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The relationship between depression and feeding disorder symptoms among persons with severe and profound mental retardation

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THE RELATIONSHIP BETWEEN DEPRESSION AND FEEDING DISORDER
SYMPTOMS AMONG PERSONS WITH SEVERE AND PROFOUND MENTAL
RETARDATION

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
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by

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Abstract

In recent years, feeding disorders have been described in detail, and various assessment and treatment methods for these disorders have been reported. Within the literature, an emphasis has been placed on functional variables responsible for the onset and maintenance of feeding disorders, yet little has been reported on the relationship between feeding disorders and other forms of psychopathology. Therefore, the relationship between depression and feeding disorders was assessed. Three groups of individuals were compared across subscales and individual items on the Screening Tool for fEeding Problems (STEP) to assess for differences in problematic feeding behavior. Individuals who met diagnostic criteria for a mood disorder characterized by clinically significant symptoms of depression ($n = 18$), met DSM-IV diagnostic criteria for a Pervasive Developmental Disorder ($n = 18$), and those without a DSM-IV Axis I diagnosis ($n = 18$) were included in the study. Significant differences were found across diagnostic groups for STEP subscales and/or items representative of aspiration risk, food refusal, and nutrition related behavior problems. Feeding disorders varied across diagnostic categorization, and underscore the need for further research that assesses the relationship between feeding disorders and other forms of psychopathology.

Introduction

Mental retardation (MR) was described during the times of ancient Greece, yet the relationship between MR and mental illness has received limited attention in the psychiatric literature until the last few decades (Lewis & MacLean, 1982; Menolascino, 1970). Although interest was initially generated in mental retardation by the work of Jean-Marc-Gaspard Itard and Edouard Seguin in the early to mid-nineteenth century, it deteriorated over the 20th century following the development of “defect” theories (Lewis & MacLean, 1982). These theories were proposed in the late nineteenth century by French scholars who stated that the cause of MR was entirely due to brain impairment. This short sighted view of MR gave rise to numerous other “defect” theories that implied treatment was not useful for individuals with MR (Lewis & MacLean, 1982). The rise in popularity of the Binet intelligence test in America shortly after the turn of the nineteenth century is also cited as a landmark development that fostered apathy toward research focused on MR (Lewis & MacLean, 1982). The Binet test of intelligence provided psychologists with I.Q. quotients that put a damper on interest in the individual case formulation. Once an individual was provided with an I.Q, the person was essentially diagnosed with a condition that was viewed untreatable.

In addition to defect theories that encouraged the view that MR was untreatable, views about the limited mental capacity of those with MR also hampered development of the field of dual diagnosis (Lewis & McLean, 1982). Clinicians had long assumed that to be considered mentally ill, the capacity to reason and generate complex thought was required. Thus, the prevailing view for decades was that mental retardation and mental illness were mutually exclusive diagnostic entities since many believed the mentally

retarded lacked such capacity (Lewis & MacLean, 1982). This belief is reflected in the separation of government agencies that deal with mental health and those that deal with mental retardation. Those investigating the issue have noted that the separation of these agencies has placed an emphasis on mental retardation as the primary diagnosis among mentally retarded individuals, thus promoting the notion that mental retardation and mental illness do not coexist (Lewis & McLean, 1982; Matson & Sevin, 1994). As a result, aberrant behavior was often considered a direct consequence of mental retardation, and psychiatric symptoms were frequently subsumed under a diagnosis of MR (Reiss, Levitan, & Szyszko, 1982). This practice has since been termed diagnostic overshadowing and has been discussed at length in the literature (Reiss, Levitan, & Szyszko, 1982).

In the latter half of the twentieth century, dual diagnosis received more attention following the movement toward community placement for individuals with MR (Lewis & McLean, 1982). Behaviors once considered normal during institutionalization were deemed aberrant following community placement. At the same time, those prominent in the behavior modification movement began demonstrating that aberrant behavior among those with MR could be treated effectively (Matson & Sevin, 1994). This finding was especially important because it demonstrated that the diagnostic label of MR no longer implied treatment was useless for individuals with co-occurring psychopathology.

In the late 70's (Menolascino, 1977) and early 80's (Eaton & Menolascino, 1982; Matson & Barrett, 1982), the comorbid presence of mental illness and MR was further described, and the term "dual-diagnosis" was popularized. Around the same time, studies began to emerge that demonstrated the utility of behavioral interventions for treating

psychopathology among those with MR. These interventions had previously been limited in application to the population at large, but were now being used to treat phobias, depression, obsessive-compulsive behavior, and psychosomatic problems among those with MR (Matson & Sevin, 1994). These interventions stemmed from etiological theories and assessment methods for dual diagnosis; two important building blocks that paved the way for effective treatment strategies.

Etiological Theories of Dual Diagnosis

Etiological theories of psychopathology among those with MR have been forwarded during the last four decades and reflect a combination of innovative theory, and extension of etiological theories from the population at large. In a review of dual diagnosis, Matson and Sevin (1994) categorized these theories into organic, behavioral, sociocultural, and developmental models. This model provides a comprehensive framework for the various etiological theories for dual diagnosis that have been forwarded over the last four decades.

Organic theories of dual diagnosis postulate that the high incidence of mental illness among those with MR is a result of structural abnormalities of the brain (Matson & Sevin, 1994). This approach includes genetic disorders such as Fragile X syndrome (Bregman, Leckman, & Ort, 1988), and Down's Syndrome (Bregman & Hodapp, 1991), which have been suspected in the development of certain forms of psychopathology. In addition, high rates of psychopathology have been found among those with MR and comorbid seizure disorders, contributing to speculation that the two disorders may be linked (Lund, 1985; Rutter, 1977).

Sensory impairments and neurotransmitter imbalances have also been implicated in the development of psychopathology among those with MR (Matson & Sevin, 1994).

Neurotransmitter theories of psychopathology that have been applied to the population at-large have been extended to the MR population. That is, various affective disorders and psychoses are believed to stem from an imbalance of certain neurotransmitters (e.g. serotonin or dopamine). Like the population at-large, this hypothesis has generated limited support from studies that demonstrate reduction in psychiatric symptoms following administration of medication affecting levels of neurotransmitters in the brain (e.g., Bodfish & Madison, 1993; Langee & Conlon, 1992; Sperner, et al., 1998). Unfortunately, many medication studies are methodologically flawed, thus limiting conclusions that may be drawn from pharmacological research in the field of MR (Matson, et al., 2000).

Behavioral theorists of dual diagnosis postulate that classical conditioning, social learning, and operant models of aberrant behavior that apply to the population at-large may be extended to those with MR (Matson & Sevin, 1994). In particular, classical conditioning and social learning models appear particularly relevant to the development of anxiety disorders (Ollendick & Ollendick, 1982). On the other hand, operant models of psychopathology among those with MR appear to apply to a wider range of psychological problems. Within the operant model of psychopathology, various problematic histories of punishment and reinforcement have been implicated in the development of both mood and anxiety disorders among those with MR (Matson & Sevin, 1994).

Lastly, etiological theories of psychopathology classified as sociocultural and developmental have been applied to those with MR (Matson & Sevin, 1994). The sociocultural model posits that individuals with MR may be prone to developing psychological disorders as a result of experiencing a high rate of negative social experiences. On the other hand, developmental theories suggest that an individual's developmental level plays an integral role in the expression of psychopathology. In particular, it is suggested that individuals with MR progress through developmental stages more slowly than persons without MR. Consequently, individuals with MR tend to experience psychopathology in ways both qualitatively and quantitatively similar to children without MR (Matson & Sevin, 1994).

In summary, numerous etiological theories of dual diagnosis have been forwarded over the last few decades. Often these theories emphasize the role of a single precipitant for the onset of psychopathology. Given that research has emerged supporting many of the aforementioned etiological factors, it appears a theory that integrates some of the already established theories of dual diagnosis may be most appropriate.

Assessment of Dual Diagnosis

The increased interest in the phenomenology and treatment of mental illness among those with MR over the last few decades was accompanied by the development of standardized assessment methods for dual diagnosis. Prior to the renewed interest in dual diagnosis that emerged in the late 70's and early 80's, assessment methods traditionally utilized with the population at large were employed for assessment of psychopathology among individuals with MR (Mordock, & Van Ornum, 1989). This approach included projective measures such as the Thematic Apperception Test and the Rorschach. Since

those with MR often possess a wide array of limitations such as communication and cognitive deficits that are not as prevalent in the population at large, assessment of psychopathology with measures specific to MR is especially important (Sovner, 1986)

By the early 1980's standardized measures were being developed and implemented to aid in assessing dual diagnosis in persons with MR. The Psychopathology Instrument for Mentally Retarded Adults (PIMRA; Matson, Kazdin, & Senatore, 1984; Senatore, Matson, & Kazdin, 1985) was the first measure of psychopathology developed specifically for use with the mentally retarded. The PIMRA consists of 56 items, and was developed in both self-report and interview formats that conformed to DSM-III diagnostic criteria. The PIMRA was found to have good reliability through estimates of test-retest reliability and internal consistency. Furthermore, evidence for criterion validity and construct validity was found for some of the subscales included on the PIMRA (Linaker & Helle, 1994; Senatore, Matson, & Kazdin, 1984).

