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ASSESSMENT OF ANGER IN PERSONS WITH COGNITIVE LIMITATIONS:

A REVISION OF THE ADS-VII

By Wayne David Schmoyer

Submitted in Partial Fulfillment of the Requirements of the Degree of

Doctor of Psychology

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PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by Wayne David Schmoyer on

the 17th day of March, 2005, in partial fulfillment of the requirements for

the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship

and literary quality.

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Abstract

Assessment of angry patients with mental retardation or borderline intellectual functioning is time consuming. Existing assessment tools may be inadequate for gathering data and for guiding treatment, thus presenting a challenge for practitioners. The Anger Disorders Scale (DiGiuseppe & Tafrate, 2001) samples the cognitive, affective, and behavioral components of anger. However, this scale is a self-report survey for adults of average or higher intellectual functioning. This investigation provided a feasibility test of the "Anger Disorders Interview for persons diagnosed with Mental Retardation" (ADIMR), a modified version of the Anger Disorders Scale designed as a clinical interview for cognitively limited patients who present with symptoms of anger. Comparisons between the ADIMR and existing assessment instruments for cognitively limited patients will be discussed.

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Introduction

Assessment of patients who have a history of anger problems can be time

consuming and challenging. When patients with frequent displays of assaultive or

destructive behavior also present with mental retardation or borderline intellectual

functioning, existing assessment tools may be inadequate for gathering the data necessary

to select appropriate treatment strategies. Thus, the lack of appropriate assessment tools

presents a challenge to practitioners when designing treatment programs, in terms of fully

understanding constructs related to the genesis of assaultive and destructive behavior for

developmentally disabled patients. At the present time there are few assessment tools

which address the unique needs of angry and aggressive patients with cognitive limitations

(Reiss, Levitan, & McNally, 1982).

Assessment methods that are complex and time consuming may be cognitively

demanding (and even invalid) for persons of below average intellectual ability. Below

average intellectual functioning can negatively impact assessment because the performance

of patients with cognitive limitations can be impeded by a lower than average fund of

knowledge, by deficits in social skills, by lower than average abstract reasoning ability, and

by difficulty focusing and sustaining attention (Khreim & Mikkelsen, 1997). Below

average intellectual functioning in angry and aggressive patients presents a specific

challenge for mental health practitioners because standardized therapeutic techniques

suitable for intellectually average or above average patients often need to be adapted.

Cognitive-behavioral treatment (CBT) approaches for anger are often not applied when treating patients of borderline or lower levels of intellectual ability (Benson, 1992), and these approaches are often not applied when treating patients who present with assaultive and destructive behavior (Kellner & Tutin, 1995).Cognitive-behavioral treatments are often considered to be "second-line" treatments, in contrast to an applied behavior analytic approach and its associated treatment techniques (Frances, 2000). The existing theoretical models of aggression for developmentally disabled persons emphasize behavioral, not cognitive factors (Emerson, 1998). One reason for this may be that assessment tools have not been developed which adequately identify the cognitive contents typical of developmentally disabled patients who are both angry and aggressive,.

Cognitive-behavioral techniques can directly affect the factors that support the production of anger and aggressive behavior. But CBT techniques must be applied in a flexible manner and need to be tailored to the unique needs of patients with cognitive limitations. Thus, the assessment tools that will be helpful when selecting treatment strategies for the anger and aggressive behavior of such patients will be those which can sample their cognitions. The Anger Disorders Scale (ADS), a self-report assessment tool developed by Raymond DiGiuseppe and Raymond Tafrate (2001), was designed to sample the cognitive and affective components of anger, the behavior produced by persons when they are angry (including aggressive responses), and the stimuli that trigger episodes of anger. Prior to the ADS, the Clinical Anger Scale (Snell, Gum, Shuck, Mosley, & Hite, 1995) was the only instrument designed with the objective of assessing anger as a disorder. DiGiuseppe and Tafrate sought to improve on this concept by developing a more complete, multi-dimensional scale that would discriminate among the varied degrees of

anger severity and also among the component parts of anger (DiGiuseppe & Tafrate, 2001). They included in their design subscales that identify different types of aggressive responses to anger.

The instrument that emerged as a result of their endeavors, the Anger Disorders Scale (ADS), was designed to assess anger in adult clinical populations with the goal of assisting clinicians to plan treatment for their angry patients. This scale includes seven subscales that specifically measure cognitive aspects of anger, and three subscales that specifically measure aggressive behavior (see Figures 1 through 3). The remaining eight subscales assess other aspects of anger and aggression, such as the length of episodes, the extent of physiological arousal, and the extent of tension reduction drive. The Anger Disorders Scale was normed using samples of adults functioning in the range of average or higher intelligence. The samples consisted of patients referred for treatment of anger and an untreated control group (DiGiuseppe & Tafrate, 2001). However, this scale is constructed as a self-administered, self-report survey which makes it difficult to use with patients who have cognitive limitations.

Purpose of the Present Investigation

The intention of the present investigation was to demonstrate that the anger cognitions of aggressive patients with mental retardation (MR) or borderline intellectual functioning could be sampled using a standardized clinical interview format, and that such an interview could also identify the affective and behavioral factors associated with the production of these patients' anger and aggression. This investigation also sought to demonstrate that the Anger Disorders Scale, version seven (ADS-VII) could be modified for application as a structured clinical interview. The potential utility of this modified

scale, the "Anger Disorders Interview for persons diagnosed with Mental Retardation" (ADIMR), as an instrument for assessment of cognitively limited patients who present with a history of both anger and assaultive or destructive behavior will be discussed. Comparisons with similar assessment instruments currently in use will also be made.

Impact of the Problem

Among the many behavioral responses associated with anger, aggression is one of the most significant problems worldwide. An epidemiologic study of mortality conducted by the violence prevention division of the National Center for Injury Control and Prevention (NCIPC) estimated that in 1990 a total of 1, 851, 000 people, worldwide, died as a result of violence (Center for Disease Control [CDC], 1990). This represented 3.7 % of all deaths across the globe that year. Estimates of aggressive behavior for persons in the United States suggest that 3.7% of the general population commit at least one violent act each year (Kavoussi, Armstead & Coccaro, 1997). Not surprisingly, violent behavior has also been reported for a portion of the population of persons with mental retardation. A study conducted in Sweden found that men with reduced intellectual abilities were five times more likely than other males to commit violent crimes, and women with reduced intellectual abilities were twenty-five times more likely to commit such crimes than other females (Harvard Mental Health Newsletter [HMHNL], 2000). Another recent study examined the behavior of 264 developmentally disabled participants and found that twelve percent of the sample displayed either assaultive or destructive behaviors (Emerson, Kiernan, Alborz, Reeves, Mason, Swarbrick, Mason, & Hatton, 2001).

Behavioral problems occur for approximately one out of every five patients with mental retardation who are living in the community, and aggressive behavior has often

been reported as a treatment concern for patients with mental retardation and persistent

mental illness (Zubicaray & Clair, 1998). In 1988 the National Institutes of Health

estimated that 160,000 persons with developmental disabilities exhibited some form of

significantly destructive behavior, including aggression toward others or toward property.

The estimated cost of care for these persons, at that time, was annually above three billion

dollars (National Institutes of Health [NIH], 1989). This cost appears to be relatively

stable, as evidenced by a recent study conducted by the National Institute of Child Health

and Human Development, which estimated the annual cost of services to assaultive and

destructive persons with mental retardation to exceed 3.5 billion dollars (Thompson &

Gray, 1994). The aggressive behavior of persons with developmental disabilities often

prevents them from living in community placements (Gardner, 2002, pp. 27-33; Gardner &

Cole, 1993) and puts them at risk for being abused by caregivers and peers (Rusch, Hall &

Griffin, 1986). Return assaults have been identified as a problem for persons with

developmental disabilities who display aggression in the work place (National Institute for

Occupational Safety & Health [NIOSH], 2000) and many aggressive developmentally

disabled persons are unable to maintain competitive employment because of their intrusive

or aggressive behaviors (Gardner & Cole, 1993).

Another deleterious effect of anger and aggression is that many developmentally

disabled persons are treated with neuroleptic medications. Many of these medications

produce adverse physiological effects after long periods of use (Goodman & Gilman, 1985,

p. 406; Restak, 1994, pp. 197-98; Rothenberg & Chapman, 1994, p. 469). Although the

use of psychotropic drugs in the treatment of institutionalized persons with developmental

disabilities appears to be decreasing, investigators studying a sample of 6,450 patients

found that 26.8 percent were taking some type of antipsychotic medication. They also discovered that this use of psychotropic medications was positively correlated with the participants' aggression (Stone, Alvarez, Ellman, and Hom, et al., 1989). A similar study, conducted in Australia with 2,412 developmentally disabled participants between the ages of five and eighty-five years, reported that eleven percent (261) displayed some form of aggressive or destructive behavior. Among these participants sixty-six percent received medication for treatment of their destructive behaviors, while only thirty-four percent received some form of behavioral intervention (Sigafoos, Elkins, Kerr, & Attwood, 1994). Thus, if non-pharmacological interventions for aggression can be implemented more often for persons with mental retardation, it is possible that the use of psychotropic medications for these patients may decrease. However, an impediment to psychological intervention for this patient group is that it is difficult to sample and modify their schema for anger.

Factors Affecting Anger and Aggression for Patients with Cognitive Limitations

Developmentally disabled patients who display aggressive behavior have frequently been diagnosed with some type of persistent mental illness. The highest rates for mental disorders among developmentally disabled persons have been reported for adults with mild mental retardation; large population surveys estimate that the prevalence of mental illness among persons with mental retardation may be as high as 20 percent (Reiss, 2000). Three to six percent of this population may have affective disorders, and the occurrence of affective disorder is relatively equivalent across gender, racial, and ethnic groups. Unfortunately, research supporting treatment approaches for developmentally disabled persons with mental illness is sparse (Nezu & Nezu, 1994).

Psychotic Disorders. Psychosis is one factor in the genesis of aggressive behavior

for some developmentally disabled persons. Mendez, Doss, and Taylor (1993) compared

the behavior of forty-four outpatients who participated in psychiatric evaluations for

aggression with outpatients who had no history of aggression. Most of the aggressive acts

consisted of verbal or minor physical aggression. Twenty of these patients met criteria for

a schizophrenic disorder. When compared with patients matched for age and gender who

had no history of aggression, the aggressive patients with schizophrenia were frequently

found to be diagnosed with mental retardation. This may be due, in part, to biological

factors and formative life experiences that could predispose persons with mental

retardation to experience psychosis, and thus to displays of explosive behavior (Reiss,

2000).

Depressive Disorders. Persons with mental retardation experience depression and

its characteristic automatic negative thoughts and feelings of hopelessness, much like

depressed persons functioning at or above the average range of intellectual functioning

(Nezu, Nezu, Rothenberg & DelliCarpini, 1995). Depression in persons with

developmental disabilities has been associated with higher rates of aggressive behavior

(Charlot, 1997; Hamilton, 1996; Stone, Alvarez, Ellman, & Hom, 1989). Reiss and

Rojahn (1993) conducted an investigation with 528 participants (including children,

adolescents, and adults) living in the mid-western USA. Sixty percent of the participants in

the sample were functioning intellectually within the moderate to mild range of mental

retardation, and the remaining forty percent were classified within the severe to profound

range of mental retardation. The examiners found that nearly nine percent of the

participants met criteria for a diagnosis of depression; forty percent of these participants

displayed aggressive behavior, while only ten percent of the participants identified as "not depressed" reportedly displayed aggressive behavior (Reiss & Rojahn, 1993). Research findings also report that anxious patients with mild to moderate mental retardation often present with symptoms of agitation and displays of aggressive behavior (Stavrakaki & Mintsioulis, 1997).

Cognitive Deficits. Cognitive factors play a significant role in the production of aggressive behavior for persons with developmental disabilities. A study conducted by Carol Pert and her associates (1999) demonstrated that aggressive persons with mental retardation may hold a hostile bias. She found that the aggressive participants interpreted others' intentions and actions as hostile when they were exposed to ambiguous, but non-threatening interpersonal situations. Interestingly, these same participants demonstrated a superior ability to take others' roles over that of non-aggressive participants. This suggests that cognitive contents, and not only deficits in interpersonal skills, are important in the production of aggressive behavior for persons with mental retardation (Pert, Jahoda & Squire, 1999). An earlier study conducted by Gomez and Hazeldine (1996) also found that persons with mental retardation (in this case children) demonstrated an interpretive bias; they produced more hostile behavioral responses to ambiguous social cues than did non-MR (child) participants. Adults with different levels of mental retardation report anger differently; Benson and Ivins (1992) administered self report measures of depression and anger to 130 adults with mental retardation and found that participants with mild mental retardation were more likely to report anger than were participants with moderate to severe mental retardation.

