	na	Female	55	2	African Amer.	Yes	Profound
2	Haldol	Female	39	0	African Amer.	Yes	Profound
2	Abilify	Female	45	6	African Amer.	Yes	Profound
2	na	Female	29	10	African Amer.	Yes	Profound
2	Risperdal	Male	58	0	Caucasian	Yes	Profound
2	Risperdal	Male	59	1	Caucasian	Yes	Severe
2	na	Male	56	2	Caucasian	Yes	Profound

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Note.   a= Experimental Group 1 (diagnosis of akathisia with a history of and current neuroleptic use)

b= Experimental Group 2 (no diagnosis of akathisia with a history of and current neuroleptic use)

c= Control Group (no akathisia and no history of neuroleptic use)

Institutional Review Board

Approval for this project was obtained.

Measures

In recent years, considerable research has gone into the development of assessment tools to overcome the unique challenges presented by the significant disabilities common in individuals with ID (Matson & Bamburg, 1998). Disabilities in language, both receptive and expressive, and physical disabilities position indirect assessment as a favorable tool to assess this population. An indirect assessment allows for data to be gathered from an informant familiar with the individual being assessed. As previously discussed, indirect assessment has many advantages compared to other methods. For those reasons, the validity of the MEDS, an indirect assessment of

medication adverse reactions, was investigated. Additionally, the ARMS was investigated to provide an evaluation of convergent validity. Unlike the MEDS, the ARMS is a direct assessment and is vulnerable in ways the MEDS is not. Indirect assessment methods have been shown to be reliable and valid in a variety of areas; germane to this project is the emerging area of the adverse reactions to medications.

Matson of Evaluation of Drug Side Effects (MEDS). Information about adverse neuroleptic effects was obtained by administering the CNS-behavior/akathisia subscale of the Matson of Evaluation of Drug Side Effects (MEDS; Matson & Baglio, 1998). The MEDS is a 90-item, comprehensive measure of adverse drug reactions in individuals with ID. Items are rated with respect to severity and duration of specific symptoms that have occurred within the last two weeks. Symptoms are rated with respect to severity and duration on a 3-point Likert-like rating scale. The severity ratings, score of 0, 1, and 2 reflect no problem, a mild or moderate problem, or severe or profound problem, respectively. The duration ratings are similar, scores of 0 - 2 (0 = duration of less than one month, 1 = between 1 and 12 months, 2 = more than 12 months). The 90 items are divided into nine domains: (1) cardiovascular and hematological, (2) gastrointestinal, (3) endocrine/genitourinary, (4) eye/ear/nose/throat, (5) skin/allergies/temperature, (6) CNS-general, (7) CNS-dystonia, (8) CNS-parkinsonian/dyskinesia, and (9) CNS-behavior/akathisia. Each section contains between five and 14 symptoms, which would produce a maximum score of 10-28. Inter-rater reliability is r = 0.85 and the internal consistency is r = 0.99 (Matson, Mayville, Bielecki, Barnes, Bamburg, & Baglio, 1998). Reports of validity indicate that the MEDS can be used to identify individuals exhibiting psychotropic medication side effects, specific to typical and atypical anti-psychotic

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medications (Advokat, Mayville, & Matson, 2000). Specific to the 8-items CNS-behavioral/akathisia subscale are an internal consistency coefficient alpha r =.68 and an inter-rater reliability r = 0.99.

Akathisia Ratings of Movement Scale (ARMS). Information about symptoms of akathisia was obtained by administering the Akathisia Ratings of Movement Scale (ARMS; Bodfish et al., 1997), a 7-item assessment of the objective components of akathisia. Each item of the ARMS is scored on a Likert-like scale of 0 - 4 (0 = not present, 1 = minimal, 2 = mild, 3 =moderate, 4 = severe) with a maximum score of 28 and a cut-off score of 4. The assessment is completed while the individual is observed sitting and standing. Interrater reliability is r = 0.69 and good predicative validity is reported (see Bodfish et al., 1997).