With the development of the PIMRA, a void was filled for the assessment of psychopathology among those with mild and moderate MR. However, growing interest in the assessment of dual diagnosis led to recognition of the need for different measures of psychopathology to be used across individuals with varying levels of MR. Matson, Gardner, Coe, and Sovner (1991) developed the first diagnostic measure specifically designed for use with those in the severe to profound range of MR. The Diagnostic Assessment for the Severely Handicapped (DASH; Matson et al., 1991) was developed to assess the frequency and severity of symptoms representative of a wide array of diagnostic entities. The DASH was originally keyed to DSM-III-R diagnostic criteria

and has subsequently been revised (DASH-II) to correspond to the diagnostic criteria in the DSM-IV. The DASH-II consists of 84 items that make up 13 subscales representing various diagnostic categories. The subscales are used for screening purposes, and assess the frequency, intensity, and duration of symptoms related to DSM classification. Information on the DASH is gathered through use of an informant who is familiar with the client's behavior. Matson, et al. (1991) found good initial estimates of interrater reliability across psychiatric conditions represented on the DASH (Matson, 1994).

The Aberrant Behavior Checklist (ABC) is another measure developed for the assessment of psychopathology among those in the severe to profound range of MR. The ABC consists of 58 items that assess maladaptive behavior. Unlike the DASH, the ABC was empirically derived with the specific purpose of assessing treatment effects (i.e., behavioral intervention or medication) on behavior (Aman, 1991). The five subscales of the ABC identified through factor analysis are: 1) Irritability, 2) Agitation, 3) Stereotypic Behavior, 4) Hyperactivity, and 5) Inappropriate Speech. Internal consistency, test-retest reliability, and interrater reliability have all been found acceptable (Aman, 1991).

Just as measures of psychopathology have been developed for individuals categorized with severe and profound levels of MR, the Assessment of Dual Diagnosis (ADD; Matson & Bamberg, 1998) was developed specifically for use with those diagnosed with mild and moderate MR. The ADD is a 79-item informant-based measure that consists of 13 subscales: 1) Mania, 2) Depression, 3) Anxiety, 4) Posttraumatic Stress Disorder, 5) Substance Abuse, 6) Somatoform Disorders, 7) Dementia, 8) Conduct Disorder, 9) Pervasive Developmental Disorder, 10) Schizophrenia, 11) Personality Disorders, 12) Eating Disorders, & 13) Sexual Disorders. It was seen as an advance over

the PIMRA in that it corresponds to diagnostic criteria for the DSM-IV versus DSM-III-R criteria. The ADD assesses the frequency, intensity, duration, and severity of each symptom reported as present over the last month. Matson & Bamberg (1998) reported good to excellent test-retest reliability, internal consistency, and interrater reliability across all subscales of the ADD. Unlike the PIMRA, the ADD is more diverse in its coverage of psychopathology, and items on the measure correspond to DSM-IV diagnostic criteria (Matson & Bamberg, 1998).

Two additional scales developed for the assessment of psychopathology among those with MR are the Reiss Screen for Maladaptive Behavior (Reiss, 1988) and the Emotional Disorders Rating Scale for Developmental Disabilities (EDRS-DD; Feinstein, Kaminer, Barrett, & Tylenda, 1988). The Reiss Screen is a 36-item rating scale for use with adolescents and adults with MR. Like the majority of the other scales developed for assessment of psychopathology in MR, the Reiss screen relies on information gathered from an informant who is familiar with the behavior of the individual being assessed. However, the Reiss Screen is different from the PIMRA, DASH-II, ABC, and the ADD in that the Reiss screen items correspond to behavioral dimensions rather than individual behaviors. A factor analysis of the Reiss Screen yielded seven factors: 1) aggressive behavior, 2) psychosis, 3) paranoia, 4) depression (behavioral signs), 5) depression (physical signs), 6) dependent personality disorder, and 7) avoidant disorder. Reiss (1988) reported some evidence of criterion validity for the Reiss Screen, and reliability estimates (internal consistency and interrater reliability) have been found acceptable. In particular, it appears that the Reiss Screen may be most useful for identifying psychopathology in-general as opposed to serving as a valid instrument for

the provision of individual diagnoses (Aman, 1991). That is, the Reiss Screen assesses behaviors that may indicate the presence of a psychiatric disorder, yet it does not conform with current diagnostic criteria. Supporting this assertion is data suggesting that the subscales of the Reiss Screen may lack construct validity (Sturmey & Bertman, 1994).

Rating scales and checklists such as the PIMRA, DASH-II, ABC, ADD, and the Reiss Screen play an important role in the assessment of dual diagnosis. However, additional methods of assessing psychopathology among those with MR have been described as important, including measures of behavior function that identify antecedents and consequences that contribute to the occurrence and maintenance of problem behavior (Singh, Sood, Sonenklar, & Ellis, 1991). Identification of environmental variables has been found particularly important for the development of appropriate treatment strategies for maladaptive behavior (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982; Matson, Bamburg, Cherry, & Paclawskyj, 1999)

These assessments vary in range from how direct they are in measuring the behavior as it occurs in the natural environment (Singh, et. al., 1991). Indirect measures of behavior function include rating scales such as the Motivation Assessment Scale (MAS; Durand, 1988) and the Questions About Behavioral Function (QABF; Matson, & Vollmer, 1995) that are completed with the help of an informant who is most familiar with the individual and behavior in question. Although the MAS appears to be lacking in reliability (Spreat & Connelly, 1996; Zarcone, Roders, Iwata, Rourke, & Dorsey, 1991), data gathered on the reliability and validity of the QABF is promising (Matson, Bamburg, & Cherry, & Paclawskyj, 1999; Paclawskyj, et. al., 2000).

Direct measures for assessing the role of environmental variables in the onset and maintenance of aberrant behavior include scatter plots (Touchette et al., 1985), descriptive information of the behavior within an antecedent-consequence-behavior format (Bijou, Peterson, & Ault, 1968), and experimental functional analyses (Iwata, Wollmer, & Zarcone, 1990). Of these techniques, the experimental functional analysis is the most direct, yet also the most time consuming. When direct observation of aberrant behavior is not possible, functional analysis within an analogue setting may provide useful information (Singh, et al., 1991).

With the development of appropriate assessment techniques for evaluating psychopathology among those with MR, the field of dual diagnosis has expanded to provide further description of the phenomenon. This includes information relating to the severity of the problem in the form of prevalence estimates. These estimates place dual diagnosis in context and detail the need for further research investigating MR and co-occurring mental illness.

Prevalence of Dual Diagnosis

The need for further research pertaining to dual diagnosis is reflected in the many studies that have provided estimates of the occurrence of mental illness among those with MR (Borthwick-Duffy, 1994). In the 1970's, Rutter, Tizard, Yule, Graham, and Whitmore (1976) reported findings from the Isle of Wight studies; a series of prevalence studies that estimated the occurrence of dual diagnosis within the entire population of the Isle of Wight. The authors found that the prevalence of mental illness was 3-4 times higher among children with MR compared to nondisabled children. Almost invariably, additional prevalence studies have found the rate of psychopathology among those with

MR to be much higher than that in the population at-large, yet methodological differences have lead to prevalence estimates ranging from less than 10% to greater than 80% (Borthwick-Duffy, 1994). Two major problems identified as responsible for the lack of consistency across studies include: 1) Differences in the way mental illness and mental retardation are defined, and 2) Sampling biases that prevent accurate representation_of the MR population (e.g., sampling in institutional settings or the community at-large) (Borthwick-Duffy, 1994).

Sovner and Pary (1993) summarized additional variables previously identified as potential complicating factors in the assessment of psychopathology among those with MR. Undoubtedly, these factors have an effect on deriving accurate prevalence estimates of dual diagnosis. The authors term these complications “Pathoplastic Effects”; variables introduced into the diagnostic process by MR. The first of these is Intellectual distortion. Intellectual distortion refers to the inability of some individuals with MR to describe their inner experience in meaningful abstract terms that would aid the diagnostic process (Sovner, 1986). For example, persons with MR may have difficulty describing depressed mood or thought processes indicative of a psychotic disorder. Psychosocial masking and cognitive disintegration are other factors that may hinder the diagnostic process (Sovner, 1986; Sovner and Pary, 1993). Psychosocial masking refers to the effect of impoverished psychosocial development of individuals with MR that in turn contributes to a lack of depth in describing problematic life experiences. Cognitive disintegration refers to the phenomenon of an increased likelihood that those with MR will be more likely to demonstrate decrement in cognitive performance and an increase in maladaptive behavior. The last of the pathoplastic effects, baseline exaggeration, refers to the

exaggeration of low levels of aberrant behavior during times of increased stress, and/or following the onset of a psychiatric disorder. In turn, the diagnosis of a psychiatric disorder may be complicated by an increase of problematic behavior that is not integrally related to a psychiatric disorder (Sovner & Pary, 1993).