Patients with mental retardation have cognitive deficits that limit their ability to participate in standardized assessment and treatment approaches. Most importantly, they often cannot read. Additionally, they may have difficulty with learning new skills, with focusing and sustaining attention, with self monitoring, and with inhibition or modulation of strong affective responses (Johnston, Kaslow & Brooks, 1997). Of particular interest to this investigation are patients with cognitive limitations who experience anger and who also frequently display aggressive or destructive behavior. Impediments to patients' self-managing their aggressive behavior include cognitive factors associated with the production of their aggression. These factors can include patients' personal anger cognitions, interpretation of ambiguous social stimuli (e.g., eye-contact) as signaling hostile intent, expectations that others should remove frustrations or demands immediately, belief that aggressive behavior is necessary for self-preservation or maintenance of social standing, excessive attention to negative social cues, limited awareness of positive social cues, and limited knowledge of (and recall for) adaptive responses to provocation (Alpert & Spillmann, 1997; Pert, Jahoda, & Squire,1999; Pettit, 1997). These cognitive factors will be examined in greater detail below. However, before this can be accomplished, an in-depth discussion of how aggression is produced is necessary.

The Production of Aggressive Behavior

Integrating biological, cognitive, affective, and situational components it is possible to construct a complete etiological model for aggression. This is useful because such a model can guide the development of assessment tools and treatment methods for aggression. Aggressive behavior has its beginning in cognitive impairments that result directly from dysfunctions in

affected brain centers, primarily, the frontal cortex, the temporal lobes, the hippocampal gyri, and the amygdalar-thalamic neural circuit (Giancola, 1995; Krishnan, 1999). In affected individuals, such impairments result in greater ease of autonomic nervous system activation (i.e., an increased speed of physiological arousal) and a decreased capacity for interpreting others' facial expressions, language, and behavior. At some point, the person becomes involved in experiences in which they feel "provoked" by others or by specific situations. The effect of provocation, whether real or imagined, is the activation of the autonomic nervous system and the "flight-or-fight" response (Cannon, 1932). Eventually the individual misinterprets (or over interprets) others' actions, becomes angry, and may argue or fight with them. As the individual builds an experience base for aggressive situations, environmental and interpersonal cues that previously were ambiguous (such as extended or unexplained eye contact) become associated with cognitions that support defensive aggression. For example, an individual may come to believe that one way to prevent harm to oneself is by attacking first. Once this individual learns that aggressive responses usually result in escape from irritating or confusing social situations, precipitous aggressive behavior becomes a useful strategy for avoiding conflict and uncomfortable emotional states (anger; anxiety). This model will be explained in greater detail in the sections that follow.

Biological Correlates of Aggression. Research suggests that aggression can originate in response to discomfort from exposure to noxious stimuli. Environmental and physical factors, such as excessive sensory stimulation, crowding or physical discomfort can act as noxious stimuli. Cognitive neo-association theory (Berkowitz, 1990) proposes that aggression can be triggered by any negative feeling state, not only by anger inducing cognitive attributions and appraisals. Any sufficiently irritating or ambiguous stimulus can

trigger a state of rapid sympathetic nervous system activation, the emotions that have been associated with this state (e.g., anger; panic), and the disinhibition of impulses to display defensive aggression. The negative feeling states that precipitate anger and aggression can be triggered by either internal or external events. For example, hot weather, loud noise from a nearby argument, or emotional/psychological frustration could be sufficient to induce a negative feeling state, leading to autonomic nervous system activation for some aggressive patients.

Aggression can result directly from damage to deep brain structures, without the involvement of the cortex (as, for example, in focal lesions of the hypothalamus). It can also be produced indirectly through the disruption of regulatory neural circuitry (e.g., the Thalamic-Amygdalar Circuit) and the brain's maintenance of critical neurotransmitter levels for Serotonin, Dopamine, and Norepinephrine (Krishnan, 1999; Lyketsos, Steele, Galik, Rosenblatt, Steinberg, Warren, & Sheppard, 1999; Rashkind, 1999). While no single constellation of brain structures has been identified that can explain the production of every type of aggressive act, it appears that the limbic structures, the sub-cortical nuclei, and their interconnections are often implicated (Krishnan, 1999; Scarpa & Raine, 1997). These areas, in conjunction with the cerebral cortex, are critical to the interpretation of sensory information (e.g., recognition of faces and interpretation of facial/vocal affect), memory (e.g., assigning meaning to external events and emotional situations), and the modulation or suppression of fear and rage when such responses are inadvisable. Thus, the production of aggression can be jointly cortically and sub-cortically produced (e.g., through damage to the left temporal lobe or its connections, and through damage to the

pre-frontal cortex or its connections) and can be extremely complex (Hirono, Mega, Dinov, Mishkin, & Cummings, 2000; Kavoussi, Armstead, & Coccaro, 1997).

The amygdala appears to be especially critical to the interpretation of stimuli as threatening. It has been demonstrated that bi-lateral lesions in rats result in almost complete loss of conditioned fear responses (LaBar & LeDoux, 1996). Memory is also enhanced by the action of the amygdala, which adds emotional tone to memories (Krishnan, 1999). The orbital and prefrontal cortices, which are linked to the amygdala, appear to be implicated in the suppression of aggressive responses; an increased frequency of aggressive behavior results when these areas are damaged (Giancola, 1995). One factor in the generation of this phenomenon may be the disruption of dopamine production by the substantia nigra, which can result in the absence of the orbital/pre-frontal cortices' control over the operation of the amygdala and the basal ganglia (i.e., the Striatum, Globus Pallidus, Putamen, and Caudate Nucleus).

The cognitive impairments associated with the aforementioned cortical and sub-cortical sites include poor processing of auditory information, poor comprehension of verbal, facial, and situational cues, and inadequate regulation of emotions. There is evidence that, even in the presence of neurological conditions that support an angry or aggressive response, higher cortical functions supercede the effect of these conditions and either facilitate or suppress volatile responses based on the social context and demands operant at the time (Delgado, 1967). In fact, reinterpretation of an anger inducing social situation can reduce anger and prevent aggressive behavior just as social reinforcement can increase the production of displays of anger and aggression in specific situations (Bandura, 1973). Thus, anger and aggression are at least partially mediated by cognitive variables. Therefore, assessment tools are needed to

identify the cognitive factors associated with anger and aggression if effective treatment programs for aggression are to be developed.

Impulsive Aggressive Behavior. Three of the models that attempt to explain the role that physiological factors play in the production of anger and other emotions are the James-Lange Theory (James, 1890), the Cannon-Bard Theory (Cannon, 1927), and the Schacter and Singer Cognitive Theory (Schacter & Singer, 1962). The Cannon-Bard and Schacter and Singer theories have the strongest research support, and propose that emotions are not merely reactions to bodily sensations but are largely the product of the cognitive appraisals made of bodily sensations. The Cannon-Bard model purports that the cortex of the brain and the autonomic nervous system react to stimuli almost simultaneously. This theory helps to explain mixed emotional states, such as "joy with fear," in response to a single event. Schacter and Singer's model is the most complex of the two theories and purports that physiological responses, environmental context, and cognitive appraisals are all implicated in the production of emotional reactions. The James-Lange theory may best explain the sudden production of aggressive behavior (i.e., impulsive aggression) in the absence of any specific emotional or cognitive sequelae. This theory states that emotions are actually secondary perceptions, i.e., reactions to changes in bodily sensations (Hergenhahn, 1997, pp. 310-311). For example, fear can be the perception that a person has in response to his or her body shaking, which itself can be an automatic reaction to a threat of physical harm. Unfortunately, even the earliest research into the relationship between emotional responses and physiological changes suggested that the James-Lange theory is invalid (Beck, 1978, pp. 338-344).

The research into impulsive aggression has been diverse in emphasis and much of it is not directly relevant to this review. Some of the research into impulsive acting-out

comes from investigations of stimulus-response patterned aggression; many of these are studies which compare animal models of behavior with those for humans. Conditioned aggressive responses to normatively benign (i.e., neutral, not provocative) stimuli have been studied using animal subjects. But findings from studies investigating aggression models for animals are difficult to apply to humans (Carlson, 1981, pp. 524-526). This is partly because, for both animals and humans, the term aggression refers to many different behavioral responses that are based on diverse cultural and neurobiological factors (Vitielo & Stoff, 1997). For example, Hake and Campbell (1980) applied shock to squirrel monkeys to suppress bar pressing responses that had already been reinforced with food. While being shocked, monkeys pressed the food reinforcer bar infrequently and instead frequently bit a target stimulus (a "bite tube"). However, when the bite tube was absent during shock, the same monkeys returned to a higher rate of bar pressing in response to the shock (Hake & Campbell, 1980). The relevance of these findings to human models of aggression must be established before such findings can be of value to the present investigation.

Attempts have been made to relate animal research to human aggression models, and studies investigating conditioned aggression have been conducted with humans (Berkowitz, 1983; Tortora, 1983). The research that is of interest to this investigation includes the following studies. Stanford, Greve, and Gerstle (1997) examined the neuropsychological characteristics of a non-clinical sample of twenty-four college students. One half of the participants were identified by self-report as having had a lifetime history of episodes of impulsive physical aggression, and the remaining twelve participants served as the study control group. Participants identified as impulsively aggressive were found to have neurological deficits

in executive functions necessary for impulse control and processing of verbal information (Stanford, Greve & Gerstle, 1997). More recently, a study conducted by Verona, Patrick, and Lang (2002) with participants selected for their negative emotional traits demonstrated that, following a period of aversive stimulation (air blasts), participants high in such traits displayed more intense aggression (i.e., they delivered a higher amplitude of electric shocks) than other participants. The stress-affected participants who were high in negative emotional traits also experienced a lower threshold for startle response. The investigators concluded that stress-reactive persons may display more rapid, intense aggression after experiencing periods of negative affect (Verona, Patrick & Lang, 2002). Research of this kind is promising, because it does shed some light on factors which may predict impulsive aggression. If such investigations also examined participants' cognitions, findings might be informative for practitioners designing cognitive-behavioral treatments for impulsive aggression.

Stimulus-response factors are clearly relevant to assessment and treatment for anger and aggression (i.e., factors such as the environmental context and situational triggers of aggression); however, these are factors that can often be quickly and objectively identified, and steps can be taken to prevent their effects. But hidden factors, such as a person's basic and conditional schema or his or her attributional (i.e., causal) belief systems for anger and aggression, are less easily identified. Therefore, effective intervention for anger and aggression requires assessment methods that are designed to identify such hidden, cognitive factors.

Social Cognition, Anger, and Aggressive Behavior. Anger is a multidimensional phenomenon. The words of researcher Raymond W. Novaco (1977) illustrate this well:

Anger does not only occur as a response to conditions of inequity or the appraisal

of events as unjust.... The arousal of anger is far too complex to be understood in

terms of single factor deficits such as appraisal or of deficits in a single modality

such as cognition. A multidimensional view that incorporates the cognitive,

affective, and behavioral modalities is advised... (Novaco, 1977, p. 606).

Anger and aggression are emotional responses to perceived provocation. Assessment of

anger is useful because it informs treatment, and effective treatment for anger can help to

prevent aggression. Anger is based, in part, on a person's appraisals (i.e., his or her

expectations of interpersonal situations), and is precipitated or intensified by provocation

(Novaco, 1975; Meichenbaum, 1977, p. 162). The manner in which a person interprets

his or her biological responses determines, to some degree, his or her emotional state

(Schacter & Singer, 1962). Anger, which is only one possible emotional response to

provocation, can become for some individuals a sufficient condition for generating

displays of aggressive behavior (Clement, 1986). Research has helped to explain the role

that anger cognitions play in the production of violent behavior. An investigation of the

cognitive styles of married men with a history of violent behavior toward their wives

indicated that these participants, as compared with angry but non-violent husbands,

possessed poor cognitive, affective, and behavioral self-monitoring as well as inadequate

levels of anger controlling self-instructions. Further, they tended to have cognitive

distortions causally associated with anger arousal and aggressive behavior (Eckhardt,

Barbour, & Davison, 1998).

Higher order brain processes are implicated in the generation and timing of a

person's aggressive responses to statements or actions that are perceived as threatening

(Bandura, 1975; Berkowitz, 1990; Scarpa & Raine, 1997). Cognitive attributions and memories play a role in the production of aggression and may determine its intensity. Cognitions associated with past aggression episodes, as well as behavioral responses associated with aggression, can be automatically triggered by external stimuli (Todorov & Bargh, 2002).