Procedure

Interviewers and Informants. Master's level graduate students from Louisiana State University's clinical psychology program, trained in using the MEDS and ARMS conduct the assessments under the supervision of a licensed psychologist. Training involved classroom instruction on the instruments, a review of the manuals, and achievement of interrater reliability of .69 or better on three administrations of the instruments. Caregivers at each developmental center served as the informants. Administration of the MEDS occurred during the caregivers regularly scheduled shifts. Only caregivers with greater than six months experience working with the individual whom he or she was responding about served as the informant. The assessments were administered at a location on the hospital grounds convenient for the informant. The

ARMS were conducted on an individual basis with the participants in a location on the hospital grounds convenient for them.

Data collection and storage were conducted with a concern for the security of participant confidentiality. Procedures for maintaining confidentiality were based on recommendations of Simon, Unutzer, Young, and Pincus (2000). All electronic data were stored in a password-protected computer database. Electronic data was separated into raw data and identifying demographics. Each of the 66 individuals assessed were assigned a participant number and the corresponding identifying demographics were housed in a separate password-protected database. Only the primary investigator and the consulting psychologist had access to the identifying demographic information. The graduate student assistants only had access to the raw data for data entry, data verification, and statistical manipulation. All tangible data such as assessment protocols were stored in a locked private office.

Data Analyses

The goal of analyses was to establish the utility of the MEDS CNS - B/A and the ARMS for the identification and monitoring of neruoleptic-induced akathisia in individuals with ID. Psychometric reliability data was assessed using interrater reliability. Beyond the primary analysis, a manipulation check was included. Analyses of mean differences and correlations were used. Statistical procedures included Pearson product moment correlation coefficients to determine correspondence for total scores (Anastasi & Urbina, 1997), Spearman rank-order correlations were conducted for individual items (Siegel & Castellan, 1988), and multivariate analysis of variance were conducted to detect difference of total scores (Cohen, Swerdlik, & Phillips, 1996). The successful

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outcome of this project helps to establish the MEDS and ARMS as viable screens for akathisia, thereby provide clinicians greater flexibility to assess and monitor symptoms of akathisia in individuals with ID.

Hypotheses

The main hypothesis predicts that the ARMS and MEDS: CNS - B/A total scores will differentiate the three groups. Specifically, persons with no medication history and no akathisia (control group) and those with a history of medication or current use but no diagnosis of akathisia (experimental group 2) will have lower scores on the ARMS and MEDS: CNS - B/A than those with a history of and current medication use and a diagnosis of akathisia (experimental group 1). A secondary follow-up analysis was anticipated based on the confirmation of the main hypothesis. Specifically, an analysis of critical items to identify items on the ARMS and MEDS: CNS - B/A that are particularly significant predictors of akathisia.

Reliability

Inter-Rater Agreement. The ARMS is a behavioral observation instrument that requires the administrator to interact with the participant. To examine inter-rater agreement, Anastasi and Urbina (1997) recommend calculating the error variance due to interscorer differences between independent raters (LSU Ph.D. students in clinical psychology). Calculation of correspondence between the administrators was conducted for 20% of all individuals assessed. One administrator conducted the assessment and rendered a score while the other administrator simultaneously observed the assessment and made independent scores at the same time. Pearson product moment correlation coefficients were calculated to detect correspondence for total scores (Anastasi &

Urbina, 1997). Spearman rank-order correlations were calculated to determine

correspondence for individual items based on Siegel and Castellan (1988)

recommendations for calculating ordinal data such as Likert ratings of items.

RESULTS

<u>Reliability</u>

<u>Inter-Rater Agreement.</u> Thirteen participants (20%) were randomly selected for

the inter-rater comparison. Demographic of this group are provided below in Table 3.

Table 3

<u>Demographic Information of All Participants and Inter-Rater Caparison Group Clusters</u>

	Samples			
	Total		Cross-rater	
	n	*%*	*n*	*%*
Sex				
Female	36	54.5	4	30.8
Male	30	45.5	9	69.2
Race				
African American	9	13.6	0	0.0
Caucasian	55	83.3	11	84.6
Hispanic	2	3.1	2	15.4
Ambulation				
Yes	66	100	13	100
No	0	0.0	0	0.0
Level of Intellectual Disability				
Mild	0	0.0	0	0.0
Moderate	5	7.6	1	7.7
Severe	10	15.2	1	7.7
Profound	51	77.3	11	84.6
Unspecified	0	0.0	0	0.0
Antipsychotic Medication I				
Abilify	6	9.1	3	23.1
Haldol	1	1.5	0	0.0
Risperdal	13	19.7	3	23.1
Seroquel	5	7.6	3	23.1
Zyprexa	19	28.8	4	30.8
Age in Years				
29-39	3	4.5	0	0.0
40-49	25	37.9	7	53.8