Other factors that may complicate diagnosis, and consequently prevalence estimates, are the effects of medication and comorbidity (Sovner & Pary, 1993). Medications have been shown to mask behavior indicative of psychopathology and generate symptoms that mimic psychopathology. Along the same lines, comorbidity may cloud the diagnostic picture by resulting in a wide array of intermixed pathological behaviors (Sovner & Pary, 1993).

Collectively, these factors limit conclusions drawn about the prevalence of psychopathology among those with MR. Although further research that takes these problems into account will inevitably cast more light on the true prevalence of dual diagnosis, there is ample research to suggest that mental illness among those with MR is a serious and frequently occurring problem. In particular, depression has been cited as a disorder that warrants further study given the presence of symptoms such as suicidal ideation, and vegetative symptoms such as sleep and appetite disturbance (Matson & Barrett, 1982).

Depression and Mental Retardation

From prevalence and case studies that have been reported throughout the years, it is evident that the full range of psychiatric disorders reported in the population at-large are also experienced by those with MR (Matson & Sevin, 1994). Reports of depression occurring among those with MR first emerged in late 19th century (Clouston, 1883; Hurd,

1888) and continued to appear sporadically throughout the 20th century until dual diagnosis began to receive increased attention in the late 1970's and early 1980's (Eaton & Menolascino, 1982; Matson, 1982; Matson, 1983; Matson & Barrett, 1982; Menolascino, 1977). Among those studies appearing over the last few decades, reports of suicidal ideation and other severe associated features have underscored the need for more research related to depression comorbid with MR (Kaminer, Feinstein, & Barrett, 1987; Sternlicht, Pustel, & Deutsch, 1970). Unfortunately, little research on this topic has been conducted.

Prevalence of Depression among Persons with MR

Three relatively large prevalence studies of dual diagnosis have included prevalence estimates of depression among those with MR. The earliest of these, the Camberwell Study, was conducted in South London and included 402 adults with MR (Corbett, 1979). International Classification of Diseases (ICD-8; World Health Organization, 1968) diagnostic criteria were used for diagnosis of mental disorders. A prevalence estimate of 2% for major depression and dysthymic disorder was found and bipolar disorder was diagnosed for 1.5% of the sample.

Gostason (1985) used a method similar to that in the Camberwell study and found much lower prevalence estimates of mood disorders among adults with MR in Kopparberg county, Sweden. Using the Comprehensive Psychopathological Scale (Asberg, Perris, Schalling & Sedvall, 1978), the Eysenck Personality Inventory (Eysenck & Eysenck, 1964), and DSM-III (APA, 1980) diagnostic criteria, a prevalence estimate of .9% for depressive disorder and .9% for cyclothymia was found. These numbers reflect a

more conservative estimate and may be a result of the failure to include persons with MR who were nonverbal.

The largest of the prevalence studies that included estimates of depressive disorders was conducted by Lund (1985) and consisted of 302 individuals with MR who were included in a database for government services in Denmark. Individuals were assessed with the MRC Schedule of Handicaps, Behavior, and Skills (Wing, 1980) and DSM-III diagnostic criteria (APA, 1980). A prevalence estimate of 3.2% for affective disorders was found. However, no distinction was made between unipolar and bipolar depressive disorders.

Although the aforementioned studies reflect an admirable attempt to account for the need of prevalence estimates for depression, flaws in methodology limit conclusions that may be drawn. Measures developed specifically for use with MR populations were not used, diagnostic categories were often considered mutually exclusive, diagnostic criteria frequently lacked operational definitions, and in the case of the Kopparberg study, medication status was not taken in to account during assessment. Collectively, these methodological problems render the results of these studies questionable (Sovner & Pary, 1993). Future research will need to account for these variables if reliable and valid inferences about depression among those with MR are to be made.

Phenomenology of Depression Among Persons with MR

Depression as described in the DSM-IV under criteria for a major depressive episode consists of a constellation of symptoms including depressed mood, anhedonia, changes in body weight and appetite, hypersomnia or insomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or inappropriate guilt,

reduced ability to concentrate, and suicidal ideation (APA, 1994). Depression is described within the larger category of diagnostic entities termed mood disorders. This includes: 1) Major Depressive Disorder, 2) Dysthymic Disorder, 3) Depressive Disorder Not Otherwise Specified, 4) Bipolar I disorder, 5) Bipolar II disorder, 6) Cyclothymic Disorder, 7) Bipolar Disorder Not Otherwise Specified, 8) Mood Disorder Due to a General Medical 9) Substance-Induced Mood Disorder, and 10) Mood Disorder Not Otherwise Specified. To date, symptoms of measures that assess depression tend to correspond to diagnostic criteria for a major depressive episode, and/or a manic episode.

It is accepted that symptoms of psychopathology seen among those with MR may differ from the population at-large as a function of severity of cognitive impairment (Einfeld & Aman, 1995), yet researchers have found that DSM-IV diagnostic criteria for depression appear to be applicable to those with MR (Matson et al., 1999). Kazdin, Matson, and Senatore (1983) and Reid (1972) were among the first to describe differences in depression between mild, moderate, and profound MR. It was noted that subjective complaints (e.g., verbal accounts of sadness) were less frequent among those categorized in the severe and profound ranges of MR. Given the apparent differences in observable symptoms across levels of mental retardation, Sovner and Hurley (1983) suggested that an emphasis should be placed on observed loss of interest in one's environment in place of subjective reports of depression. Furthermore, Pawlarczyk and Beckwith (1987) conducted a survey of the symptoms among individuals with mild MR. They found that symptoms of depression among those with MR were similar to the mainstream population, yet the observable symptoms of depression (e.g., vegetative symptoms such as sleep, appetite, and psychomotor disturbance) were more frequent than

subjective complaints among those diagnosed with MR and depression. Charlot, Doucette, and Mezzacappa (1993) supported the observation of prominent vegetative symptoms among a sample comprised predominantly of severe and profound participants with MR. In addition, it was noted that irritability was strongly associated with a diagnosis of major depression. When Charlot (1997) compared a sample of persons with severe to moderate MR with a group diagnosed with MR in the mild to moderate range, it was found that the moderate to severe group exhibited fewer psychological symptoms (i.e., subjective report of depressed mood). This finding highlighted the importance of vegetative symptoms and those symptoms observable by others to arrive at a diagnosis of depression among those with more severe levels of MR.

Assessment of Depression in MR

With the realization that individuals categorized within the severe to profound range of mental retardation are more likely to be diagnosed with depression through assessment of vegetative symptoms and/or other symptoms that are observable by a respondent familiar with the depressed individual's behavior, researchers who developed measures for use with this population made modifications in their scales to adjust for differences in symptom presentation. Measures of depression used with the population at-large such as the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, et al., 1961), Zung Depression Scale (Zung, 1965), Hamilton Depression Scale (HAM-D; Hamilton, 1960), Child Depression Inventory (CDI; Kovacs & Beck, 1977), and the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1978; Achenbach & Edelbrock, 1979) have been described as potentially useful for those with MR (e.g., Kazdin, et al., 1983; Matson, Barrett, & Helsel, 1988; Sovner & Pary, 1993), yet there are

few measures developed specifically for the assessment of depression with this population.

The Emotional Disorders Rating Scale (EDRS-DD; Feinstein et al. (1988) is a 59-item informant-completed rating scale that is the first measure developed specifically for the assessment of depression among those with MR. The EDRS-DD consists of eight subscales that assesses psychopathology in MR (irritability, anxiety, hostility, psychomotor retardation, depressive mood, somatic/vegetative symptoms, elated/manic, and sleep disturbance. Initial research with the EDRS-DD supports the interrater reliability of this instrument, yet little else is known about the psychometric properties of this scale.

As noted previously, the ADD and the DASH-II both possess subscales that target depressive symptomology. In comparison to the EDRS-DD, these scales have been more thoroughly investigated for reliability and validity. The ADD was specifically developed for use with those with mild MR, and was designed to correspond to DSM-IV diagnostic criteria for a major depressive episode. The depression subscale has excellent internal consistency, interrater reliability, and test-retest reliability (Matson & Bamburg, 1998).