Patients with neurological systems that predispose them to rapid autonomic arousal and emotional activation are at risk for acquiring many experiences in which aggressive behavior is useful as an escape strategy. This autonomic nervous system activation can then be misinterpreted by the patient as externally provoked, negative emotion (e.g., "others are angry with me and are threatening me"). As a patient's firsthand experience with aggressive incidents increases, numerous cues that were at one time benign and ambiguous become salient and potent signals that can trigger displays of defensive aggression. Eventually, aggressive behavior becomes an over-learned and efficient means of escape from perceived threats. For example, aggressive responses frequently lead not only to the termination of unwanted task demands or social contacts, but also to the rapid cessation of irritating environmental cues (Carr, Newsom & Binkoff, 1980). In this way, displays of anger and aggression become efficient strategies for self-modulation of uncomfortable affect: when a person displays agitation the source of provocation is often withdrawn and the autonomic nervous system activation begins to abate (Talkington, Hall, & Altman, 1971). Almost as frequently, the patient also feels some relief from his or her uncomfortable, angry affect when it is discharged through aggressive or destructive behavior.

After many experiences in which agitation and aggression have resulted in de-escalation the patient has acquired a solid learning history that violent behavior "works," and that it works quickly and reliably. This makes the learning of more socially adaptive strategies (e.g., problem-solving; waiting; assertiveness; negotiation) difficult, particularly for patients with cognitive limitations that impede attention, concentration, learning and memory (Bortoli & Brown, 1995). This may be particularly the case for persons with mental retardation, who frequently experience problems throughout their development with cognitive processing of social information and use of language, resulting in social skills deficits (Leffert & Sipperstein, 1996).

Situational cues, such as emotionally charged verbal interactions, can trigger a state of flight-or-fight (Cannon, 1932) in recurrently aggressive patients, thereby leading to emotional activation and defensive behavioral displays. Although these cues do not necessarily lead to displays of aggressive behavior when there is no negative feeling state, the presence of such cues when people are angry, anxious, depressed, or irritated can trigger violent behavioral responses (Berkowitz, 1990; Berkowitz & Lepage, 1967). Thus, situational cues in the environment must be correctly interpreted by recurrently aggressive patients if they are to avoid emotional activation and impulsive displays of aggressive behavior.

Unfortunately, for patients with cognitive limitations, correctly interpreting ambiguous environmental stimuli as non-threatening is difficult. Once a particular cue becomes associated with an aggressive incident, this cue is now more salient the next time it is presented (e.g., Bill says, "I hit Ted because he made me angry; he was staring at me and then he hit me!"). Thus, the cue becomes provocative (i.e., when Ted stares at Bill

again, Bill will more quickly judge this to be the warning of an impending altercation).

This will be especially true if the person has neurological problems which impair his or her

ability to self-direct his or her own thoughts (Amen, 1998). Successive, similar altercations

further strengthen the power of the same cue to operate as a "trigger" for the person to

become assaultive. In this way the presence of aggression-stimulating environmental cues

can determine whether thought processes lead to violence, or to displays of relatively

benign escape behaviors.

Existing Assessment Tools

Cognitive therapy for anger has only recently been adapted for use as a treatment

method for patients who have mild mental retardation (Benson, 1992). Psychotherapy for

patients with mild to moderate mental retardation can be effective but may need to be

adapted in order to address patient deficits in ability to learn, in abstract reasoning, and in

ability to communicate (Bongiorno, 1996; Khreim & Mikkelsen, 1997). Silka and Hauser

(1997) advised, in their article on assessment and treatment for aggression and self-

injurious behavior, that intervention include teaching developmentally disabled persons

cognitive-behavioral skills for self-management of anger and anxiety. In their view, a

complete treatment package might include teaching patients to carry out escape strategies

in response to aversive environmental stimuli, while also providing them with

communication and social skills training. Kellner and Tutin (1995) demonstrated that CBT

treatments for aggression (i.e., those based on Novaco's model for production of anger)

can be modified for use with angry adolescents and young adults with cognitive

limitations. In this study the authors report that the participants were able to learn about

the factors that contributed to their anger, and also about methods for managing their

anger and aggressive behavior (Kellner & Tutin, 1995).

In order to maximize the effectiveness of cognitive-behavioral interventions for

cognitively limited patients, assessment methods must be adapted to meet their unique

needs. Tools that can identify not only the topography of anger and aggression, but also

the cognitive contents experienced by aggressive persons with developmental disabilities,

would be of value for designing treatment programs. Presently, a review of the recent

literature shows that several instruments are being used as screening tools for identifying

aggression and mental illness in persons with developmental disabilities. These instruments

include the Psychopathology Inventory for Mentally Retarded Adults (PIMRA), the Reiss

Screen for Maladaptive Behavior (RSMB), the Diagnostic Assessment for the Severely

Handicapped (DASH), the Questions About Behavior Function Scale (QABF), and the

Motivation Assessment Scale (MAS).

The Psychopathology Inventory for Mentally Retarded Adults (PIMRA). The

Psychopathology Inventory for Mentally Retarded Adults (PIMRA) is a 56 item forced-

choice inventory (i.e., Yes/No queries) developed by Johnny L. Matson and colleagues for

screening for mental illness in persons with mental retardation (Senatore, Matson &

Kazdin, 1985). It was the first such scale based on the DSM-III for which validity data

were available. The scale items are completed by an informant who knows the participant

being assessed, or the scale questions are administered in an interview format to the

participant by a qualified mental health professional (i.e., all items are read to the

participant by the interviewer). The interview portion is not conducted if the participant is

clearly unable to participate (e.g., if he or she is unable to communicate answers or is

unable to hear and comprehend the queries). The scale is intended for use in conjunction with other instruments, such as the Reiss Screen for Maladaptive Behavior (RSMB), as part of a more comprehensive evaluation for identifying persons with mental retardation who may need mental health treatment. The scale yields a total score and eight subscale scores representing categories of mental illness. These are based on the DSM-III diagnostic system and include the Schizophrenias, Affective disorders, psychosexual dysfunctions, Anxiety disorders, Somatoform disorders, Personality disorders, and two scores for adjustment disorders (a general adjustment disorder category and one titled, "Inappropriate Adjustment").

Items were arranged hierarchically based on the results of a factor analysis, and each item was placed into the diagnostic category for which it rated highest. Items with factor loadings below .35 were excluded from the scale. For most of the scale, affirmative answers are counted as supporting the presence of symptoms (i.e., a few items are reverse scored), and a minimum of four items scored as affirmative are required in order to suggest a significant level of symptoms in any given category. The PIMRA total score is believed to provide an index of the presence or absence of psychopathology; in preliminary trials it did appear to discriminate between non-diagnosed and previously diagnosed samples of subjects. The PIMRA total score was also found to be highly correlated (.83) with an early version of the Reiss Screen for Maladaptive Behavior. Significant correlations were also found between the PIMRA self-report score and the Beck Depression Inventory ($r = .40$) and between the PIMRA ratings-by-others score and the Hamilton depression scale ($r = .64$). The PIMRA was pilot-tested with two samples of adults diagnosed as functioning intellectually within a range from severe mental

retardation through borderline intellectual functioning (the largest number having been diagnosed within the mild to moderate range of mental retardation, n = 51 and 46, respectively). The samples together, in which 54% of the participants were male, comprised a total of 209 adults ranging in age between 17 and 71 years. Because of its extensive clinical use and the availability of research data, this scale is a good choice for experimental comparison with newly developed scales.

The Diagnostic Assessment for the Severely Handicapped (DASH). There is a substantial amount of research published regarding the Diagnostic Assessment for the Severely Handicapped (DASH). This scale, developed by Johnny Matson, William Gardner, David Coe and Robert Sovner (1991), is comprised of 83 items spanning thirteen psychiatric diagnostic categories and was specifically designed to assess mental health problems for persons with severe to profound mental retardation. The scale, which has been found to demonstrate good interrater reliability, has been tested with 506 persons functioning intellectually in the severe to profound range of mental retardation (Matson, Gardener, Coe & Sovner, 1991). The Diagnostic Assessment for the Severely Handicapped (DASH) scale demonstrated in one study that depressed MR subjects exhibit significantly higher rates of aggression than non-depressed subjects (Hamilton, 1996). The DASH, version two (DASH-II; Sevin, Matson, Williams, & Kirkpatrick-Sanchez, 1995), is similar in design to the original DASH, and includes 86 items that sample problem behaviors indicative of symptoms of mental illness. The items are scored in terms of frequency, duration, and severity and are grouped into 13 subscales. Its test-retest reliability has been assessed with 658 adults with severe to profound retardation and a .84 or higher agreement between ratings was found across all items (Sevin, et al., 1995).

The Reiss Screen for Maladaptive Behavior (RSMB). The Reiss Screen for Maladaptive Behavior (Reiss, 1988/1990; Reiss & Valenti-Hein, 1994), like the PIMRA, was developed with the goal of identifying mental illness in persons with mental retardation. Also, similar to the PIMRA, it is not intended for use with children (although recently a scale has been developed for this purpose, i.e., the Reiss Scale for Children). The instrument requires that a minimum of two informants complete it, and informants are expected to have a close (i.e., for at least the preceding three months) working knowledge of the person being rated. Computerized scoring software is available, as well as a computerized scoring service. Each item (there are 38) is scored using a three-point Likert scale (scores range from 0, or "no problem," to 2, or "major problem"). Raw scores from the different informants are averaged for use in the computation of scaled scores that are then used to generate results in comparison with cut-off scores based on available norms for the specific problem areas. Similar to the PIMRA, there are eight sub-scales: Aggressive behavior, Autism, Psychosis, Paranoia, Behavioral signs of depression, Physical signs of depression, Dependent personality disorder, and Avoidant personality disorder. Unlike the PIMRA, the RSMB does not identify specific disorders or symptom clusters. It is not intended to generate a diagnosis; it is designed only for identifying the type of problem experienced in order to determine if the person being rated should be referred for mental health services. In addition to the eight scales noted previously, the screening yields six other scores useful for identifying substance abuse, hyperactivity, sexual problems, stealing behaviors, suicide risk, and self-injurious behavior. Scales comprised of at least 15 items generated internal reliability coefficients (Cronbach) of .70 or higher. For most of the scales with only five items, reliability was also .70 or better. The

exception to this was the physical signs of depression scale, for which the reliability was .54 and .57 for two of the five samples studied. A similar result was obtained for the Autism scale. Thus, more judgment must be exercised when interpreting the scores from these two scales. The RSMB total score (based on 26 items) obtained a reliability coefficient of .84.

The RSMB was normed using five samples of subjects (a total of 676 subjects), all of whom were diagnosed with both mental retardation and mental illness. Subjects were in their late teens or older, the majority being older than age twenty. Persons functioning intellectually in each category of mental retardation (i.e., from severe/profound through mild) were well represented. The scale has been factor analyzed, but the author cautions users that the RSMB measures only the raters' subjective ratings of problems and their severity, and was not designed to isolate factor-based symptom clusters. The test is also biased toward identifying significant mental health and behavioral problems (i.e., it does not assess normative life problems). Empirical studies suggest that the RSMB may be useful in screening for depression in non-verbal persons with mental retardation who present with irritability and aggressive behavior (Powell, 1999). This scale has been demonstrated to provide a better estimate of problem severity than multiple behavioral observation ratings (Havercamp & Reiss, 1996). The RSMB has been compared experimentally with the Apperceptive Personality Test, the PIMRA, and the Residential Services Indicator, as an assessment tool for evaluating a participant who presented with both mental retardation and intermittent explosive disorder (Reiss, 1992). The concurrent validity of the RSMB and the PIMRA subscales that screen for personality and adjustment disorders has been established experimentally (McDaniel, Turner & Johns, 1999).

The Questions About Behavior Function Scale (QABF). The Questions About Behavior Function Scale (QABF) developed by Johnny Matson and colleagues (see Paclawskyj, Matson, Rush, Smalls, & Vollmer, 2000) has demonstrated its utility as a behavioral measure which can be used to predict the occurrence of aggression for persons with mental retardation, and which can produce data to direct the selection of treatment. However, this scale samples external (antecedent) behaviors and identifies behavioral functions (i.e., attention, escape, nonsocial, and tangible), not internal (cognitive) factors associated with the production of aggression (Matson, Bamburg, Cherry, & Paclawskyj, 1999).