(Table 3 continued)

50-59	29	44.0	4	30.8
60-69	4	6.0	1	7.7
70-79	5	7.6	1	7.7

To examine inter-rater agreement, Anastasi and Urbina (1997) recommend calculating

Pearson product moment correlation coefficients to determine correspondence for total

scores. Pearson correlation for the MEDS subscale was r = .996 and r = .907 for the

ARMS. Given the ordinal nature of the Likert ratings for items, Spearman rank-order

correlations were calculated to determine correspondence for individual items (Siegel &

Castellan, 1988). Spearman correlations for the MEDS range from .85 - 1.00 and .66 -

1.00 for the ARMS. Correlations for each item are provided below in Table 4.

Table 4

Spearman Rank Correlations for Inter-Rater Agreement by Item

	r_s
MEDS CNS - Behavioral/Akathisia	
83. Motor restlessness or agitation	1.00
84. Pacing or inability to sit still	1.00
85. Weight shifting while standing or sitting	.85
86. Hyperactivity or disorganized behavior	1.00
87. Anxiety or nervousness	1.00
88. Stereotypic behavior	1.00
89. Self-injurious behavior	.97
90. Aggression or destruction	1.00
ARMS	
1. Sit - fidgety arms	.98
2. Sit - fidgety legs	.66
3. Sit - shifting	.99
4. Sit - inability to remain seated	1.00
5. Stand - shifting	.77
6. Stand - walking on the spot	1.00
7. Stand - inability to remain standing	.82

A manipulation check was conducted based on the hypothesis that statistical analyses for demographic variables would not to be significantly different on the dependent variables. To evaluate the manipulation check, a Multivariate Analysis of Variance (MANOVA) was conducted that included demographic variables (race, sex, age, and level of ID) as the independent variables and the ARMS total score and MEDS CNS Behavior/Akathisia subscale scores as the dependent variables. Individuals were also grouped on the ability to ambulate but this demographic was not included in the MANOVA because all participants possess the ability to ambulate. A unified model was not produced because the sample did not include individuals that represented all the possible demographic variables. For example, no African American males were represented in the sample. Taken individually, none of the demographics variables had significant Wilks' Lambda values when compared to the dependent variables. See Table 5 for Wilks' Lambda values for each demographic

Table 5

Demographic Variable by Wilks' Lambda values

	F	Hypothesis df	Error df	p
Sex	3.28	2	16	.06
Race	1.19	4	32	.33
Level of Intellectual Disability	0.52	4	34	.72
Age	1.41	60	32	.15

variable. An addition MANOVA was calculated using the 22 groups as the independent variable and the ARMS total score and MEDS CNS Behavior/Akathisia subscale scores as the dependent variables. This MANOVA also yielded no significant effects, Wilks' Lambda F (42, 86) = .578, p = .974. These findings were expected given the matching process utilized in-group formulation. No secondary analyses were warranted. Based on the Bartlett-Box procedure (Box, 1949) the results of Box's Test of Equality of Covariance Matrices were non-significant, F (54, 1782.8) = 1.123, p = .243. This non-significant difference in the variance-covariance matrices suggests that the data from this sample can be analyzed together in a single combined analysis. Group size and percentages for demographic variables are reported in Table 1.