Like the ADD, the DASH-II corresponds to DSM-IV diagnostic criteria and was developed for use with those who have severe and profound MR. The DASH-II depression subscale has been shown to discriminate between depressed and nondepressed individuals (Matson, et al., 1999). In addition, it possesses acceptable to good psychometric properties that indicate its usefulness with the severe to profound MR population (Matson, 1994).

Given the challenges of assessing depression among some individuals with MR, additional methods of assessment have been proposed including the Dexamethasone Suppression Test, sleep assessment, and assessing for a family history of mood disorders (Sovner & Pary, 1993). However, these methods alone may not be suitable for diagnostic purposes. Although sleep disturbance has been reported in the majority of persons diagnosed with major depression (Reynolds, 1987), few studies have investigated sleep disturbance among those with MR. Concordance rates of depression among family members may lend support to diagnostic hypotheses, yet family history alone is not suitable for diagnosis. Likewise, the Dexamethasone Suppression Test has not been deemed reliable enough for the purpose of diagnosis (Arana & Baldessarini, 1987).

Treatment of Depression

Although validated measures for the assessment of depression among those with MR have been developed, literature concerned with the treatment of depression among those with MR consists primarily of case studies detailing pharmacological and behavioral interventions. Of the pharmacological studies reported, most studies have consisted of uncontrolled or otherwise methodologically flawed case reports describing treatment with major tranquilizers (Adams, Kirowitz, & Ziskind, 1970; Rioth, 1961) and lithium (Rivinus & Harmatz, 1979). Of the three most recent pharmacological studies for depression included in a review of psychopharmacology studies for MR, two reports yielded positive findings for the use of antidepressant medication to treat depression (Ghaziuddin et al., 1991; Langee & Conlon, 1992), and one report indicated mood stabilizers may have use in managing symptoms of bipolar disorder among those with MR (Kastner & Friedman, 1992). However, even among the most recent studies there are

significant methodological flaws that preclude definitive statements about the efficacy of psychotropic medication for depression among those with MR (Matson, et al., 2000). Hence, further studies that give careful consideration to research methodology are needed to determine the utility of medication for the treatment of depression among those with MR.

With regard to behavioral interventions for the treatment of depression, Matson, Dettling, and Senatore (1981) reported the first case of behavioral treatment for depression among an individual with borderline to mild MR. Utilizing an ABA design, depressive behaviors (e.g., disparaging self-statements and suicidal verbalizations) were targeted and reduced with reinforcement of positive self-statements and feedback regarding depressive behaviors. Matson (1982) followed up with a multiple baseline across subjects design that was conducted with four depressed individuals diagnosed with mild to moderate MR. All participants demonstrated decreases in depressive behaviors following verbal feedback and reinforcement procedures. Although these studies demonstrate the utility of behavioral interventions in modifying depressive behaviors, further research is needed to assess the utility of behavioral interventions among persons with more severe levels of MR.

Symptoms of Depression and Feeding Disorders

In addition to the need for further research to investigate the phenomenology of depression and utility of behavioral and pharmacological interventions for its treatment, there is a need for more research pertaining to the nature of depressive symptoms among those with MR. Among the most frequent symptoms of depression described among those with MR are vegetative symptoms such as sleep disturbance, psychomotor

agitation, and appetite disturbance, (Sovner & Pary, 1993). Of these symptoms it may be inferred that disturbance of appetite and weight loss are likely related and represent a greater threat to physical health than other vegetative symptoms.

To date, literature examining feeding disturbances among adults with MR consists primarily of case studies that are either descriptive in nature or describe the use of functionally-based assessment and treatment. Thus far, assessment and description of depressive symptoms in feeding disorders has been neglected, and much of the research on feeding disorders has focused on children with and without MR. From research published thus far, a handful of feeding disorders have been identified and described. These studies pertain to pica, rumination, food selectivity and/or food refusal, overeating, vomiting, and problems related to feeding skills or related behavior problems (Gravestock, 2000; Matson & Kuhn, 2001). The limited amount of research conducted on these problems is reflected in the DSM-IV's limited coverage of feeding disorders among those with MR.

Prevalence of Feeding Disorders

Prevalence figures of feeding disorders among those with MR vary considerably across studies. Much like prevalence studies of dual diagnosis in general, prevalence rates of feeding disorders vary widely across studies due to methodological heterogeneity. Across inpatient and community samples, prevalence rates for feeding disorders range from 1-35% (Bouras & Drummond, 1992; Gravestock, 2000). Across studies, prevalence rates tend to be higher among inpatient samples (Gravestock, 2000). Utilizing the DASH eating disorders subscale; a scale based on DSM diagnostic criteria, Matson, et al., (1991) estimated the prevalence of eating disturbance at 27.5% among a

sample of 506 individuals with MR residing across two state-run residential facilities. Overall, feeding disorders appear to be more prevalent among those with more profound levels of MR (Matson et al., 1991).

As research on feeding disorders has progressed over the last few decades, detailed descriptions of various feeding problems among those with MR have emerged. To date, most research has focused on the problems of pica, rumination and vomiting, food selectivity, food refusal, and overweight/obesity. The potential negative health consequences of behaviors that define these problems (e.g., aspiration, malnutrition, and death) underscore importance of further research in this field. To date, feeding problems most commonly described in the literature include, pica, rumination, food selectivity/food refusal, weight related problems, and problems related to feeding skills.

The Feeding Disorders

Pica

Pica is a feeding disorder characterized by the repeated consumption of inedible objects (APA, 1994). DSM-IV criteria specify that the behavior is part of a persistent pattern that has been occurring for at least one month in duration. In addition, the behavior must be inappropriate to developmental level, and not part of a culturally sanctioned practice (APA, 1994). Common examples of pica include ingestion of cigarette butts, paint chips, fecal material, paper, and dirt (APA, 1994; Matson, & Bamburg, 1999). Others have extended the definition of pica to take in to account various aspects of this phenomenon (McLoughlin, 1987). For example, pica may be classified as non-food pica, food pica (e.g., consumption of rotten or frozen food), non-ingestion pica (e.g., mouthing, licking, or sucking inedible objects), or a combination of

these pica subtypes. Pica may also be limited to a single substance (Specific pica) or may occur across a variety of substances (Generalized pica). Lastly, pica may vary in etiology. Cultural factors, addiction, and mental illness have all been implicated in the development of pica (McLoughlin, 1987). Currently, pica is one of the most thoroughly studied feeding disorders, and also one of the most dangerous. Ingestion of inedible objects may lead to physical consequences such as gastrointestinal obstruction, nutritional deficiency, disease, lead intoxication, and death (Danford & Huber, 1982; McLoughlin, 1987). Prevalence estimates for Pica range from 4-26% (Danford & Huber, 1981; Dudley, Ahlgrim-Dezell, & Calhoun, 1999). It is believed that the prevalence of pica tends to increase with the severity of MR (McAlpine & Singh, 1986; Dudley, Ahlgrim-Dezell, & Calhoun, 1999). In addition to the previously mentioned methodological issues that result in a wide range of prevalence estimates, the way in which researchers have defined pica (e.g., including rotten food or hand mouthing) has likely contributed to inconsistent prevalence rates (Gravestock, 2000).

Rumination

Rumination refers to the voluntary regurgitation of food during mealtime, where food is usually chewed and re-swallowed as part of a repetitive cycle (APA, 1994). According to DSM-IV diagnostic criteria, this pattern is recurrent for at least one month following a period of normal functioning. Rumination is thought to occur more often in males than females (APA, 1994), yet little is known about the course the disorder and prevalence among persons with MR. Regurgitation is facilitated by the individual through various means. Stimulation of the gag reflex and various body movements conducive to regurgitation (e.g., movements of the head and neck) are common, yet not

all individuals who ruminate will display overt behavior indicative of rumination (Johnston, 1993). The rate of ruminative behavior also varies across individuals, and specific food characteristics have been found to influence the likelihood that rumination will occur (Johnston, Greene, Vazin, Winston, & Rawal 1990). For example, Johnston, et al. (1990) found that rumination tended to increase when foods were of a pureed consistency. Ingestion of foods with high caloric density (Greene, et al., 1991; Rast, Johnston, Ellinger-Allen, & Drum, 1985), favorable hedonic qualities of food (Johnston, 1993), and low rates of oropharyngeal stimulation (Rast, et al., 1985) have also been associated with increased rates of rumination. In addition, Kuhn, Matson, Mayville, and Matson (2001) found that social skills deficits are associated with rumination. Although the findings of this study are correlational, this relationship may hold implications for assessment and treatment of rumination.

Much like pica, rumination poses a significant health risk (APA, 1994). Adverse consequences such as weight loss, esophageal irritation, tooth decay, decreased resistance to disease, aspiration, and death have been linked to rumination (Johnson, 1993; Jones, 1982). Given the potential severity of consequences associated with rumination, further research is needed.