The Motivation Assessment Scale (MAS). The Motivation Assessment Scale (MAS) is just what it purports to be, a screening for possible "motivations" for problem behaviors (Durand & Crimmins, 1988). It is not concerned with diagnosis of mental illness, per se, only with generating hypotheses about the function of identified problem behaviors. It is based on an applied behavioral methodology, similar to the QABF. The MAS instrument is administered by having two or more informants complete ratings independently, and then combining these ratings into a profile (much like the RSMB). Raters are providing their subjective opinions using the forced choice items on the survey, and they are advised not to share information with one another when completing their portions of the survey. The resulting scores are divided across four motivational categories: seeking sensory stimulation, seeking escape, seeking tangible items, and seeking of attention. Similar to the PIMRA and the RSMB, the MAS does not intend to provide a DSM-based diagnosis.

The MAS is unique because it does not assess symptoms nor identify problem areas; it simply assigns relative weights to the four motivations previously described. Each behavior of concern that is identified by the raters must be rated by completing one MAS exclusively for each behavior. It was found by Duker and colleagues (1998) that, when the MAS was factor analyzed, four factors from the study differed from the original subscale structure. The authors suggested that the construct validity of the MAS was ambiguous and concluded that the MAS should be employed in conjunction with other assessment instruments (Duker, Sigafoos, Barron, & Coleman, 1998). Because of this, and its dissimilarity to the design of the ADS-VII, the MAS was not a good choice for comparison as part of the present investigation.

The Anger Disorders Scale (ADS). The Anger Disorders Scale, version seven (ADS-VII), is a self-report survey comprised of 74 items that span five domains (i.e., Provocations, Arousal, Cognitions, Motivations, and Behaviors) and eighteen individual subscales. As previously noted, the ADS-VII includes seven subscales that specifically measure cognitive aspects of anger and three subscales that specifically measure aggressive behavior (see Figures 1 through 3). The remaining eight subscales assess aspects of anger and aggression such as episode length, physiological arousal, and desire to seek tension reduction. Each item is rated by the person being assessed using a five point Likert scale (ranging from 1, "never/rarely," to 5, "every time/frequently," or similar response choices). Items were designed to assess the constructs for each subscale and were then subjected to a factor analysis. Items were assigned to domains and subscales based on the results of the factor analyses (i.e., to be included in a specific subscale individual items needed to load only on the factor associated with that scale).

Items were administered during the test phase to both normal and clinical populations. All items in the ADS-VII obtained factor loadings above .30 for the subscales to which they were assigned. Each subscale is comprised of three or more items (most have five items).

The ADS-VII yields scores for the subscales as well as a total score. The total score and subscale scores have demonstrated moderate correlations with anxiety and depression measures. The ADS-VII has demonstrated good internal consistency (.80 or greater) and correlates well with the STAXI2 (Speilberger, 1999). It is believed to discriminate well between anger and negative affect, as verified by factor analysis. The final version of the ADS was normed using a sample of 204 participants, among them college students, police officers, military personnel, and business men and women. Participants were recruited from the New York Metropolitan area.

The internal consistency of the ADS-VII Total score, and the major theoretical domains of the ADS-VII and its subscales, were assessed using a Cronbach's Alpha procedure. Statistics were calculated based on the entire participant sample. The alpha for the Total score was .97. The alpha coefficients for the 18 subscales ranged from .71 to .93. The ADS Overall Aggression Score produced the highest alpha coefficient (.93), indicating the scale is adequate for interpreting test responses of individual patients. DiGiuseppe and Tafrate found correlations between the main scales of the ADS-VII and the STAXI 2. All correlations were significant at the .001 level. The ADS-VII Total scale score correlated with the STAXI2 Trait Anger scale (.78). The correlations between the ADS-VII factor scores, Anger-Out and Anger-In, and the STAXI2 Trait Anger scale were .73 and .67, respectively. These results support the concurrent validity of the ADS-VII.

The Anger Disorders Scale is unique in its design in that it is the only scale that comprehensively samples the cognitive, physiological, interpersonal, and motivational factors associated with the production of anger and aggressive behavior. It is constructed to provide data for making a diagnosis and for selecting treatment modalities to address problems associated with anger. Because many of the biological, cognitive and situational factors that are involved in the production of anger and aggression for non-disabled persons will be the same (or similar) for persons with cognitive limitations, the ADS-VII should be able to obtain useful data if it can be modified effectively into an interview format.

Development of the ADIMR

In the first phase of the investigation, the ADS-VII instrument was adapted for use as a structured clinical interview. The rough draft of this new instrument, the Anger Disorders Interview for persons diagnosed with Mental Retardation (ADIMR), was then critically examined by practitioners and researchers who have experience with assessment and treatment for persons with cognitive limitations. After its approval by a review committee composed of doctoral level, licensed practitioners (see below), the ADIMR instrument was pilot tested for use in the present study. Details of the modification process are provided below.

Modification of the Anger Disorders Scale. Participants with cognitive limitations pose a particular challenge for a self-report assessment format because they may have difficulty comprehending the intended meanings of assessment questions, and difficulty providing graded responses to assessment items (Finlay & Lyons, 2001). In other words, expressive skills and reflective self-assessment and abstract reasoning skills may be limited

for participants with MR and borderline intellectual functioning, making it difficult for them to complete test items accurately even when these are read aloud to them. Therefore, irrespective of the extent to which items from the ADS-VII had been modified, the final item contents of the ADIMR needed to remain as close in apparent meaning to the original ADS-VII items as possible. This allowed for comparisons to be made between the ADS-VII and the ADIMR.

The ADS-VII was designed for self-administration by persons with a fourth-grade or better reading level. In its present form, this renders it useless for participants who cannot read and for persons who function intellectually below a fourth-grade performance level. Therefore, in the development of the ADIMR, the administration of the items of the ADS-VII needed to be recast into an interview format so that participants who are unable to read could be assessed. As much as possible, the language used in the ADIMR needed to be matched to the expected level of participants' intellectual and educational functioning. During the modification process, as little as possible of the original ADS-VII text was altered. Because the development of ADIMR items often required simplification of the vocabulary used in the ADS-VII, it was assumed that the reading level of the ADIMR would be at or below a fourth-grade level. The actual reading level of the ADIMR items was assessed using the Flesch-Kincaid procedure included with the Microsoft Word 2000 word processing package. Items were subdivided into logical groups and then analyzed. The lowest reading grade level for a block of items was 2.1, and the reading level for the highest block was 3.8. Overall, the reading grade level of the ADIMR items was determined to be 2.4 by using the Flesch-Kincaid procedures.

One ADIMR item required the inclusion of a visual analog. This was a pictorial example (i.e., a modified photograph) of a person, in this case the responsible investigator (see Figure 4), affecting a facial expression of anger. This visual analog was added to provide a pictorial example of anger to pair with the word "mad" (the anger term used preferentially throughout the ADIMR items). This type of modification was intended to decrease the amount of abstract reasoning ability required by the assessment tool, thereby increasing the likelihood that some participants (i.e., those who could not demonstrate that they knew the word "mad" referred to anger) could comprehend that the use of the term "mad" referred to anger (i.e., by seeing it paired with the word "mad"), and thus could respond more accurately.

All participants were given the same, standardized guidance at the start of the ADIMR interview and the assistance that was offered for items after the interview began was also standardized. In order to validate individual test profiles, a set of validity checks was added in order to document that participants were able to answer accurately (i.e., that they could use the terms "yes" and "no" correctly, and were not responding from an "all yes" or an "all no" response bias). Additional systematic checks were added to ensure that participants with cognitive limitations could provide accurate verbal self-reports and graded answers as per a Likert scale.

All participants were asked to identify their correct name from among two choices (i.e., the individual's own name and one matched for gender from a standard list of names not identical to their name). Those responding correctly (i.e., affirmatively to their own name and negatively to the false name) were judged able to comprehend the interview items and were allowed to participate in the interview. Those who could not correctly

discriminate between their own name and a false name, even after a standardized practice

drill, were not allowed to participate. With respect to practice providing graded responses,

all participants were asked to respond to a visual analog scale represented physically as

three wooden bars of different heights (see Figure 5). Participants were then asked to

point to the bars in response to sample queries (i.e., "I need to make sure you can

understand the questions I am going to ask, so I will be asking you to point to your

answers...Let's practice with these blocks...When I say, 'point to your answer,' point to

the block I am talking about"...Let's practice...Which block is the Smallest

block?...Which block is the Biggest block?...Which block is the block in the Middle?"). In

fact, participants were asked to point when giving their response to every ADIMR item.

Participants were expected to perform accurately on the pointing validity check

portion of the interview before proceeding further. Participants could then be presented,

throughout the interview, with the specific terms needed to verbally (i.e., vocally) label the

height of each bar as these terms corresponded to the Likert scales used for each of the

ADIMR items (e.g., "Next question...when you get mad [interviewer points to the tallest

bar] you tell everybody... [Interviewer points to the middle bar] you tell one or two

people... [interviewer points to the shortest bar] you don't tell anybody...please point to

your answer").

Another modification of ADS-VII items that was made as part of the development

of the ADIMR was the addition of physical examples (i.e., brief demonstrations) for items

depicting phenomena that are difficult to describe with words. These demonstrations were

given before presenting the item response choices to the examinee. The use of these

demonstrations, it was expected, would help participants with cognitive limitations to

place item queries within the intended context, thus avoiding the necessity of complex verbal explanations. For example, when presenting the item, "Sometimes you are very mad and your heart beats fast/hard," the examiner demonstrated tachycardia by tapping his chest seven times with one hand above the area of his heart.

Most of the items of the ADIMR were designed to include an alternate form. This device was employed as follows: when a participant could not (or would not) give a response to an item, it was passed over until the end of the interview when it was asked a second time. If the item was designed with an alternate form (in each case, a form that was simplified further to enhance its comprehensibility), this alternate item form was used instead of the standard item form when administering the item a second time. The item design format just described was also included to account for the probability that participants might have difficulty with the wording or syntax of some items; in other cases, it was designed to allow participants to have a break before returning to items that were difficult or upsetting for them.

The items of the ADIMR were initially presented as "yes" or "no" queries; if a participant answered "no" to an item, that item was concluded and the next item was administered. All "no" responses were scored as "0" points. This method greatly reduced the length of time of interview administration, because all items that were answered with "no" included no Likert scale type response choices. When a participant responded "yes" to an item, he or she was then presented with several item response choices, and was asked to "point to" his or her answer using a visual scale analog consisting of three wooden bars of disparate heights. The format of these ADIMR item response choices was designed to match that of the ADS-VII as closely as possible, while also limiting the total

number of choices to three (not five, as per the ADS-VII). This allowed for the use of the ADIMR visual scale analog (see Figure 5) and also limited the number of pointing bars to three, providing fewer response choices and thereby making comprehension and performance much easier for participants with cognitive limitations. Thus, participants were actually being asked to hear and then visually (and with immediacy) associate their chosen response with the appropriate wooden bar, instead of hearing three choices and comparing them mentally and responding from memory. For many persons with cognitive limitations, this latter method would be ineffective and would greatly increase the amount of error in the obtained interview data.

In order to match the ADIMR score range closely with that of the ADS-VII, item response choices were scored (whenever possible) from one through five points. Because all "no" item responses are scored zero points, the point range for items of the ADIMR is zero through five. Because the ADIMR is comprised of 74 items, this resulted in a total score range of zero through 370 points.

Review and Approval of the ADIMR Content. Prior to the start of the investigation, the assistance of three doctoral level, licensed mental health professionals with experience providing assessment and treatment for persons with cognitive limitations was enlisted; this was done in order to provide an expert review of the ADIMR design. Specifically, these professionals assisted with the development and approval of the ADIMR item content, and the content of the standardized guidance provided to examinees. The assembled group of experts was provided with the initial draft of the ADIMR which they examined item by item for congruence with the intended meaning of the ADS-VII item contents, for face validity, for clarity of the language and other stimulus

materials used, for the comprehensibility of items to members from the target population, and for clinical utility in the assessment of anger and aggressive behavior.

After every item had been judged to be appropriate for administration to participants from the target population, the ADIMR was adopted as the instrument for use in the present investigation (see Figures 6 through 8). It was considered appropriate for use when a minimum consensus of two-thirds of the expert group had been obtained for each item in the ADIMR.

Pilot Testing of the ADIMR. Before the formal investigation of the ADIMR instrument commenced, the ADIMR was pilot tested with three participants selected as per the inclusion and exclusion criteria given below. These participants and their care givers were required to give consent (or assent) as per the same procedures used for the formal investigation (see below). The pilot testing provided an opportunity to collect information about the typical length of the interview administration, the instructions that were missing or were redundant, and about the type of help that was needed by examinees with cognitive limitations. Also under consideration were how many items (and which specific terms) appeared to be incomprehensible to examinees, whether or not examinees could endure the length of time that the interview would take, and in situ observations of examinees' responses to the visual stimulus materials. Based on the pilot testing results it was decided that the ADIMR instrument was appropriate for the study purposes, that no modifications were necessary, and that no additional pilot testing needed to be conducted in order to refine the measure.