Hypotheses

  The main hypothesis was confirmed. Specifically, that the MEDS: CNS - B/A and ARMS total scores differentiate the three groups, i.e., persons with no medication history and no akathisia (control group) and those with a history of medication or current use but no diagnosis of akathisia (experimental group 2) did have lower scores on the dependent measures than those with a history of and current medication use and a diagnosis of akathisia (experimental group 1). Analysis of this hypothesis began with a 3 (group) x 2 (dependent variable) MANOVA using data from the MEDS: CNS - B/A and ARMS, Wilks' Lambda F (4, 124) = 9.97, p<.001. Significant results of this analysis prompted follow up analyses of two, 3 (group) x 1 (dependent variable) ANOVAs with Tukey HSD post-hoc tests. Both ANOVAs were significant, MEDS: CNS - B/A, F (2, 65) = 16.88, p<.001 and ARMS F (2, 65) = 13.03, p<.001. Tukey HSD post-hoc tests for both dependent variable resulted in significant differences between the control group

and experimental group 2 from experimental group 1. That is persons with a history of and current medication use and a diagnosis of akathisia (experimental group 1) had higher scores on both measure, whereas, persons with no medication history and no akathisia (control group) did not differ from those with a history of medication or current use but no diagnosis of akathisia (experimental group 2). Interestingly, Pearson correlation between the two scales was calculated at .51 for this sample, indicating the two scales are not strongly related. Such a low score suggests each scale measures akathisia differently and prompts item analysis of each scale's items.

Item Analysis

A secondary analysis was calculated to identify items on the MEDS: CNS - B/A and ARMS that are particularly critical predictors of akathisia. For each item 1-way ANOVAs with Tukey HSD post-hoc tests were run. Analysis of the MEDS: CNS - B/A subscale found four critical items that differentiated those with an akathisia diagnosis from those without akathisia. These items were numbers 84 (pacing or inability to sit still), 86 (hyperactivity or disorganized behavior), 87 (Anxiety or nervousness), and 89 (Self-injurious behavior). Analysis of the ARMS found only two items that differentiated those with an akathisia diagnoses from those without. These items were numbers 2 (sitting position - fidgety legs) and 7 (standing position - inability to remain standing). See Table 6 for Q statistics for each item.

Table 6

Tukey HSD post-hoc test by item

	Q
MEDS: CNS - B/A	
83. Motor restlessness or agitation	
Experimental Group 1 by Experimental Group 2	.07

(Table 6 continued)

Experimental Group 1 by Control	.04*
Experimental Group 2 by Control	.97

84. Pacing or inability to sit still
Experimental Group 1 by Experimental Group 2	**.00***
Experimental Group 1 by Control	**.00***
Experimental Group 2 by Control	.40

85. Weight shifting while standing or sitting
Experimental Group 1 by Experimental Group 2	.19
Experimental Group 1 by Control	.07
Experimental Group 2 by Control	.87

86. Hyperactivity or disorganized behavior
Experimental Group 1 by Experimental Group 2	**.01***
Experimental Group 1 by Control	**.00***
Experimental Group 2 by Control	.89

87. Anxiety or nervousness
Experimental Group 1 by Experimental Group 2	**.05***
Experimental Group 1 by Control	**.00***
Experimental Group 2 by Control	.32

88. Stereotypic behavior
Experimental Group 1 by Experimental Group 2	.11
Experimental Group 1 by Control	.07
Experimental Group 2 by Control	.97

89. Self-injurious behavior
Experimental Group 1 by Experimental Group 2	**.00***
Experimental Group 1 by Control	**.01***
Experimental Group 2 by Control	.97

90. Aggression or destruction
Experimental Group 1 by Experimental Group 2	.15
Experimental Group 1 by Control	.05*
Experimental Group 2 by Control	.88

ARMS
1. Sit - fidgety arms
Experimental Group 1 by Experimental Group 2	.01*
Experimental Group 1 by Control	.12
Experimental Group 2 by Control	.47

2. Sit - fidgety legs
Experimental Group 1 by Experimental Group 2	**.04***
Experimental Group 1 by Control	**.00***
Experimental Group 2 by Control	.44

3. Sit - shifting
Experimental Group 1 by Experimental Group 2	.16

(Table 6 continued)

Experimental Group 1 by Control	.07
Experimental Group 2 by Control	.93
4. Sit - inability to remain seated	
Experimental Group 1 by Experimental Group 2	.03*
Experimental Group 1 by Control	.06
Experimental Group 2 by Control	.97
5. Stand - shifting	
Experimental Group 1 by Experimental Group 2	.38
Experimental Group 1 by Control	.12
Experimental Group 2 by Control	.78
6. Stand - walking on the spot	
Experimental Group 1 by Experimental Group 2	.53
Experimental Group 1 by Control	.53
Experimental Group 2 by Control	.99
7. Stand - inability to remain standing	
Experimental Group 1 by Experimental Group 2	**.02***
Experimental Group 1 by Control	**.01***
Experimental Group 2 by Control	.99

Note. EG1 = Experimental Group 1 (Akathisia and neuroleptic use)
EG2 = Experimental Group 2 (No akathisia and neuroleptic use)
Control = Control Group (No akathisia and no neuroleptic use)
*The mean difference is significant at the .05 level.