Food Selectivity and Food Refusal

Food selectivity and food refusal have been described as common among those with MR (Riordan, et al., 1984). Food selectivity refers to an individual's preference for certain foods (e.g., foods of a certain texture)(Babbitt, et al., 1994). Food refusal is a common consequence of food selectivity where non-preferred foods are refused during mealtime (Babbitt, et al., 1994). Complete food refusal is thought to be less prevalent

than refusal occurring with food selectivity (Gravestock, 2000). The prevalence of food refusal appears to be quite high. In a sample of children with MR, Thomassen et al. (1991) found that 30% displayed behavior indicative of food selectivity/refusal. Moreover, 19% presented with a decrease in appetite. Given the high prevalence and serious nature of these problems, the need for further research in this area is underscored.

Various case studies detailing food selectivity/food refusal behavior have illustrated a varied pattern of problematic eating behavior. Included in the literature are reports of selectivity specific to food type (Leibowitz & Holcer, 1974; Shore, et al., 1998) and foods of a particular texture (Luiselli & Gleason, 1987; Johnson & Babbitt, 1993). Complete food refusal has also been reported (Kerwin, Ahearn, Eicher, & Burd, 1995), yet it is thought to be less common than food selectivity (Gravestock, 2000).

Various organic and environmental factors have been implicated in the development and maintenance of food selectivity/food refusal (Riordan, Iwata, Wohl, & Finney, 1980; Jones, 1982). Organic problems include physical obstructions and abnormalities that interfere with food intake. This includes deformities in oral musculature, food allergies, cleft palate, muscular dystrophy, and paralysis (Jones, 1982). Common environmental factors described in the onset of food selectivity/food refusal include a lack of opportunities for skill development, and aversive feeding experiences (Siegel, 1982). Following the onset of food selectivity/food refusal, reinforcement contingencies have been found responsible for maintenance of the problem behavior (Jones, 1982; Riordan, et al., 1984; Cooper, et al., 1995).

Overweight, Obesity, and Associated Behaviors

Researchers estimating the occurrence of weight problems among those with MR have found that a large percentage of individuals are overweight (Burkart, Fox, & Rotatori, 1985; Wood, 1994). Prevalence estimates have reached as high as 35% (Wood, 1994). Individuals in the overweight (Body Mass Index ≥ 25) and obese (Body Mass Index ≥ 30) ranges of body composition are at an increased risk for numerous health complications (Bray, 1998). Given that individuals with MR already experience health problems at a rate beyond the population at large, the study of weight problems among those with MR appears all the more urgent.

Unfortunately, eating behaviors that may be associated with overweight and obesity have not been thoroughly investigated among those with MR. For example, literature related to food stealing is scarce outside of a handful of notable studies (Reid, Ballinger, & Heather, 1978; Matson, et al., 1991; Maglieri, DeLeon, Rodriguez-Catter, & Sevin, 2000). Likewise, research related to binge eating behavior and binge eating disorder has largely neglected MR, yet behaviors characteristic of binge eating have been described. This includes excessive food seeking behavior, rapid consumption of food, and continuous food consumption (O'Brien & Whitehouse, 1990; Matson, et al., 1991; Smith, Branford, Collacott, Cooper, & McGrother, 1996).

Feeding Skill Problems

Numerous feeding skill deficits have been noted among those with MR (Matson & Kuhn, 2001; Sisson & Dixon, 1986), yet little research on this phenomenon has emerged in the literature. Problems associated with feeding skills include difficulties swallowing, chewing, and accessing food. These deficits result from a wide arrange of

physical problems and/or knowledge deficits (Matson & Kuhn, 2001). Little is known about the prevalence of these various skill deficits, and clearly more research is needed.

Assessment of Feeding Problems

The two most common forms of assessment for feeding problems are medical and behavioral assessment. Given the high prevalence of physical problems implicated in the development and maintenance of feeding disorders (Palmer, Thompson, and Linscheid, 1975) a complete medical assessment is necessary. In addition to assessing for medical problems, continuous monitoring of weight and nutritional intake are important indicators and of health status and behavior (Iwata, Riordan, Wohl, & Finney, 1982; O'Brien, Repp, Williams, & Christopherson, 1991). After physical variables are accounted for, a behavioral assessment for feeding may help determine environmental variables contributing to the onset and maintenance of problematic behavior (Babbitt, et al., 1994; Iwata, et al., 1982; O'Brien, et al., 1991). A thorough behavioral assessment often includes a detailed analysis of behavior topography and assessment of functional relations. Such information may be gathered through caregiver interview, a questionnaire, food preference assessment, direct observation, and functional analysis.

Caregiver Interview

The caregiver interview is usually an unstructured interview that gathers information from the parent or other caregiver about the individual's eating behavior. Within an interview, a wide range of information is gathered that relates to the topography of behavior and behavior function. Questions often pertain to the course of the feeding problem, prior treatment strategies, types of foods consumed and/or rejected,

the amount of food consumed, meal duration, the client's daily routine, home structure, and environmental-behavior relationships (Babbitt, et al., 1994).

Questionnaire

The development of measures for the assessment of feeding disturbance among those with MR has been largely neglected. The Screening Tool for Feeding Problems (STEP; Matson & Kuhn, 2001) is a measure developed specifically for the assessment of common feeding problems among those with MR. It is completed through asking caregivers a series of 23 questions related to various dimensions of problematic eating behavior. The items on the STEP are grouped in to 5 rationally derived subscales. The subscales of the STEP include items related to aspiration risk, food selectivity, feeding skills, food refusal and related behavior problems, and nutrition related behavior problems. Items assess the frequency and severity of each behavior. Matson and Kuhn (2001) found that the STEP possesses acceptable test-retest and cross-rater reliability. With regard to validity, Kuhn and Matson, (In press) found that items on the STEP related to pica and rumination were significantly correlated with DSM-IV diagnoses of rumination and pica. To date, the STEP represents the only measure specific to feeding problems among those with MR.

Food Preference Assessment

The assessment of an individual's preferred foods may provide useful information for interventions that follow (Babbitt et al., 1994; Parsons, & Reid, 1990). An example of food preference assessment consists of presenting foods to the individual in pairs (Babbitt, 1994). Following the first presentation, the individual is offered the opportunity to consume both of the paired foods during an additional trial. Foods not chosen on the

initial trial are re-paired with other foods not initially chosen. The pairing procedure is then repeated, resulting in a hierarchy of preferred foods that may be used as reinforcers once an intervention is implemented.

Direct Observation/Functional Assessment

Direct observations of eating behavior play an integral role in the behavioral assessment of feeding problems. Observation of caregivers during the feeding process may help elucidate patterns of behavior that may reinforce eating problems (Iwata, et al., 1982; Babbitt, et al., 1994). Initial observation of caregiver/client interaction may also serve as baseline for intervention that follows (Iwata, et al., 1982). Observations that cannot be conducted at home are best carried out in settings that approximate normal mealtime conditions (Iwata, et al., 1982). In an effort to determine behavior function, data gathered from the assessment may be graphed according to the antecedents and consequences surrounding the target behavior (Bijou, et al., 1968). In addition, functional assessment questionnaires such as the Questions About Behavior Function (QABF; Matson & Vollmer, 1994) may be useful for determining the function of feeding problems.

Functional Analysis

Analogue functional analysis of feeding disorders consists manipulating consequences for the individuals feeding behavior to infer behavioral function (Babbitt, et al., 1994). This often includes providing positive reinforcement such as praise or access to preferred foods contingent upon the occurrence of the target behavior (Babbitt, et al., 1994). Girolami and Scotti (2001) used analogue methodology in three separate

cases of food refusal to determine that problematic mealtime behavior was maintained by escape and access to tangibles.

Antecedent manipulation has also been described in the assessment of feeding disorders (Munk & Repp, 1994). Through manipulating food type and texture, Munk and Repp (1994) categorized problem eating behavior in to food refusal, type selectivity, texture selectivity, and type and texture selectivity. More specifically, foods of a different type or texture are varied gradually to assess changes in food acceptance rates. Given that functional analysis usually refers to the manipulation of consequences, Munk and Repp (1994) have preferred to categorize antecedent manipulation under the rubric of behavioral assessment.

Treatment

Beyond medical intervention for feeding disorders with an organic etiology, treatment usually consists of variety of interventions that stem from the results of a behavioral assessment. Interventions commonly include multiple treatment components (Cooper, et al., 1995). In particular, this often includes the implementation of differential reinforcement strategies (e.g., contingent attention or tangible reinforcement), noncontingent reinforcement, escape extinction, antecedent manipulation, and negative reinforcement techniques. These procedures are frequently cited in the treatment of food selectivity and food refusal (Cooper et al., 1995; Hoch, Babbitt, Coe, Krell, & Hackbert, 1994)., 1994: Johnson, & Babitt, 1993; Riordan, et al., 1984; Werle, Murphy, & Budd, 1993). In addition to these procedures, aversive techniques are sometimes used in the treatment of life-threatening behaviors such as pica and rumination (Gravestock, 2000; Holvoet, 1982).