Hypotheses

The present investigation sought to answer several questions: (a) Can the ADS-VII be effectively modified to assess the anger and aggression of participants with cognitive limitations? (b) Can the modified ADS-VII, the Anger Disorders Interview for persons diagnosed with Mental Retardation (ADIMR), successfully obtain information about participants' anger and aggressive behavior to the extent that the obtained information corresponds closely with that provided by established measures of anger and aggressive behavior for the target population? (c) Can the ADIMR obtain data about anger and aggressive behavior that matches the informant data describing participants' episodes of anger and aggressive behavior? (d) Also, were specific mental health symptoms (i.e., anxiety and depression) evident for participants in the study sample? (e) Did the ADIMR appear to be gathering information different from that believed to be measured by the PIMRA?

Due to the small size of the study sample, the aforementioned questions could not be resolved through quantitative statistical analyses. Instead, the study hypotheses were operationally defined as follows:

1. There will be an observable similarity between participants' scores on the ADIMR and the frequency and intensity of their aggressive behavior as sampled by the AAMR Social Adjustment, Social Behavior, and Disturbing Interpersonal Behavior subscales.

2. There will be an observable similarity between participants' scores on the ADIMR and the intensity and frequency of their aggressive behavior as documented by Episode Description Forms (EDFs).

3. Participants' scores for the ADIMR and PIMRA will be demonstrated to vary together. However, it is also expected that sufficient variation between participants' scores will be found to indicate that the ADIMR and the PIMRA are testing different, albeit related, constructs.

4. There will be an observable similarity between participants' scores on the ADIMR and that of their caregiver/informants' ADIMR scores (i.e., these scores will rise and fall in a similar pattern). However, because the ADIMR is intended to sample covert data about participants' anger and aggression, it is anticipated that there will be some variability between participant and caregiver/informant ADIMR scores.

When attempting to answer the aforementioned queries the investigators applied a qualitative analytic approach. The principle objective was to demonstrate the feasibility of the ADIMR instrument and its associated methods for assessing the anger and aggressive behavior of persons with cognitive limitations.

Method

Participant Recruitment

The target population of this study consisted of participants with cognitive limitations who have a documented history of displaying aggression toward others or toward property. The participant sample also included persons who had received treatment for one or more DSM-IV diagnoses.

Recruitment of participants was conducted for a period of eleven months through the posting of informational fliers in locations where professionals working with potential participants would view them; it was also conducted through fliers sent via mail and email to human service agencies, county mental health programs, intermediate units, and private practitioners of psychological services. The participants who comprised the final sample were recruited from work training programs, residential programs, private providers of psychological services, and from private families located in South Central Pennsylvania. In addition to the aforementioned participants, the assistance of family members or professional staff currently working with or living with the participants was enlisted. These persons were either staff persons working directly with participants in the locations where the aggressive behaviors had been displayed, or were family members who routinely managed the participants' aggressive behavior at home.

Inclusion Criteria

In order to be included in the study participants were required to meet the following criteria: (a) they needed to be able to hear and to verbally express willingness to participate in the study (i.e., a participant needed to provide assent if he or she were not his or her own legal guardian or consent if they were), (b) according to existing records

they must have displayed three or more aggressive episodes during the 180 days immediately preceding the study. Also, the aggressive behavior displayed needed to include either aggression directed toward objects or other persons, or both, (c) participants needed to have a Full Scale IQ between 55 and 75 points (as per AAMR criteria, Luckasson, Coulter, Polloway, Reiss, Schalock, Snell, Spitalnik & Stark, 1992), and (d) all participants needed to have a documented diagnosis of either mental retardation or borderline intellectual functioning assigned by a qualified mental health practitioner and determined by one valid measure of intellectual functioning.

Family and professional staff members participating in the study included only those persons who had direct contact on a weekly basis, for a period of at least three months, with the participant they were supporting (i.e., this was operationally defined as a minimum requirement of eight hours per week, average, for the 90 days immediately preceding participation in the study).

Exclusion Criteria

Prospective participants were excluded from the study if a) they were unable to speak, b) if there was clear evidence of a dementia process, c) if there was evidence of an active and untreated psychosis, d) if they were on a psychotropic medication regimen that had been changed in any way within the two weeks preceding their participation in the study, e) if they were unable or unwilling to give assent or consent, f) if their level of intellectual functioning could not be determined using a valid measure of intellectual performance, g) or if their measured level of intellectual functioning fell outside of the range required by the inclusion criteria.

Family and professional staff members who were to participate were excluded

from participation in the study if a) they were unable or unwilling to give assent or

consent, b) if they began to associate with the participant who they were supporting fewer

than 90 days prior to their participation in the study, and c) if the average number of hours

they had spent with the participant who they were supporting during the 90 days

preceding the study was fewer than eight.

Investigation Materials

The materials used throughout the present investigation included those developed by

the investigators, as well as standardized assessment instruments currently in use, clinically, for

persons with mental retardation. Materials from the latter category included the AAMR

Adaptive Behavior Scales-Residential and Community (ABS-RC:2; Nihira, Leland & Lambert,

1993). The ABSRC:2 is the current revision of the original AAMD Adaptive Behavior Scales

(1969; 1974). Throughout its revising, the present version was comprehensively evaluated and

designed to assess the level of adaptive functioning of persons with mental retardation, those

residing in the United States as well as in other countries. The scale items were selected for

their high interrater reliability and their ability to discriminate between institutionalized persons

with mental retardation and those in community, residential, or scholastic settings (Grossman,

1983).

Individual items are grouped into Domains, and raw scores are converted to standard

scores ($M = 10$, $SD = 3$) and percentiles. Groups of items are also expressed as Factor scores,

and raw scores are converted into "quotients" ($M = 100$, $SD = 15$) and percentiles. The

normative sample consisted of more than 4,000 participants. Samples were obtained from 43

states, and consisted of persons with developmental disabilities residing either in the community

or in residential settings. Internal reliability and stability for all ABSRC:2 scores exceeded .80. The subscales most relevant to the purpose of this study were the "Social Adjustment," "Social Behavior," and "Disturbing Interpersonal Behavior" subscales.

The Psychopathology Inventory for Mentally Retarded Adults (PIMRA) was also employed during the study and is, as previously described, an inventory consisting of 56 forced-choice (i.e., "yes or no" answered) items developed by Johnny L. Matson and colleagues for screening for mental illness in persons diagnosed with mental retardation (Senatore, Matson & Kazdin, 1985). This scale is based on the diagnostic criteria of the DSM-III, and items are completed either by an informant who knows the participant being assessed, or by participants themselves when administered in an interview format. This scale is used in conjunction with other instruments such as the Reiss Screen for Maladaptive Behavior (RSMB), as part of a comprehensive evaluation for identifying persons with mental retardation who may need mental health treatment. The scale yields a total score, and eight other scores representing categories of mental illness including Schizophrenia, Affective disorder, psychosexual dysfunction, Anxiety disorder, Somatoform disorder, Personality disorder, and Adjustment disorder. In most instances, affirmative answers are counted as supporting the presence of symptoms, and a minimum of four affirmative scores are required to exceed the threshold for the probability of diagnosis in any given category. The PIMRA total score is believed to provide an index of the presence or absence of psychopathology.

In addition to the ADIMR, the investigators developed a standardized checklist for documenting study participants' episodes of anger and aggressive behavior. This form, the Episode Description Form (EDF), is composed of three sections and has a score range

from zero to fifteen points. Section one is used to describe the type of aggressive behavior displayed and has a range from zero to nine points. The remaining two sections describe the episode duration and intensity, with point ranges from zero to four and zero to two points, respectively. Totaled together the three sections yield a single score describing the episode severity level. Lastly, a brief mental status exam based on the Folstein Mini Mental State Exam (Folstein, Folstein, & McHugh, 1975) was developed by the investigators and was used to screen participants before their participation in the present study.

Investigation Procedures

   Consent to participate. Participants gave their consent in writing by signing a standardized consent form. This form was read aloud to each participant, and the study intent and procedures were explained to them in detail, including any questions they raised at the time that they gave consent. Any participant who could not legally give consent (i.e., one adjudicated incompetent) was required to have a significant other who was legally able to give such consent sign the standardized consent form for him or her, after it had been read and explained to both participant and caregiver. In such a case, the participant was also asked to sign an assent form documenting his or her willingness to participate. During the present investigation, only one participant needed consent to be provided by a legal guardian (i.e., nine out of the ten participants in the study were able to give consent, and did so). Family and staff members who participated in the study were also required to give consent for their participation and documented this by signing the standardized written consent form.

Administration of the ADIMR. Throughout the investigation, all participant screening and other testing required by the investigation was conducted by the responsible investigator. All participants were assessed using the AAMR Adaptive Behavior Scales-Residential and Community (ABS-RC:2; Nihira, Leland & Lambert, 1993), making it possible to verify that participants' adaptive functioning levels corresponded with their reported levels of mental retardation. A Folstein-type Mental Status exam was conducted to verify that all participants were appropriately oriented, able to comprehend speech, and not experiencing active dementia or psychotic symptoms at the time of their participation in the study.

Each participant in the study participated in a structured clinical interview which consisted of the ADIMR and the Psychopathology Inventory for Mentally Retarded Adults (PIMRA). The Psychopathology Inventory for Mentally Retarded Adults (PIMRA) was included to allow for comparisons to be made between the ADIMR and an existing instrument that is similar in design. The PIMRA is a good choice for experimental comparison with newly developed scales because of its extensive clinical use and the availability of research data. It is also a good choice because it is a self-report interview, as is the design of the ADIMR. The PIMRA scale items were completed independently (as per standard PIMRA procedure) by both the participant and the caregiver/informant assisting the participant. This helped to identify the extent to which participants' responses were congruent with observer reports. For this same reason staff and family members were also asked to complete the ADIMR independently, with reference to the participant they were supporting.

All forms and instruments were completed by caregivers/informants on the same day on which the participants that they were assisting were interviewed. Staff and family members assisting participants were first interviewed in order to complete a brief paper and pencil survey developed by the responsible and principle investigators. This was done in order to document the demographic information and other data required for the investigation. Staff and family members were asked to complete the demographic survey, the PIMRA and ADIMR, and the other instruments completed as part of the investigation in a manner that described the participants they were supporting (i.e., they were asked to respond in reference to the participants' behavior, not their own). The other instruments included the AAMR Adaptive Behavior Scales-Residential and Community (ABS-RC:2). The ABS-RC:2 includes three subscales, the "Social Adjustment," "Disturbing Interpersonal Behavior," and "Social Behavior" scales, which provided measures of aggressive and intrusive behavior (Nihira, Leland & Lambert, 1993) for comparison with participants' ADIMR scores, and with descriptions of their episodes of anger and aggressive behavior.

Staff and family members were asked to complete ratings of their participants' anger episodes describing the type of acting out displayed, and also the severity and intensity of each episode. Specifically, they completed three or more standardized Episode Description Forms (EDFs). The form used was a Likert-type scale developed by the investigators (see Figure 9) with a score range from zero to fifteen points. Staff and family members rated their participants' five most recent episodes of anger and/or aggression using a separate form for each episode. These five ratings were then averaged to produce a profile of each participant's anger and aggressive behavior.

Results

The study sample was comprised of ten participants. Because the sample size was greatly restricted, it might be expected that the information obtained from study participants would be inadequate to answer questions of feasibility. Fortunately, this was not the case. Participant characteristics (e.g., level of aggressive behavior displayed, type of aggression, and mental health concerns) were sufficiently heterogeneous to demonstrate the ability of the ADIMR and associated procedures for collecting detailed individualized information about each participant's anger and aggressive behavior. Although participant and caregiver/informant reports did not always agree (as was expected to be the case), a sufficient level of similarity was obtained for the study sample. The following is a discussion of the scores that were obtained and of the performance of the ADIMR interview procedures. Please note that all of the numerical figures reported hereafter represent results based on scores obtained from all ten participants in the sample, unless otherwise stated.

Recruitment Concerns

The study inclusion/exclusion criteria were specifically designed to ensure that a participant sample could be identified that would allow for evaluation of actively aggressive persons with cognitive limitations, who could independently answer interview items, and who were not experiencing any active symptoms of mental illness or fluctuations in mood/mental status as a result of medication titration. Also, participants were required to be assisted by caregivers/informants of long association with them. The participant sample met the aforementioned criteria, and the resulting data obtained was as

expected, with the exception that an insufficient number of participants were recruited to allow the ADIMR instrument to be statistically validated.