Internal Consistency reliability analysis was calculated for both dependent variables to identify items that do not contribute to the measures ability to differentiate groups. Overall Cronbach's alpha for the MEDS: CNS - B/A was .82 and .67 for the ARMS. All items for the MEDS: CNS - B/A contributed to the overall Cronbach's alpha. Corrected item-total correlations ranged from .61 - .34. Item alpha if deleted ranged from .81 - .78. All but one item of the ARMS contributed to the overall Cronbach's alpha. Item 6, standing position - walking on the spot, if removed would increase the overall Cronbach's alpha by .01 to an alpha of .68. Corrected item-total correlations ranged

from .64 - .17. Item alpha if deleted ranged from .68 - .54. See Table 7 item-total

statistics.

Table 7

Internal Consistency Reliability Analysis Item -Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
MEDS: CNS - B/A				
83. Motor restlessness or agitation	3.47	9.79	.61	.78
84. Pacing or inability to sit still	3.44	9.97	.55	.79
85. Weight shifting while standing or sitting	3.76	11.14	.34	.82
86. Hyperactivity or disorganized behavior	3.70	9.94	.53	.79
87. Anxiety or nervousness	3.73	9.80	.62	.78
88. Stereotypic behavior	3.72	10.58	.42	.81
89. Self-injurious behavior	3.79	10.05	.56	.79
90. Aggression or destruction	3.79	9.84	.64	.78
Cronbach's alpha = .82				
ARMS				
1. Sit - fidgety arms	1.90	9.17	.39	.65
2. Sit - fidgety legs	2.29	9.01	.64	.54
3. Sit - shifting	2.52	11.12	.44	.62
4. Sit - inability to remain seated	2.60	12.43	.28	.66
5. Stand - shifting	2.46	12.44	.28	.66
6. Stand - walking on the spot	2.69	13.52	.18	.68
7. Stand - inability to remain standing	2.21	9.62	.47	.60
Cronbach's alpha = .67				

DISCUSSION

Both the MEDS and ARMS proved to be effective in establishing which participant evinced akathisia. These scales assess a somewhat different set of items using different data collection formats. Given these findings, it would appear that these scales complement each other, and where practical both are recommended given the short administration time of each (Bodfish et al., 1997; Matson et al., 1998). Impaired verbal skills make such decisions particularly difficult along with comorbid disorders with the persons studied here (Bothwick-Duffy & Eyman, 1990). Thus, within reason a battery of measures with reliability and validity on persons with ID would appear to be the preferred assessment method.

Significant numbers of individuals with ID are prescribed psychotropic drugs to address mental health disorders (Aman, Singh & Stewart, 1985; McGillivray & McCabe, 2004). While these medications are undoubtedly necessary in many cases, they put the person with ID at risk for adverse side effects, particularly when administered at high doses and particularly when prescribed over a long period of time (Sachdev, 1995; Sachdev & Kruk, 1994). Given current knowledge, it is recognized that some people are overmedicated, may have been misdiagnosed, may no longer evince a given disorder, evince it to a milder degree due to waxing and waning of symptoms or may be experiencing particularly egregious side effects. For these and other reasons it may be appropriate to decrease or stop altogether a given psychotropic drug. Symptoms of akathisia which appear with current dosing, with dose titration, or with drug discontinuation may be misinterpreted as the re-emergence of psychotic or other mental

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health symptoms. Thus, accurately parsing mental health disorders from akathisia has very important implications for treatment.