In terms of skills deficits related to problematic feeding behavior, behavioral treatment for the development of appropriate mealtime behavior (e.g., appropriate utensil use and chewing behavior) has also been implemented with success. Utilizing instructions, prompts, modeling, manual guidance, behavioral rehearsal, and contingent attention, Sisson & Dixon, (1986) increased appropriate mealtime behavior among six children with MR. Behavioral techniques have also been effective in reducing behaviors that interfere with feeding such as mealtime sloppiness (Cipani, 1981) and rapid eating (Favell, McGimsey, & Jones, 1980)

Feeding Disorders, Depressive Symptoms, and Needed Research

Literature related to feeding disorders has focused heavily on the medical and functional aspects of problematic eating behavior. In addition, it has been hypothesized that lack of stimulation, neglect, life stressors, and parent/child relationship problems may be associated with the onset of rumination disorder (APA, 1994), yet little is known about the contribution of depression to feeding disorders among those with MR. Although high rates of appetite disturbance among those with MR have been reported (Sovner & Pary, 1993), little research exists detailing the relationship of depressive symptoms to feeding disorder symptoms among those with MR. This omission is important since the majority of research related to the treatment of feeding disorders has not considered the role of psychopathology in the onset and maintenance of these problems among those with MR. To date, a study by O'Brien and Whitehouse (1990) represents the only reported research that has examined the relationship between depressive and feeding disorder symptoms. In this study, it was found that individuals displaying depressive symptoms were more likely to engage in food-seeking and eating

behavior compared to nondepressed individuals. However, important limitations of this study illustrate the need for further research related to depression and feeding disorders. First, the measure used in the study was not validated with those in the profound range of MR. In addition, the diagnostic group for depressed individuals was very small (n = 10), and participants were not grouped according to level of mental retardation.

Purpose

Ultimately, further research related to depression and feeding disordered behavior may clarify the relationship between assessment and treatment of feeding disorders among those with MR. Given the serious and even life threatening nature of feeding disorders, and the fact that little is known about the etiology or treatment of these problems, additional research is needed. In the population at-large, disturbances in mood have been implicated in the onset and maintenance of aberrant eating behavior (e.g., Heatherton & Baumeister, 1991; McManus & Waller, 1995). To date, much of the literature on feeding disorders has focused on functional relations to the exclusion of psychopathology as a potential etiological factor. If a relationship between depression and feeding disorders is found, it may influence the way in which feeding disorders are conceptualized, assessed, and treated. Consequently, the purpose of this study is to investigate differences in feeding disorder symptoms across individuals with and without symptoms of depression. Given the disturbance of appetite occurring among the depressed population at-large, it is expected that the presence of feeding disorder symptoms will be more prevalent across individuals in the severe and profound range of MR who are depressed.

Method

Participants

Participants in the study were residents at Pinecrest Developmental Center (PDC) in Pineville, Louisiana. PDC is a state-run facility that consists of individual homes under 24 hour supervision. PDC houses approximately 650 persons with varying levels of mental retardation. Institutional Review Board approval for this project was obtained through a previously approved research proposal entitled: “Norming Psychological Assessment Battery for Treatment Plans”.

Participants included both males (n = 24) and females (n = 30) diagnosed with severe (n = 10) and profound (n = 44) mental retardation. Participants were classified with either severe or profound MR, and the majority were Caucasian. See Table 1 for a complete listing of demographic characteristics for the entire sample.

Table 1:

Demographic Characteristics of the Total Sample

Demographic	Percent of Sample
<u>Age</u>	
0-21	0
22-45	20.40
46-65	59.30
66+	20.40
<u>Gender</u>	
Female	55.60
Male	44.40

Table 1 continued

Race

Caucasian	75.90
African American	22.2
Hispanic	1.85

Level of Mental Retardation

Severe	18.5
Profound	81.5

Diagnoses of MR and Axis I disorders were provided by an on-site licensed psychologist with DSM-IV criteria. Participants were divided into three diagnostic groups: 1) Clinically depressed (e.g., major depression, bipolar disorder, dysthymia, or mood disorder nos), 2) Pervasive Developmental Disorder, and 3) No Disorder on Axis I. The Pervasive Developmental Disorder group was used as a validity control group to demonstrate that any feeding problems with the depressed group are due to depression and not to psychopathology in general. Demographic characteristics of each diagnostic group are presented in Table 2

Table 2:

Demographic Characteristics of the Diagnostic and Control Groups

<u>Demographic</u>	<u>Percent of Sample</u>		
	Depressed (n = 18)	PDD (n = 18)	No Diagnosis (n = 18)
<u>Age</u>			
0-21	0	0	0

Table 2 continued

<u>Age</u>				
22-45	22.22	16.67	22.22	
46-65	55.56	72.22	50.00	
66+	22.22	11.11	27.78	
<u>Gender</u>				
Female	55.55	55.55	55.55	
Male	44.44	44.44	44.44	
<u>Race</u>				
Caucasian	88.89	77.78	61.11	
African American	11.11	16.67	38.89	
Hispanic	0	5.56	0	
<u>Level of Mental Retardation</u>				
Severe	22.22	5.56	27.78	
Profound	77.77	94.44	72.22	

With regard to the depression group, participants were only included in the depressed group if they obtained clinically elevated scores on the DASH-II mood disorder subscale. The purpose of screening participants with this scale was to ensure that participants diagnosed with bipolar disorders were experiencing significant symptoms of depression at assessment. Given that some manic symptoms (e.g., restlessness or agitation) overlap with the mood disorder subscale, participants were not included in the depression group if they were diagnosed with a current manic episode and/or symptoms on the DASH-II did not indicate the presence of depressive symptoms

(e.g., appears sad, loss of interest, etc.) See Table 3 below for the percentage of mood disorder diagnoses in the Depression group.

Table 3

Percentage of Axis I Mood Disorder Diagnoses

Major Depression	16.67
Bipolar Disorder	33.33
Cyclothymia	5.56
Depressive Disorder nos	38.89
Bipolar Disorder nos	5.56

Measures

Diagnostic Assessment for the Severely Handicapped-II (DASH-II)

The DASH-II (Matson, 1994) is the first diagnostic measure specifically designed for use with those in the severe to profound range of MR. It consists of 84 items across 13 subscales representing major psychiatric disorders: 1) Anxiety, 2) Depression, 3) Mania, 4) PDD/Autism, 5) Schizophrenia, 6) Stereotypies, 7) Self-injury, 8) Elimination, 9) Eating, 10) Sleep, 11) Sexual, 12) Organic, and 13) Impulse. The DASH-II has good interrater reliability, and the validity of the DASH-II and many of its subscales has been well established. A series of studies supports the validity of the Anxiety, PDD/Autism, Stereotypies, Schizophrenia, and depression subscales (Bamburg, Cherry, Matson, & Penn, 2001; Matson, Baglio, Smiroldo, Hamilton, & Packlowskyj, 1996; Matson, et al., 1997; Matson, et al., 1999; Maston & Smiroldo, 1997; Matson, Smiroldo, Hamilton, & Baglio, 1997). Researchers examining the validity of the DASH-II also found that the DASH-II and its subscales correlated with the Aberrant Behavior Checklist (ABC; Aman

& Singh, 1986); the only additional measure of behavior problems currently available for use with individuals with MR in the severe to profound range.

DASH-II Mood Disorders Subscale

The DASH-II Mood Disorders Subscale consists of 15 items that correspond to DSM criteria for unipolar diagnoses. The subscale assesses the frequency, intensity, and duration of mood disorder symptoms, and demonstrates good criterion validity when compared with independent diagnoses (Matson et al., 1999). Test-retest reliability of the Mood Disorder subscale is good as indicated by median percent agreement over a two week retest interval (.88-.94) (Matson, 1994). Estimates of interrater reliability as assessed by percent agreement across informants (.92-96) are good (Matson, 1994).

DASH-II Autism/PDD Subscale

The DASH-II Autism/PDD Subscale consists of six items corresponding to DSM-IV criteria for autism. The Autism/PDD Subscale has demonstrated close correspondence with the Child Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988), and items on the subscale are able to differentiate between those who do and do not have diagnoses of autism (Matson, et al., 1996; Matson, Smiroldo, & Hastings, 1998) Median percent agreement over two weeks (.81-1.0) indicates that the Autism/PDD subscale possesses good temporal stability, and interrater reliability estimates indicate satisfactory agreement across informants (.81) (Matson, 1994).

DASH-II Sleep Disorder Subscale

The DASH-II Sleep Disorder Subscale is a five-item subscale designed to screen for significant disturbances in sleep. Although there has not been a lot of research conducted with the Sleep Disorder Subscale, percent agreement for interrater reliability

(.93), and Test-retest reliability (.94) has been assessed (Matson, 1994). To date, the validity of the Sleep Disorder Subscale has not been assessed.