As per Cohen (1992) and Kazdin (1998), the effect size (ES) of a sample population can be estimated from ES values available in the existing research literature. This allows for the selection of investigation statistical parameters, including the number of subjects required, at the outset of an investigation. As already noted above, available research data on anger and aggression for persons with cognitive limitations is scarce. However, if it is assumed that the ADIMR closely resembles the original ADS-VII, then correlation values (which correspond with expected ES) for the ADS-VII should be similar to those of the ADIMR. DiGiuseppe and Tafrate (2001) found the correlations among the ADS-VII subscales (and between the ADS-VII and other tests) to be, on average, .30 or higher. As per Cohen (1992), if the ADIMR can be expected to perform similarly to the ADS-VII, then a conservative estimate would be that of a medium or smaller ES. Therefore, if the alpha level were set at .05 and a desirable power rating of .80 were established, a sufficient sample of participants could be expected to include 85 persons. Thus, it was hoped that approximately 85 adult participants (i.e., age18 or older) would have been recruited for the present investigation. It was the intention of the investigators to recruit male, female, and racially diverse participants. Unfortunately, an insufficient number of participants were recruited, which prevented the ADIMR from being statistically examined as per the original intention of the investigators.

There are several plausible reasons for the small size of the study sample. The target population (persons with cognitive limitations who display aggression) represents only a subset of the total population of persons with mental retardation and borderline

intellectual functioning, which in turn can be estimated as consisting of five percent or less of the total United States population (Groth-Marnat, 1997, p. 671). If one accepts that the "aggressive" subset of the total population of persons with mental retardation is no greater than 25 percent (or less) of the whole, then the target population can be assumed to be relatively small. It can also be assumed that a significant number of otherwise eligible participants were excluded because their anger and aggressive behavior were already controlled (e.g., as a result of therapeutic or pharmacological interventions) during the six month period prior to the commencement of the study. In this manner, the inclusion and exclusion criteria may have limited the number of eligible participants available in the recruitment region, and could account for some of the reduction in sample size. With each parameter added to the inclusion criteria the approximate size of the population being sampled for the present study logically decreased; this greatly increased the difficulty of obtaining a sufficiently large participant pool in the recruitment time allotted.

As per the study criteria, in order to be included participants were required not only to agree to participate in the investigation, but they also could not have had any medication changes within two weeks of their participation; they also had to have displayed aggressive or destructive behavior several times within the preceding six months, and had to be functioning intellectually within a limited range (i.e., effectively between mild mental retardation and borderline intellectual functioning levels). These requirements, and the remaining inclusion/exclusion criteria, partially account for the small response to study recruitment efforts (i.e., in response to the more than 200 study advertisement fliers issued, as well as follow-up phone calls and emails, approximately 20 potential participants were able to be identified).

An additional impediment arose with respect to Health Insurance Portability and Accountability Act (HIPAA) regulations: agencies that did provide participants sometimes delayed their participation in order to satisfy their internal HIPPA compliance procedures, including internal consent-to-participate procedures, which had to be completed before final screening of the participants could commence. Several participants were excluded because they did not meet the study inclusion/exclusion criteria. Several participants initially agreed, but later declined to participate. Ultimately, ten participants who met the study criteria participated. The data obtained from the performances of these participants using the ADIMR satisfied the principle objective: to demonstrate the feasibility of the ADIMR as a method for obtaining information from cognitively limited persons about their anger and aggressive behavior.

Description of the study participants and informants

As previously noted, the study sample consisted of ten participants (specifically, two female and eight male participants). Eight of the participants were residing in community residential facilities (CRFs) for persons with mental retardation at the time of their participation in the study. The remaining two participants were residing in other types of community placements, these being either foster care with a foster family or a personal care boarding home. Participants had resided at their present locations an average of three years, lengths of stay ranging from eleven months to five years and several months.

The caregivers supporting the participants included one pair of foster parents, two supervisory staff from a sheltered workshop setting, and seven direct care staff (four of these were supervisors). All caregivers/informants had direct, weekly contact with the

participants they were supporting, and had observed these participants display anger and aggressive behavior. The average length of time of their association with participants was four and one third years, ranging from 13 months to 13 years (the modal length of time of association between participants and caregivers was two years).

Adaptive Functioning Levels of the Participants. The mean age of participants at the time of the study was 36.3 years (median = 35.5, mode = 23.0) ranging from 19 to 59 years of age. All ten participants in the study were assessed with regard to level of adaptive functioning using the AAMR Adaptive Behavior Scales for home and community (ABS:RC2); these scales provide a measure of comparison between the participant pool and a normative group of adult persons with mental retardation living in community residential settings. The Community Sufficiency, Social Adjustment, Social Behavior, and Disturbing Interpersonal Behavior scales are of particular interest.

The Community Sufficiency Scale provides a measure of a participant's ability to function independently in social settings outside of his or her own home environment. The mean performance of the study participants was at the 62nd percentile (median score = 57.5; mode = 47; scores ranged from 42 to 95 points), indicating that on average, when compared with persons living in the community who are of similar age and who function intellectually in the range of mental retardation, the study participants have difficulty functioning independently in the community. One reason for this could be that the social behavior of the participant group was also remarkably impaired. The Social Adjustment, Social Behavior, and Disturbing Interpersonal Behavior scales provide an index of how well the participants perform interpersonally: the first two of these three scales assess behaviors that include anger and aggressive acts, while the third scale provides an index of

a participant's attitude when interacting socially. The mean performances of the participants for the Social Adjustment and Social Behavior scales were at the 22nd and 18th percentiles, respectively. This level of performance indicates significantly maladaptive behavior in social situations. Results for the Disturbing Interpersonal behavior scale were similar (see Table1).

These findings correspond well with the characteristics of the participants' aggressive behavior as reported by eye-witnesses (i.e., caregiver/informants) using the EDFs developed for the present study. The overall episode ratings (composite scores ranging from 0 to 15 points which reflect type of behavior, duration, and intensity) were high for the sample, indicating that the episodes described were often characterized by deliberate attempts on the part of participants to assault others or to damage property (mean for the sample was 10.5 or 70 % of the total possible rating). Moreover, ratings for type of episode (the portion of the scale that describes the type of behavior demonstrated when acting-out) were also high, above six points on average for the participant sample. A score of six points on the episode rating checklist corresponds with episodes in which verbal or gestural threats are made, followed by deliberate attempts to assault others or to damage property when provoked. On average, the duration of the episodes described was between one and five minutes. However in many instances the duration of an episode was longer than five minutes.

In order to make comparisons between participants' performance on the other measures applied in the study and the overall level of aggressiveness reported, participants were identified hierarchically, from least aggressive to most aggressive, using the study episodes ratings. Participant rankings were first arranged in order of the total number of

high scores they received for episode type (i.e., scores of eight or higher), then in order by

the total number of highest possible scores (i.e., four) obtained for intensity ratings, and

finally by total number of highest possible scores obtained for episode duration (i.e., two).

This method produced a clearly ordered progression of participants from least to most

aggressive (see Figure 10).

   Participants Presenting Mental Disorder Diagnoses. The participants in the

ADIMR feasibility study presented with a variety of DSM-IV diagnostic labels. The most

prevalent diagnoses for the study sample were Intermittent Explosive Disorder (50 % of

the participants) and mood disorder diagnoses (50 % of the participants having been

diagnosed either with a Major Depressive Disorder or some other type of mood disorder).

Personality Disorder diagnoses were the next most frequently represented (30 %). The

remaining diagnoses of interest included (one participant each): Impulse Control Disorder,

N.O.S., Schizophrenia, and Autism complex disorder (see Figure 11). Results from

participants' PIMRA scores supported three of the aforementioned diagnoses, in that

90 % of the participants scored above the diagnostic threshold for personality, affective,

and psychotic disorders. Although only one participant presented with a schizophrenia

diagnosis, the preponderance of psychotic disorders as measured by the PIMRA (self-

report form) was not surprising in view of the fact that five of the ten participants reported

having had some type of hallucinatory experience in the past (however, none of the sample

participants reported hallucinations at the time of screening for participation in the study).

 Data Obtained from the Adminstration of the ADIMR

   The anger disorder interviews using the ADIMR were conducted in private

locations, with as few distractions as possible. Each of the final screening/double checks

for participant eligibility to join the study, the consent procedures, and the taking of

background history were conducted with the participant and his or her caregiver/informant

present. After obtaining consent, the researchers interviewed the participants separately

from their caregivers/informants, while this latter group completed their paper and pencil

interview materials in another location.

Data given below is for the ten participants in the study sample. The ADIMR took

an average of 45 minutes to administer, lengths of time for administration ranging between

30 and 60 minutes. Six participants showed periodic signs of fatigue (e.g., yawning,

shifting eye contact) during their interviews. Only four participants took a brief break as

per the break allowance built into the ADIMR (i.e., a five minute break at the mid-way

point in the interview), and only two of these participants appeared to be fatigued at the

time that they took their breaks (the others were requesting drinks or bathroom trips or

some combination of these). Of the ten participants only four gave any indication of

frustration, and in each case these events amounted to only a single event during the

course of the interview (e.g., in response to the query, "Are you mad right now?" one

participant replied, "No…but I'm getting there!" However, he agreed to continue and was

able to complete the interview without difficulty).

Participants' mean "yes" responses were 441, representing 59.6 % of the

responses (i.e., "no" responses represented 40.4%). Thus it appears that participants, in

general, were attempting to respond accurately (as indicated by the aforementioned

percentages, it would be expected that a very large percentage of yes-responses might

indicate participants displayed a yes-saying bias, just as the converse might indicate a no-

saying bias; neither was the case for this sample). As expected, "yes" responses did exceed

"no" responses, suggesting that the ADIMR was obtaining anger related information from the participants (i.e., because all ADIMR yes-responses were those grading some type of anger or aggression component, an excess of no-responses for this sample would suggest the ADIMR was ineffective for obtaining information about anger and aggression; this, however, was not the case).

Participant errors were few. During the validity check and practice segments of the ADIMR only four errors were made by sample participants. One participant made a single pointing error when practicing and was able to correct his or her technique in response to the standard ADIMR help procedures. Only two participants initially misunderstood the meaning of the word "mad," but this was also remedied as per standard ADIMR procedures. One of these participants did require presentation of the "anger face" pictorial referent, and responded appropriately to it, identifying it correctly as a photograph depicting anger. Among the sample there were no errors with the "yes/no" validity check. Hence, all participants passed the validity checks and practice segments and proceeded with (and completed) their ADIMR interviews.

Two participants' performances accounted for seven of the eight pointing errors made (i.e., the total pointing errors made during the interviews for the entire sample was eight) and these were specifically errors made when pointing to give a response. In almost every instance, participants were able to correct their pointing errors themselves. In only two instances did a participant refuse to answer an interview item (items #9 and # 35). For one of these refusals, the participant did answer the item when the alternate form was used; for the other refusal, the participant refused to answer both the item and its alternate form. This latter case represented the only failure of the alternate form device to elicit an

item response. All together, alternate item forms were used only eleven times, indicating that 98.5 % of the time participants answered the standard item without need to repeat the item with the alternate form. The items for which alternate forms were used were items numbered 1, 9, 25, 37, 39, 45, 54, 56, 60 and 72. Only one item, number 56, precipitated the need for the alternate form twice (i.e., once each for two participants); the remaining items mentioned above precipitated only one occurrence each of a need to use the alternate form. It appears unlikely that the items themselves were flawed; the performances of five of the ten subjects accounted for all of alternate items used, and among these five participants, eight of the eleven interview items involved were those selected by only two of the sample participants.

The performance of only one participant accounted for six of the eleven alternate item events. This is not surprising because this participant has a diagnosis of expressive and receptive language disorder, which could explain the higher number of alternate item forms used during his interview. This participant also gave the fewest number of "yes" responses, and when doing so, frequently chose the lowest item ratings (i.e., those which usually correspond to "never" from the ADIMR response choices), suggesting that he had rethought his answer after hearing the item choices. This indicates that this participant initially misunderstood some of the items, and said "yes" (e.g., indicating that he thought the item did describe his thoughts or his behavior), but then understood when hearing the item response choices and functionally rescinded his "yes" response by selecting the lowest possible rating. His performance as just described not only supports the hypothesis that his receptive language disorder could account for his frequent need for presentation of

the alternate items, but also that the ADIMR design was able to provide a means for obtaining data from participants who initially misunderstand the standard ADIMR items.