Results of this project are similar to the findings of previous researchers but also add to the literature by providing evidence of additional symptomology to be consideration as part of the construct of akathisia. Item analysis provides data that symptoms may manifest differently in the population of individuals with ID or at least may differ from what is observed in the general population. As expected, the results of the item analysis reveled items that describe hallmark symptoms. For the MEDS, these items include, pacing or inability to sit still and anxiety or nervousness and for the ARMS items include, fidgety legs and inability to remain standing. Unexpected was the two items, hyperactivity or disorganized behavior and SIB, assessed by the MEDS that were critical items for this sample group. Such items have not previously been considered aspects of the akathisia construct for this population. However, akathisia related suicide has been established in the general population (Brune & Braunig, 1997). Hypotheses to explain the occurrence of these two symptoms in the ID population may center on an impaired ability to communicate. Both these behaviors may be similar functionally in that they are nonverbal in nature and may sit higher in the repertoire of available responses to symptoms of restlessness and a constant need for movement. For example, SIB may be more likely to occur in this population than in the general population because of a lack of training to respond in other ways such as functional communication or other help seeking behaviors. Clearly, these behaviors should be studied in more depth before inclusion in the nosology and treatment of akathisia in persons with ID.

Challenging to the development of akathisia research in this population is impairment in communication skills among people with ID. Such limitations impede the assessment and diagnostic process which makes it a challenge to design studies, which in turn slows research. A possible, yet controversial, solution supported by some researchers is to advance the concept of pseudoakathisia, akathisia without the verbal component, as a viable solution (see Halstead et al., 1994; Nelson, 2001; Stahl, 1985; Stubbs & Halstead, 2000). Counter to this solution are researcher like Sachdev and Loneragan (1991) who caution that attempting to limit the scope of symptoms assessed to just the movements would be "inadequate, yielding only partial information of the disorder" (p.188). Sachdev (1995a) concedes that assessment is difficult in this population, not only because of communication difficulties but because of the assessments process is often complicated by noncompliant behavior. Previous researcher of akathisia in this population, Sachdev (1994) and Bodfish et al. (1997), have found that some items could not be administered to as many as 60% of their samples because of noncompliant behavior. An alternative solution as advanced by the data of the current project is the practice of indirect assessment. An indirect assessment can address the issue of noncompliant behavior as well as assess the appearances of subjective symptoms. In other words, indirect assessment allows for the consideration of internal state, particularly assessment of restlessness and does not require compliance with performing any tasks. Inspired by Sachdev's (1995a) limited success in assessment, this project set out to build a case for the use of indirect assessment to not only assess the internal symptoms of akathisia but also overcome the threat of noncompliance or poor participation in the assessment process.

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Considered in the development of this project was that assessment is prone to error and therefore requires adherence of sound research practice. Such practices include the use of tested and valid measures. In this project adherence to sound research practice included attention to the assessment process by intentionally ordering the assessment procedures to avoid an expectancy effect from the order of assessment. For each person assessed the process began with the direct observation followed by the indirect assessment. The ARMS is vulnerable to an expectancy effect in that knowledge of symptoms gained in the indirect assessment interview, the MEDS, could distort the assessor's perception during the direct assessment, the ARMS. Therefore, the MEDS was administered last as it is not subject to this kind of distortion. Most importantly, this project meets standards of assessment by including valid scales. Both measures have been tested and meet the standard of content validity e.g., face and construct validity. Both scales appear to be good translations of the construct; items are operationally defined to be measured, and the scales are comparable to the relevant content domain for the construct. Items used to develop both scales were taken from the literature describing the topography of the disorder. Albeit, the need to provide other types of validity such as criterion related validity are still warranted.

Results of this study provide evidence of criterion validity. Specifically, both scales examined could differentiate people with and without akathisia. Interestingly, concurrent validity was not demonstrated when both scales were correlated with each other. Perhaps the lack of correlation is explained by a degree of variability in symptom presentation explained by Sachdev (1995a). Particularly that akathisia symptoms may vary over time, especially in the mild cases. Variations can even be seen within a single

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assessment session. A portion of this variability may be explained by posture, time of day, level of anxiety, arousal, stress, etc., but much variability is unexplained. Observations made during data collection foreshadowed a lack of correlation between the two scales. During some direct assessments, symptoms or the lack of symptoms was obvious to identify and easily agreed upon, but during the indirect assessment it was surprising to learn that the interviewee described the converse of what was observed. Given this, it can be suggested that the MEDS captured a broader range of day-to-day symptomology that did not appear during the brief direct assessment the ARMS.