The Screening Tool for fEeding Problems (STEP)

The STEP is a 23-item informant-based measure designed to screen for a wide array of feeding problems. It consists of five subscales: 1) aspiration risk, 2) Selectivity, 3) Feeding Skills, 4) Refusal Related Behavior Problems, and 5) Nutrition Related Behavior Problems. The STEP has good psychometric properties. Crossrater reliability ($r = .71$) and test-retest reliability ($r = .71$) have been found acceptable (Matson & Kuhn, 2001). In addition, the rumination and pica subscales have demonstrated criterion validity through correlating with DSM-IV diagnoses for rumination and pica (Kuhn & Matson, in press).

Procedure

Data was collected from informants working on grounds at Pinecrest Developmental Center as direct-care workers. Each informant was selected for measure completion based on familiarity with the study participant. Each informant was required to have work experience with the participant for at least 6 months. Data collection and storage was conducted in accordance with accepted procedures to secure patient confidentiality.

Scores derived from the STEP were analyzed across the three diagnostic groups (Depressed, PDD, and No Diagnosis). Pearson correlations between STEP subscales were analyzed to determine whether the data should be analyzed through multivariate or univariate analyses. In addition, 10 individual items of the STEP that were identified by two Medical Occupational Therapy (MOT) professionals with advanced training in

feeding disorders as particularly likely to place a client at risk for severe health consequences, were subjected to the same analysis (i.e., multiple ANOVA's with Tukey's follow-up tests). An attempt was made to match participants across diagnostic groups for gender, age (within 10 years), and level of MR to prevent any confounding effect these variables may introduce to the study. Toward this end, all but seven pairs of participants were matched within 10 years of age, and one pair could not be matched for level of MR severity.

To assess the contribution of additional variables aside from the presence of depression that may account for between group differences on the STEP, a step-wise multiple regression analysis was used on STEP subscales where significant differences were found. Age, bodyweight, and DASH-II scores on the PDD, Mood Disorders, and Sleep Disorders subscale were included as predictors for STEP subscale scores. Given that sleep records were only being kept for those with documented sleep problems (less than 20% of the participants in the current study), scores on the DASH-II Sleep Disorders Subscale were included in the analysis instead of data from sleep records. To control inflated family-wise error rate, the False Discovery Rate method (Benjamini & Hochberg, 1995) was used.

Results

Analysis of STEP Subscale Intercorrelations

Overall, low intercorrelations between STEP subscales were found. Coefficients ranged from .01-.42. As a result, score differences across the five STEP subscales were analyzed with multiple univariate analyses of variance (ANOVA's) followed by Tukey's post hoc tests. STEP subscale intercorrelations are displayed in Table 4.

Table 4:

STEP subscale intercorrelations

	Aspiration	Selectivity	Refusal	Nutrition	Skills
Aspiration	*	.38	-.02	.25	.09
Selectivity	*	*	.42*	-.06	.20
Refusal	*	*	*	.16	-.01
Nutrition	*	*	*	*	.17
Skills	*	*	*	*	*

*significant at .01 level (2-tailed)

Analysis of Diagnostic Group Differences Across STEP Subscales

A significant difference was found across the Nutrition Related Behavior Problem subscale $F(2, 53) = 6.4, p = .00$. With Tukey's post hoc analyses, a significant difference was found for the Nutrition Related Behavior Problems subscale between the Depressed and No Diagnosis groups ($p = .01$), and between the PDD and No Diagnosis groups ($p = .01$). However, the difference between the depressed and PDD group was non significant

($p = .97$). Differences across the Aspiration, Selectivity, Skills, and Refusal Related Behavior Problems subscales were all non significant. Results are displayed in Table 5.

Table 5:

Means and Standard Deviations for STEP Subscale Analysis

STEP Subscale	Depressed	PDD	No Diagnosis	F	P value
Aspiration					
<u>M</u>	.33	.06	.00	3.27	.05
<u>SD</u>	(.69)	(.24)	(.00)		
Selectivity					
<u>M</u>	.94	.61	.83	.31	.74
<u>SD</u>	(1.59)	(1.24)	(.99)		
Refusal					
<u>M</u>	1.70	.72	.11	3.40	.04
<u>SD</u>	(1.58)	(1.32)	(.47)		
Nutrition					
<u>M</u>	1.56	1.67	.11	6.39	.00*
<u>SD</u>	(1.38)	(2.06)	(.47)		

*Significant at .01

Analysis of Diagnostic Group Differences Across Selected STEP items

Significant differences were found for item 11 (Only eats a small amount of the food presented to him/her), $F(2, 53) = 7.4$, $p = 2.30$, $p = .00$. With Tukey's post hoc analyses, significant differences for item 11 were found between the Depressed group and both the PDD group ($p = .01$) and No Diagnosis groups ($p = .00$). The difference between the PDD group and No Diagnosis group was non significant ($p = .82$). Out of the other nine items included in the analysis, no significant differences across diagnostic groups were found. These findings include the following items: Problem behaviors increase during meal time, eats or attempts to eat items that are not food, continues to eat

as long as food is available, spits out food before swallowing, regurgitates and re-swallows food either during or immediately following meals, pushes food away or attempts to leave the area when food is presented, vomits either during or immediately following meals, steals food, and eats foods only of certain textures. Results are displayed in Table 6.

Table 6:

Means and Standard Deviations for Selected STEP Items

STEP Items	Depressed	PDD	No Diagnosis	F	P value
2) Problem behaviors (e.g., aggression and SIB increase during mealtime)					
<u>M</u>	.39	.67	.00	2.32	.11
<u>SD</u>	(.70)	(.70)	(.00)		
9) Eats or attempts to eat items that are not food					
<u>M</u>	.28	.33	.00	1.67	.20
<u>SD</u>	(.67)	(.76)	(.00)		
11) Only eats a small amount of the food presented to him or her.					
<u>M</u>	.67	.11	.00	7.42	.00*
<u>SD</u>	(.84)	(.47)	(.00)		
12) Will continue to eat as long as food is available.					
<u>M</u>	.28	.28	.00	1.79	.18
<u>SD</u>	(.57)	(.67)	(.00)		
13) Spits out their food before swallowing.					
<u>M</u>	.28	.17	.11	.48	.63
<u>SD</u>	(.57)	(.51)	(.47)		

Table 6 continued

14) Steals or attempts to steal food outside of mealtime.	<u>M</u>	.22	.50	.00	3.70	.03
	<u>SD</u>	(.55)	(.79)	(.00)		
18) Regurgitates and re-swallows food either during or immediately following meals.	<u>M</u>	.22	.05	.00	1.52	.23
	<u>SD</u>	(.65)	(.24)	(.00)		
19) Pushes food away or attempts to leave the area when food is presented	<u>M</u>	.50	.28	.00	2.87	.07
	<u>SD</u>	(.86)	(.67)	(.00)		
21) Vomits either during or immediately following meals	<u>M</u>	.11	.00	.00	2.13	.13
	<u>SD</u>	(.32)	(.00)	(.00)		
23) Eats foods only of certain textures.	<u>M</u>	.22	.22	.67	2.00	.15
	<u>SD</u>	(.65)	(.65)	(.97)		

*Significant at .01

Linear Regression analysis Across STEP Subscales

Age, height, weight, DASH-II Mood Disorder subscale, DASH-II PDD subscale, and the DASH-II Sleep Disorder subscale were entered as predictors into step-wise linear regression analyses. Regression analyses utilizing these predictors were run across the five subscales of the STEP. Significant predictors were identified across the Aspiration and Nutrition subscales. For the Aspiration subscale [$R^2 = .16$, adjusted $R^2 = .15$, $F(1,$

53) = 10.20, $p = .002$, the Mood Disorder subscale of the DASH-II was the only significant predictor. For the Refusal Related Behavior Problems subscale, the PDD subscale was the only significant predictor [$R^2 = .14$, adjusted $R^2 = .12$, $F(1,53) = 8.53$, $p = .01$]. Regression analyses across the Selectivity, Skills, and Nutrition subscales were non significant. Bivariate correlation coefficients for the STEP subscales and predictor variables are displayed in Table 7.