The ADIMR Total Scores. The participants' total scores for the ADIMR ranged from 42 to 252 points, with a mean of 149 points. The total ADIMR scores obtained from caregiver/informants were higher, resulting in scores ranging from 91 to 264, with a mean of 176 points (see Table 2). Seventy percent of the participants' ADIMR total scores were lower than those obtained from caregiver/informants (i.e., when comparing each participant's score with that of his or her caregiver/informant the participant score was the lower of the two scores in seven out of ten instances). This indicates that caregiver/informants usually rated their participants higher than the participants rated themselves. This suggests that, in most cases for this sample, that caregiver/informants' ratings may have been overestimates; because many of the ADIMR items required caregivers/informants to rate either participants' cognitive contents or their private experience (i.e., emotional state or physiological response), only the participants themselves could answer such items with certainty. A comparison of ADIMR subscale scores supports this.

The ADIMR Subscales. Discrepancy scores (i.e., the absolute values of the differences between participant and caregiver/informant scores) were calculated for the eighteen ADIMR subscales. For the subscales together, the mean discrepancy was 5.51 points (slightly over the total possible value of any single interview item, i.e., five points). Discrepancy scores ranged between 3.4 (Impulsivity subscale) and 11.1 (Revenge Motives subscale) points. This suggests a substantial amount of agreement for most subscales between caregiver/informant and participant ratings (see Figure 12).

The picture becomes clearer when the data for each subscale is examined in terms of which individual discrepancy scores were within a difference range equivalent to the value of one ADIMR item or less (see Figure 13). The majority of subscales for which fifty percent or greater of the discrepancy scores were within five points of each other (i.e., those having a discrepancy equal to the value of one subscale item or less) were among subscales expected to rate observable signs of anger: Episode Length (70 %), Impulsivity (70 %), Indirect Aggression (60 %), Physical Aggression (50 %), Hurt/Social Rejection (50%), and Passive-Aggressive behavior (50%).

The discrepancy for the Verbal Expression subscale, also expected to rate clearly observable anger behavior, was not as great (40 %). But because some portion of the sample included participants for whom verbal expression is difficult, it seems plausible that actions may often have supplanted verbal expression for these participants, thus lowering their overall score discrepancies. Although expected to rate primarily covert (cognitive) information, the Resentment and Suspiciousness subscale scores were also within a five point discrepancy range (50% and 70 % of the sample, respectively). One factor that could account for this finding is that some of the participants in this sample may have habitually expressed resentment or suspiciousness attitudes verbally. Thus, the high rate of small score discrepancies might be attributed, in part, to the length of time that caregiver/informants have known the participants (as noted, the average length of association between participants and caregivers/informants was greater than four years).

What is most important to emphasize is that the pattern of ADIMR total scores indicates that participants and caregiver/informants were often in agreement; the mean discrepancy between these scores was only 7.8 percent for the study sample, in contrast

with the mean discrepancy for the sample PIMRA scores (42.32 percent). The disparity between ADIMR and PIMRA scores was not entirely surprising, and can partly be accounted for by the fact that these interviews were designed to measure related but different participant characteristics (see Figure 14).

Agreement between participants and caregiver/informants ADIMR scores was also demonstrated in terms of level of aggressiveness. Although the elevation in total ADIMR scores did not increase uniformly with the estimated level of participants' aggressiveness (as defined by episode ratings), this appeared to be true for 40 % of the sample (see Figure 15). More informative was the finding that 80 % of the participants' aggressiveness rankings increased in a manner similar to the increase in the number of ADIMR subscale score discrepancies at or within five points (see Figure 16). Thus, it appears that the ADIMR can generate data that reflect not only the level of an examinee's aggressiveness, but also information about the characteristics of an examinee's anger. Furthermore, in the present sample, there is some agreement between caregiver/informants' and participants' reports as demonstrated by the agreement between ADIMR total scores and subscale scores. It also appears that as the level of participants' aggressive behavior increased, the more the agreement between the caregiver/informants' and participants' responses on the ADIMR subscales increased.

Discussion

The original objectives of the present investigation were to demonstrate that the

Anger Disorders Scale, version seven, could be redesigned as a structured clinical

interview, and that this interview could be experimentally validated with a participant

sample consisting of persons with cognitive limitations who experience anger and display

aggressive behavior. Although the statistical validation of this interview was not able to be

accomplished, the interview was tested with a small and heterogeneous sample from the

population of interest. The results of this investigation indicate that this interview, the

Anger Disorders Interview for persons diagnosed with Mental Retardation (ADIMR), can

obtain useful data about examinees' anger and aggressive behavior.

The ADIMR is, in essence, a new instrument. It was based closely on its source,

the ADS-VII, and to that extent it can be assumed for the time being that the ADIMR

measures anger (the principle construct measured by the ADS-VII). The ADIMR (like the

PIMRA) was constructed as an interview, not as a paper-and-pencil self-report measure,

and by design is unable to provide objective samples of participants' cognitions or

behaviors. The selection of the PIMRA for this study did pose a limitation in that it was

based on the DSM-III, while the current industry standard in psychology is the DSM-IV.

Therefore the PIMRA may have been assessing symptoms that differ from current

standards of assessment practice. However, the PIMRA was designed with the intention

that it not be used on its own to provide a psychological/psychiatric diagnosis. Also, the

PIMRA has demonstrated experimentally that it can detect (and discriminate between)

symptoms of anxiety and depression (Masi, Brovedani, Mucci & Favilla, 2002; Matson,

Kazdin & Senatore, 1984; Swiezy, Matson, Kirkpatrick-Sanchez & Wasiams, 1995). This

is in concert with the purpose of the present investigation which was not to diagnose participants as per the DSM-IV; rather, it was to identify anger (and anger cognitions) in aggressive participants who might also present with symptoms of anxiety and depression. In this regard, the use of the PIMRA did provide a comparison that helped to demonstrate that the ADIMR was not merely reflecting the symptoms of participants' reported mental health disorders, but was instead measuring something else (e.g., anger).

The ADIMR as an assessment tool

Despite the threats to internal validity inherent in the use of self-report instruments, the ADIMR and PIMRA were appropriate for the purpose of this investigation specifically because they are self-report styled measures. This is important because such instruments are able to provide samples of participants' thoughts, feelings, and attitudes whereas this type of data would be difficult to acquire using only observational or informant sampling procedures. Thus, if the ADIMR could be found to provide statistically useful data about participants' anger cognitions and behaviors, then this instrument might have clinical utility because it would identify areas of need. An interviewing tool with these characteristics would assist therapists in the selection of cognitive-behavioral treatment techniques for patients presenting with anger and aggressive behavior.

Data obtained from the participant sample in the present investigation strongly support the feasibility of the ADIMR as an instrument for assessment of anger and aggressive behavior with examinees from the target population. This was demonstrated in terms of the correspondence observed between the participants' ADIMR scores and their recently reported levels of aggressive behavior. Also, the ADIMR results were reflective of participants' obtained scores for subscales measuring aggressive behavior that were

selected from the AAMR Adaptive Behavior Scales-Residential and Community (ABS-RC:2). A comparison of participants' and caregiver/informants' ADIMR responses demonstrated that these groups frequently scored within the value of one item (i.e., within five points) of one another for subscales with elevated scores; this strongly supports the conclusion that the ADIMR can obtain useful data from examinees with cognitive limitations even when no secondary informant is available. Thus, the ADIMR has the potential to obtain information not available through use of existing anger and aggression measures. Therefore, future research should be conducted to experimentally validate the ADIMR instrument.

Although data was collected in terms of caregivers' ratings of participants' behavior, their scores from the ADIMR were not grouped or combined with those of the participants. This data collection approach was used in order to prevent distortion of the data, while also allowing for the collection of additional information useful for interpreting participants' responses to ADIMR items. Because caregivers are unable to report on participants' actual thoughts and feelings with respect to anger, it is probable that combining the participants' and caregivers' scores would generate less accurate profiles of participants' personal (and often private) attitudes and cognitions associated with anger. Combining the scores would ultimately generate inaccurate profiles of the factors associated with participants' aggressive behavior.

Threats to the Validity of the ADIMR

Because the ADIMR was constructed as an interview, it is primarily a self-report measure and is unable to obtain objective samples of participants' cognitions and actions. Therefore, it is possible that participants' may have responded inaccurately to the

instruments' items for a variety of reasons. Participants may have answered in order to present themselves in a socially desirable manner because this would minimize the severity of their anger or aggressive behavior as it appeared to others, including the experimenter. This might have been the case for participants who had been taught to label anger or acting out behavior as inappropriate. Some participants could have inaccurately self-reported because of adherence to cultural mores which require either "face-saving" or "culture of honor" response patterns, and in such cases participants could have presented socially desirable (but inaccurate) non-angry or non-aggressive profiles. On the other hand, some participants might have purposefully sought to present a more angry and aggressive (though socially desirable) profile than was accurate.

The demand characteristics of any interview situation can interfere, and it is probable that some participants responded to what they believe the interviewer was requesting from them. Some of this threat was minimized by standardizing the ADIMR interview language and methods. As demonstrated by the results from the present study, the standardized screening provided by the ADIMR for response biases, and for comprehension and performance problems, appears to have greatly reduced the impact of the previously described validity concerns.

Future Directions

Problems, as previously noted, were experienced with recruitment of participants for the present investigation. Much of this may have been the result of the complex inclusion and exclusion criteria. Thus, future research involving the use of the ADIMR with the population of interest to this study should require less stringent inclusion/exclusion criteria, and should be conducted not only over a longer period of

time, but also over a wider geographical area. One approach could be to expand the range of intellectual functioning established for inclusion criteria, because many persons functioning intellectually at or below the moderate range of mental retardation may have sufficient verbal comprehension abilities to participate in the Anger Disorders Interview. Also, recruitment efforts could focus more intensely on locating practitioners who are willing to collect data using the ADIMR, thereby accelerating the rate at which potential study participants are identified.

The proposed investigation was originally operationalized as a multi-trait, multi-method matrix (Kazdin, 1998, pp. 294-300) and was expected to consist of a series of correlations between variables using Pearson's product moment procedures. This would have allowed for evaluation of the ADIMR in terms of concurrent and discriminant validity; data would be gathered from both participants and persons well acquainted with their behavior, using self-report (participant interviews) and observer report methods. Because this would have resulted in a large number of correlations, the chance that a significant result would be found was artificially elevated (i.e., a type I error would be likely to occur due to the increase of the experimentwise alpha level). In order to correct for this distortion of the statistical analyses, it was planned that a Bonferroni inequality correction technique (Weinfurt, 1995) would be applied prior to final interpretation of the statistical analyses (the Bonferroni technique decreases the chance of a type I error by setting a maximum alpha level based on the number of tests performed). This approach is recommended for future experimental investigations of the ADIMR.

Future research of the ADIMR instrument should include factor analyses of its structure, and attempt to demonstrate correlations between the ADIMR and well

established measures of anger or aggression. Discriminant validity could also be assessed using the total score of the ADIMR. It is anticipated that obtained ADIMR total scores will be higher, and will be positively correlated with established measures of anger and aggression for participants presenting with anger and aggression, and that scores will be lower for those who present only with anxiety or depression. Certainly the results of the present investigation support this hypothesis. It was beyond the scope of the present investigation to statistically verify the discriminant validity (and power) of the ADIMR subscales (e.g., one reason for this is that it would require a significantly larger subject sample). Information obtained in this way would assist with interpretation of the data from experimental investigation of the ADIMR into its utility for discriminating amongst different types of anger disorders. Thus it is also recommended that future research focus on experimental validation of the discriminant validity of the ADIMR.

Future investigations should seek to demonstrate that significant positive correlations can be obtained between participants' scores on specific sub-scales of the ADIMR and scores on measures of specific types of anger and aggression (e.g., symptom checklists, personality/trait measures, etc). It is anticipated that the aforementioned correlations will be similar in pattern to the performance of participants who have taken the ADS-VII. In other words, the ADIMR should be able to discriminate between subtypes of anger presentations, similar to the performance of the ADS-VII. Research should also examine participants' scores to learn whether or not the ADIMR can generate profiles of subscale scores that reflect specific anger problems and their associated behavioral presentations. This would be in concert with the manner in which the Anger Disorders Scale is currently being experimentally investigated. (R. DiGiuseppe, personal

communication, January 30, 2005). Such an endeavor would help to establish a data base useful for identifying "anger disorders" (an objective that is also being pursued by the creators of the ADS-VII). Through such efforts it may be possible one day to include specific anger disorder diagnoses in the diagnostic and statistical manual of the American Psychiatric Association. Because the ADIMR may be useful as a tool for monitoring cognitive-behavioral change and the efficacy of specific treatment packages for anger and aggression with clinical populations, future investigations should also attempt to explore this.