Alternately, the lack of correlation suggests that both scales sample different aspects of the akathisia construct. Consideration of the item content of the scales helps to explain the differences between the two scales. The most obvious difference between these scales is that the MEDS subscale is a combination of challenging behavior and akathisia. Inclusion of challenging behavior is supported by two points. First, the MEDS subscale had a higher Cronbach's alpha than the ARMS. Second, items from the challenging behavior construct were found to be critical items for identifying akathisia in this sample. As mentioned above these items are hyperactivity or disorganized behavior and SIB, neither of these symptoms has previously been considered features of akathisia. Given the population and the level of impairment in this sample (77% in the profound range of ID) it is plausible that the manifestation of internal restlessness and compelled motor activity would look like hyperactivity or SIB. Particularly in the case of SIB, it is not difficult to understand how challenging behavior would take such a form given the communication difficulties inherent in the profound range of ID. It is possible

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that the feelings of restlessness produced by akathisia are manifested behaviorally in SIB. Researchers have found similar manifestation of SIB related to the emergence of medical problems and environmental distress (Luiselli, Singh, & Matson, 1992).

Data gather from the MEDS in this study can be used to suggest broadening the range of symptoms that may be presented by persons with ID. The ARMS was developed from a scale designed for use with the general population. Some items were eliminated due to noncompliance but items that remained did not take into account unique behavioral representations of verbal communication that can be used by this population in lieu of having speech. Specifically, SIB, aggression, and other challenging behaviors are used in place of the ability to express verbally feelings of distress effectively (Emerson, 2001). The MEDS on the other hand does include items that may account for these behavioral representations of verbal communication. Specific examples are the two critical items of hyperactivity or disorganized behavior and SIB.

Given that both scales demonstrated criterion validity but did not demonstrate concurrent validity is an endorsement for the Multitrait-multimethod approach in assessing individuals with ID. In a multi-method assessment, multiple indicators per concept are assessed and data gathered for each indicator is done by multiple methods, i.e., indirect and direct assessment. However, a clinical judgment is involved in the final diagnosis and scales alone cannot be used to yield definitive diagnosis of the disorder. Many factors like exposure to neuroleptic medication, the absence of non-drug causes, baseline behavior, stereotypies, other movement disorders, and the like must be taken into account.

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Demographic factors examined in the extant literature have included variables such as age, race, sex, medication dose, and type of akathisia. In this project, age, race, sex, and level of ID were analyzed and found not to influence the dependent measures (Wilks' Lambda values ranged from .06 - .72). Some researchers have also found that similar factors had no relationship to akathisia in persons without ID while other researchers have found strong relationships. For example, in the available literature researchers have found no relationship with age (Branford & Hutchins, 1996). While others have found an interaction with age and type of akathisia for persons without ID (Miller & Fleishhacker, 2000). One weakness of this paper is that it primarily focused on identified chronic akathisia and did not address acute drug-induced akathisia, which is a specific problem that occurs with new changes in the medication regime. Therefore, no statements can be made about akathisia type and age. It is possible that ARMS and the MEDS would have correlated better if the type of akathisia was acute because the symptom presentation would be more salient, i.e., in stark contrast to previous baseline behavior. Future studies could examine the differences in groups of individual with acute versus chronic akathisia. Age may also be related to the type of akathisia in persons with ID, particularly the geriatric population. Individuals over the age of 65 have a greater rate of psychiatric morbidity, in some studies the rates were up to 62% (Cooper, 1997; Patel, Goldberg, & Moss, 1993). Therefore, an older population may tend to receive a greater amount of medication, leaving for a greater probability of developing an adverse reaction such as akathisia.

Race is a factor found to be unrelated to the emergence of akathisia in persons without ID (Sachdev, 1995a). Analyses of the effect of race on ID from this project are

not possible because of the small sample size did not include African American males. Future research in this area will help to add to the understanding of akathisia in different populations.