Table 7:

Pearson's Coefficients for STEP Subscales and Predictor Variables

STEP Subscales	Age	Weight	DASH-II Mood	DASH-II PDD	DASH-II Sleep
Aspiration	-.21	.06	.41*	.12	.14
Selectivity	.14	-.10	.12	.30	-.17
Refusal	.13	-.10	.33	.38*	.06
Nutrition	-.13	-.17	.32	.09	.14
Skills	-.10	-.02	.11	-.05	.15

*significant at .01 (2 tailed)

Discussion

From the results of univariate analyses across STEP subscales, a significant difference across the Nutrition Related Behavior Problems subscale was found. Participants in both the Depressed and the PDD groups scored significantly higher on the Nutrition subscale than participants in the No Diagnosis group. This finding suggests that individuals diagnosed with a Pervasive Developmental Disorder as well as those diagnosed with a Depressive Disorder experience significantly more symptoms of nutrition related behavior problems (steals food or attempts to steal food during meals, attempts to eat items that are not food, eats a small amount of the food presented to him or her, continues to eat as long as food is available, and steals or attempts to steal food outside of mealtime) than those without an Axis I diagnosis. Thus, it appears that the presence of psychopathology in general may be associated with an increase in the presence of certain feeding disordered behaviors.

Individual item differences in the Nutrition subscale were also found. Significant differences were found for items representative of a decrease in food intake. It was revealed through post-hoc analyses that participants in the Depressed group received higher frequency scores than participants in either the PDD or No Diagnosis groups for the item representative of a decrease in food intake. Given that appetite disturbance is a common symptom of depression (APA, 1994; Harris, Young, and Hughes, 1984; Patton, 1993), it was expected that individuals in the Depressed group may receive higher frequency endorsements for a decrease in food intake. However, the only study to date that assessed feeding behavior among those with MR (i.e., O'Brien & Whitehouse, 1990) found that individuals with symptoms of depression tend to engage in an increased level

of food seeking behavior compared to peers without depressive symptoms. A decrease in food intake in the O'Brien and Whitehouse study was not found. Explanations for the discrepancy of results between the two studies include a lack of similarity between studies with regard to the MR level of those assessed, a lack of information about the Depression diagnostic group in the O'Brien and Whitehouse study, and the exceedingly small number of subjects included in the O'Brien and Whitehouse study. In their study, O'Brien and Whitehouse included participants with moderate to severe MR as defined by the ICD-9. Although demographic information that details the number of participants diagnosed with either moderate or severe MR is not included in the study, it is likely that the level of disability in the O'Brien and Whitehouse study differs significantly from the level of disability experienced by participants in the present study. Furthermore, beyond explaining that participants were diagnosed with depression according to ICD-9 criteria, details about specific Axis I diagnoses were omitted, and only 10 participants were included in the Depressed group.

From the results of the multiple regression analyses, it was found that the DASH-II Mood Disorder subscale was the only significant predictor of scores on the Aspiration subscale of the STEP. Furthermore, the DASH-PDD subscale was the only significant predictor of scores on the Nutrition subscale of the STEP. Neither of these independent variables were expected to emerge as significant predictors.

With regard to the DASH-II mood disorders subscale and its relationship with the Aspiration subscale, there is a lack of published research indicating a relationship between behaviors that confer risk of aspiration (i.e., rumination and vomiting) and psychiatric disorders such as depression. Given the finding that behaviors such as

rumination are hypothesized to serve an automatic or self-stimulatory function (Holvoet, 1982; Johnston, 1993), it is possible that this type of behavior may serve as a self-medicating response to depression. Furthermore, it should be noted that frequency of rumination appears to vary as a function of caloric intake (Greene, et al., 1991; Rast, Ellinger-Allen, & Johnson, 1985). Thus, the possibility exists that a decrease in caloric intake among those that are depressed may contribute to an increase in behaviors such as rumination and vomiting. Given that the aspiration subscale was assessed and not each of the individual items in the subscale, it remains to be seen if the DASH-II Mood Subscale is a significant predictor of STEP scores for the individual items representative of vomiting and rumination.

For the Refusal subscale, the DASH-II PDD subscale was the only significant predictor of subscale scores. Univariate analyses on the individual items within this subscale also lead to the conclusion that the Depressed group differed significantly from both the PDD and No Diagnosis groups with regard to the item related to a decrease in food intake. This finding raises the possibility that something other than the behaviors represented within the DASH-II Mood subscale may be accounting for the differences found in the univariate analysis.

With regard to the additional subscales and individual items not mentioned, numerous STEP subscales and individual item scores did not differ significantly across the diagnostic groups included in the study. With regard to subscales, differences across the Selectivity, Refusal, Aspiration, and Skills subscales were non-significant. For the individual item analyses in the study, only the item scores representative of a decrease in food intake varied across the groups in the present study. Different possible explanations

may account for the nonsignificant results obtained across subscales and individual items on the STEP. First, the possibility exists that aside from a decrease in food intake, there are no other significant differences in feeding disorder symptoms across groups. Another possibility for the lack of significance across individual items and subscales of the STEP is a lack of statistical power. In addition, fewer multiple comparisons may have led to the detection of more significant differences across groups. Conversely, it is also possible that the high number of multiple comparisons may have led to the commission of a Type I error. Ultimately, further research may determine the extent to which items and subscales of the STEP differ across diagnostic groups.

Implications and Future Directions for Research

There are several potential implications of this study. First, the results of this study are consistent with information gathered from the population at-large with respect to symptoms of depression and disturbance in food intake (APA, 1994; Harris, Young, & Hughes, 1984; Patton, 1993). That is, among depressed individuals there tends to be a decrease in reported food intake. Since individuals in the Depressed group were screened for depression with the DASH-II Mood disorders subscale (a subscale that includes an item related to appetite disturbance) it was expected that a decrease in appetite may emerge among those in the Depression diagnostic group. This difference was found to exist across individuals with diagnoses of a mood disorder, a PDD spectrum disorder, and those without an Axis I diagnosis. Consequently, this information appears to increase the diagnostic utility of a decrease in appetite as a diagnostic symptom of depression, and may be particularly useful given the importance that has been placed on vegetative symptoms for the diagnosis of depression (Charlot, 1997; Charlot, Doucette, &

Mezzacappa, 1993; Pawlarczyk & Beckwith, 1987). Along the same lines, it appears that further support is provided for the STEP as a useful means of identifying symptoms of feeding problems among those with severe and profound MR.

Another finding of interest relates to the DASH-II mood Disorder subscale as the only significant predictor of scores on the Aspiration subscale of the STEP. Although it was found that 16% of the variance was accounted for by the Mood Disorder subscale, the amount of variance for each of the behaviors that make up the Aspiration subscale is not known. It is possible that the presence of either of these behaviors may serve as an indicator that further screening is necessary for the presence of depression. Likewise, the presence of depressive symptoms may indicate that screening for rumination and vomiting behavior is necessary. Future research will ultimately determine the nature of the relationship between behaviors indicative of aspiration risk and depression. Given that the Mood Disorder subscale of the DASH-II was the only significant predictor of scores on the Aspiration subscale, future research conducted with a larger sample may yield significance across diagnostic groups for scores on the Aspiration subscale. Furthermore, it may prove useful to assess whether or not score changes on the aspiration subscale covary with changes in symptoms of depression following treatment for either depression or aspiration/vomiting. Information such as this may ultimately be useful for assessment and treatment planning. Given that a small percentage of the variance was accounted for by the Mood Disorder subscale, future research should also investigate additional variables that may be related to rumination such as medical status.

In addition to research assessing the relationship of the DASH-II Mood subscale, further research assessing the relationship of PDD symptoms and feeding disorder

behavior may prove useful. More specifically, further investigation of the DASH-II PDD and its relationship to behaviors included in the Refusal Related Behavior Problems subscale may expand upon the existing literature detailing feeding disorders among those with PDD's. In particular, information gathered through further analysis of the PDD and the Refusal Related Problem Behaviors subscales may support existing research that has described food selectivity as an associated feature of Autism and PDD nos (Ahearn, Castine, Nault, & Green, 2001; APA, 1994).

Though significantly higher endorsement rates for specific feeding problems among the Depressed and PDD groups were found, information about feeding problems among those without Axis I diagnoses was gained as well. It appears that individuals without an Axis I diagnosis may engage in fewer behaviors related to nutrition related behavior problems when compared with both the Depressed and PDD groups. With regard to individual items on the STEP, frequency endorsements for feeding problems occurred at a low rate for individuals without an Axis I diagnosis. For eight out of the 10 individual STEP items included in the analysis, there were no frequency endorsements for any of the individuals included in the control group. Future studies with a larger sample will ultimately determine the significance of this discrepancy. In the present study, significant differences between the control group and the other two diagnostic groups were found for only one of the individual items representing a feeding related behavior problem (i.e., eats a small amount).

In summary, this study represents the first group study to examine the relationship of depression to feeding problems among a group of individuals with either severe or profound MR. The information obtained in this study may be useful to researchers and

clinicians alike who seek a greater understanding of the challenges presented by feeding disorders among those in the more severe end of the MR spectrum. From differences across diagnostic groups for items indicative of appetite disturbance, it may be inferred that disordered feeding behavior varies according to diagnostic classification. In particular, it may be inferred that disturbance in appetite may be more likely to accompany psychiatric disorders characterized by depression.

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