Examinations of sex in previous studies done with the general population have found that men have higher rates of involuntary movements (Branford & Hutchins, 1996). Studies have also found an interaction of type of akathisia and sex. Acute akathisia and pseudoakathisia are more common in men whereas chronic akathisia is more common in women (Halstead et al., 1994). An interaction has also been found with sex and type of akathisia in persons without ID. As noted above in the results section, examination of sex was nonsignificant for this sample.

Level of neuroleptic use has been examined but researchers disagree on the impact. Some researchers found no relationship with medication use (Branford & Hutchins, 1996). However, other researchers have found a strong relationship with akathisia in those who take high level of neuroleptic use, i.e., high dose and/or potency (Sachdev, 1995a; Sachdev & Kruk, 1994). Another weakness of this project and opportunity for future research is an examination of level of neuroleptic in persons with ID. Such research will help to identify susceptibilities to akathisia in this population versus a population without intellectual disabilities.

Demographic factors new to ID research are level of ID and ambulation. Examination of the level of ID is important for two reasons. First, those individuals at the lower range of ID tend to receive more medications for medical and behavioral reasons and therefore are more susceptible to adverse drug reaction (Matson et al., 2003). Second, the increased difficulty in verbal ability at the lower levels of ID makes it difficult

to identify and assess akathisia. Recall that verbal report of inner restlessness is a requirement in all akathisia assessment scales that assess internal symptoms except for the MEDS. As noted above in the results section, examination of level of ID was nonsignificant for this sample. However, a weakness of this project is the lack of population stratification in the sample. No individuals were represented from the mild range of ID and the majority of individuals (77%) were reported to function in the profound range of ID whereas profound ID makes up only 1-2% of the total population. An ability to ambulate is important because an inability to sit is a hallmark symptom of akathisia. In all akathisia assessment scales except the MEDS, the functional use of the legs is required to complete the entire scale. Although, in this project nonambulation was not considered because the full ARMS could not be administered for those without ambulation. An attempt to use only a portion of the ARMS would limit the estimation of convergent validity. Nonetheless, examination of these additional factors will help to identify susceptibilities to akathisia that different subgroups of persons with ID may have. Future validity research should investigate discriminant validity to examine the degree to which the operationalization of akathisia is not similar to other constructs that it theoretically should be dissimilar to such as other movement disorders.

An addition topic of concern is the legal implications of detection, assessment, and monitoring of akathisia. Psychotropic drugs are a typical method for treating persons with mental illness but as discussed above, there is an inherent risk of adverse reaction presented by the drugs (Baumeister & Sevin, 1990). Risks increase when multiple medications are used or used inappropriately, such as prescribing medications without an appropriate diagnosis (e.g., treatment of stereotypies, aggression, autism),

for staff convenience, or not monitoring for adverse drug reaction. Inappropriate uses of medication can lead to acute and chronic impairment (Brasic et al., 1997; Dent, 1995; Gross et al., 1993). Many cases have gone to the legal courts involving the use of psychotropic drugs that have resulted in adverse reactions. One such example is *Clites v. State*, 322 N.W. 2d 917 (Iowa Court of Appeals, 1982). In this case, the father of man with ID sued the State of Iowa and a state-operated residential treatment facility, alleging that the facility's negligence resulted in the drug induced adverse reaction of tardive dyskinesia. Negligent administration of medication was found to be the basis for liability. The court determined that the state facility had failed to provide reasonable medical treatment and it did not follow reasonable standards when administering medication. The staff did not react to the apparent bizarre behaviors/adverse reactions and did not monitor for an adverse reaction.

Legal cases such as that described above are acknowledgments that treatment should be based upon the best practices guidelines and that courts are willing to hold professionals to those guidelines, which include monitoring for adverse reactions. Evident from this case is the need for conscientious medication use to suit the needs of the individual. Professionals are tasked with accurately identifying and monitoring the effect of medications, both positive and adverse. For individuals with ID this can be difficult. As this project has shown that both the MEDS and the ARMS are able to differentiate those with and without akathisia. However, the lack of correlation between these two scales supports the need for a multifactorial approach. Finally, the construct of akathisia may need to be expanded to include hyperactivity or disorganized behavior and SIB for persons with profound ID.

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