Although the ADIMR demonstrated the ability, in this study, to obtain data efficiently through a relatively brief interview format, the number of questions may prohibit some examinees from completing the interview. Continued research using the ADIMR could allow for factor analyses to be performed, which in turn could result in a reduction of interview length through the exclusion of unnecessary items, or through a more efficient organization of subscale contents (i.e., redundant items could be excluded allowing those that remain to contribute scores to more than one subscale).

Throughout this investigation the ADIMR was viewed as a tool with the potential to identify anger cognitions in concert with the idea that such information will help when developing treatment methods for preventing aggressive behavior. Although this appears to be generally the case, the ADIMR could also be helpful for developing treatment approaches that target physiological or behavioral factors, not only cognitive contents. For example, when the treatment approach is behavioral in nature, as in applying counter conditioning methods to decrease the valence of anger inducing stimuli, serial applications of the ADIMR might be useful for assessing whether or not treatment is helping to reduce

clients' biological responses to provocation, even when no attempts at schema modification have been made. Unfortunately, the subscales of the ADIMR that are most applicable to such an endeavor are limited in content. Future research should attempt to expand the ADIMR subscale contents, possibly even to add subscales, in order to broaden the utility of the ADIMR. One modification that could be attempted would be that of adding items to the physiological arousal subscale which measure gastric upset and acid reflux, as well as other bodily responses logically associated with extreme anger.

The present investigation did not yield any information about cultural factors that may be operant for the study sample and the population from which it was drawn. Culture has a profound impact on behavior, and thus it appears reasonable that the development (and meaning) of anger and aggressive behavior may be different for persons from different cultural backgrounds. Future research could be designed to clarify the role that culture plays in the development of anger and aggression for persons with cognitive limitations.

In many respects the population made up of "persons with developmental disabilities" constitutes, in some ways, a sub-culture (albeit, a heterogeneous one). One unanswered question concerns determining which aspects of anger and aggression are "naturally" characteristic for these persons? For example, many developmentally disabled persons living in the community had previously been institutionalized and continue, even in community residential placements, to experience a restricted range of freedom of choice. Many have had traumatic life experiences resulting from having been abused or neglected by caregivers or peers, and many have multiple impairments—physically and cognitively— that negatively affect their quality of life and that can impede their social progress. In the

face of the aforementioned obstacles many developmentally disabled persons may conceive of their anger (and their aggressive behavior) as justifiable. While it seems clear that one objective when treating aggression is to reduce and eliminate its occurrence, the same cannot so easily be said about the phenomenon of anger. This makes the task of treatment design for anger a complex one, yielding not only a singular objective (i.e., achieving near-zero occurrence rates for anger) but rather a range of objectives (i.e., achieving varied rates or levels of anger, any of which could be considered manageable and acceptable). Future investigations should be considerate of these issues, and seek to shed light on how the ADIMR can be used to select among treatment options without ignoring examinees' personal perspectives and their right to decide "how they feel." Although the present study was able to obtain detailed information about the cognitions and behavior patterns of cognitively limited persons, it did not identify how treatment may develop from such information. What kind of treatment, and for which aspects of anger or aggression? Which schema and behavioral responses should be addressed first by treating clinicians? These questions need to be answered in order to make appropriate use of the data that can be generated by the ADIMR.

Effective assessment and treatment for aggressive persons with developmental disabilities could help to reduce the number of persons with these characteristics who are institutionalized; this might be accomplished by promoting timely application of treatment, which in turn could allow them to be placed into less restrictive residential or vocational settings. Effective assessment and treatment also has the potential to prevent incarceration of persons with cognitive limitations by reducing the incidence of their assaultive episodes through identifying potentially aggressive (i.e., "at risk") persons early so that treatment

can be provided proactively. Additionally, effective assessment and treatment can reduce the cost of community residential programming by reducing or preventing episodes of assaultive behavior, by preventing injury to staff and co-residents, and by the reduction of monies spent as a result of property destruction.

The ADIMR might be helpful in unique assessment situations, such as when a new patient is being assessed and there is no informant available who knows the patient well. The ADIMR may prove to be a useful dependent measure for research into the social-cognitive (Cacioppo, 2002) factors of aggression. More extensive normative sampling with developmentally disabled participants and with specialized clinical populations should be conducted. For example, normative studies should focus on use of the ADIMR with groups of cognitively limited persons experiencing episodes of anger or aggression whose acquired limitations prohibit the use of paper and pencil self-report measures. Such populations might include persons with dementia, or those with aphasic disorders or traumatic brain injuries. Examinees without functional speech may particularly benefit from the fact that the ADIMR is designed so that responses can be given by pointing. Research could also seek to establish the validity of the ADIMR as a tool for predicting the occurrence of anger outbursts and aggressive episodes for persons with cognitive limitations. Thus, this instrument might have a particular utility for forensic populations.

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Figure 1. Item content for all subscales of the Anger Disorders Scale, version seven

(DiGiuseppe & Tafrate, 2001).

Anger-In Scale

2)   I feel resentment that I hide from others.
3)   When I get angry, I avoid talking to people about the problem.
9)   When I get angry, I keep my feelings to myself and do not tell them others I feel.
30)   When I feel angry, I boil inside, don't show it, and keep things in.
32)   When I feel angry, I do not tell anyone but I am secretly quite critical of others.

Physiological Arousal Scale

8)   I have been so angry that I felt my body get hot.
10)   I have been so angry that I became aware of my heart racing.
16)   I have been so angry that I started to breath quickly.
19)   I have been so angry that I felt my hands start to shake.
41)   I have been so angry that I felt my muscles start to get tight.

Physical Aggression Scale

34)   When I get angry, I hit things such as walls and tables.
40)   When I get upset with people I push or shove them around.
43)   When I get angry, I hit the person I am angry with.

Verbal Expression Scale

15)   When I get angry with someone, I tell them what I am thinking or make some angry remark.
18)   I verbally threaten people I get angry with.
20)   I get angry and insult people.
27)   I curse or say nasty things to people I am angry with.
28)   I do things like slam doors or stomp around the house when I get angry.
29)   When I get angry, I yell or scream at people.

Rumination Scale

21)   When I get angry, my thoughts race.
25)   When I feel angry about something, I have trouble concentrating on other things.
37)   My anger interferes with my thinking.
44)   When I get angry about something, I cannot get it out of my mind.

Impulsivity Scale

26)   I get angry and lose control of my behavior.
39)   I have poor self-control when my temper flares up.
46)   I have difficulty controlling my actions when I get angry.

Figure 2. Item content for all subscales of the Anger Disorders Scale, version seven

(DiGiuseppe & Tafrate, 2001).

Coercion Scale

7)   My getting angry stops people from bothering me.
12)   I use my anger to control others.
17)   I argue with others to get what I want.
23)   I bully other people to do what I want.
38)   I purposely intimidate others to do what I want.

Duration of Anger Scale

5)   My anger has been a problem for me.
11)   Other people would say I have had a problem with my temper.
31)   I have had a problem controlling my anger.

Episode Length Scale

6)   When I get angry, it usually lasts:
13)   When I get mad, I usually stay mad for:
45)   Even though I do not show it, my anger usually continues for: _____ .

Scope of Anger Scale

1)   In general, I get angry about: _____ .
22)   I lose my temper: _____ .
33)   I tend to get angry
35)   I get frustrated and angry about: _____ .

Hurt/Social Rejection Scale

4)   I get angry if someone insults me.
14)   I get angry when someone treats me with disrespect.
24)   If someone hurts my feelings, I get angry.
36)   If I find out someone has talked badly about me behind my back, I feel angry.
42)   I get angry if someone makes me look bad in front of others.

Resentment Scale

47)   I resent that life has treated me badly.
48)   I feel bitter and think that I have had more bad breaks than others.
49)   I think I have had a harder life than most people.
50)   I feel jealous that life seems to go easier for other people.

Suspiciousness Scale

51)   I suspect that friends talk about me behind my back.
52)   I believe that you cannot trust other people.
53)   I think that people I know may turn on me.
54)   I believe that if you let people get close to you they was let you down or hurt you.

Figure 3. Item content for all subscales of the Anger Disorders Scale, version seven

(DiGiuseppe & Tafrate, 2001).

Relational Aggression Scale

60)   When I get angry at someone, I get other people to dislike the person at whom I am angry.
65)   I tell others rumors or gossip about people at whom I am angry.
69)   When I am angry with somebody, I try to stop others from hanging out with that person.

Tension Reduction Scale

56)   When I feel angry, I just want to make the tension go away.
62)   When I feel angry, I was do certain things to get rid of the uncomfortable feelings.
68)   When I am angry, my first thoughts are how to make the uncomfortable feelings stop.

Revenge Motives Scale

57)   When I get angry, I just want to hurt the person at whom I am angry.
64)   I just want to get even with people when I get angry at them.
70)   When I feel anger toward somebody, I want to get revenge on that person.
72)   If somebody gets me angry, I was do whatever it takes to get even with that person.
74)   When I feel angry at somebody, I think about ways to get even.

Passive Aggressive Scale

55)   When I am angry at someone, I try to keep that person out of my group of friends.
58)   When I am angry at somebody, I find ways of not cooperating with that person.
61)   When I get angry at someone, I refuse to do the things that he or she expects of me.
71)   When I am angry at my partner or close friend, I stop doing chores or favors for that person.

Indirect Aggression Scale

59)   I have secretly destroyed others property when I have been angry at them.
63)   I have secretly destroyed someone's property because I was angry at him or her.
66)   If I am angry at work/school, I stop trying to do my best.
67)   When angry at someone, I have tried to find ways to make that person fail without them knowing I did it.
73)   When I have been angry, I have secretly tried to destroy the person at whom I was angry.

Figure 4. Stimulus shown to participants who could not indicate understanding of the word

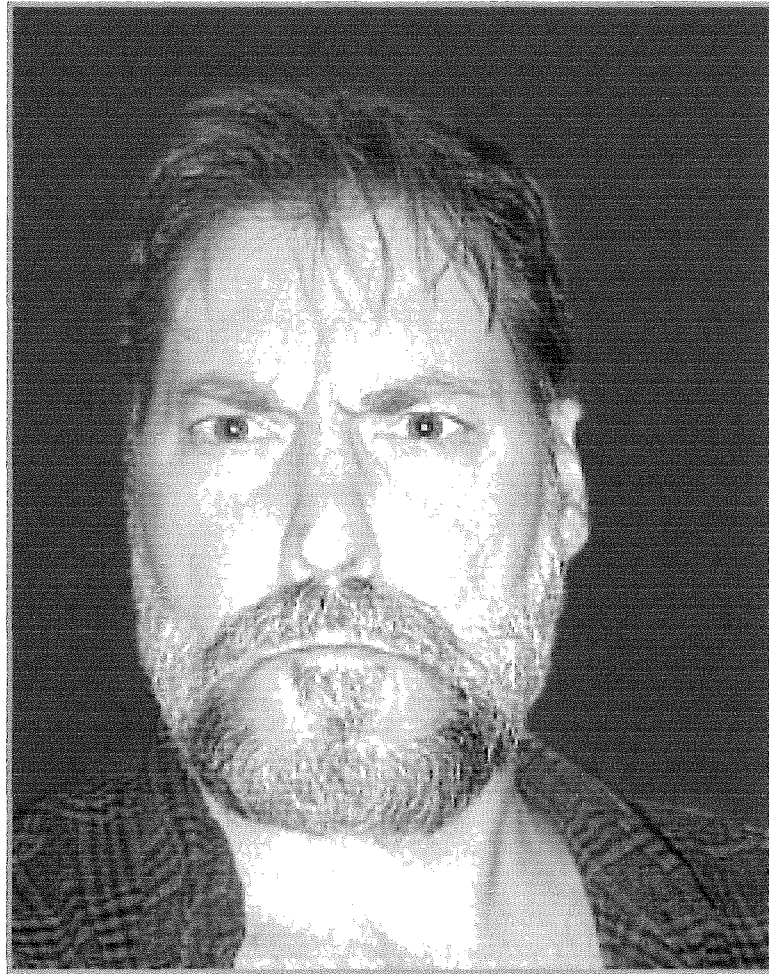"mad" during the Anger Disorders Interview screening procedure.

Figure 5. Three Dimensional Visual Analog Scale for use by ADIMR participants when pointing to assign values on a three point Likert Scale.
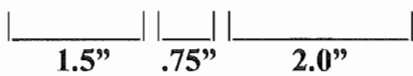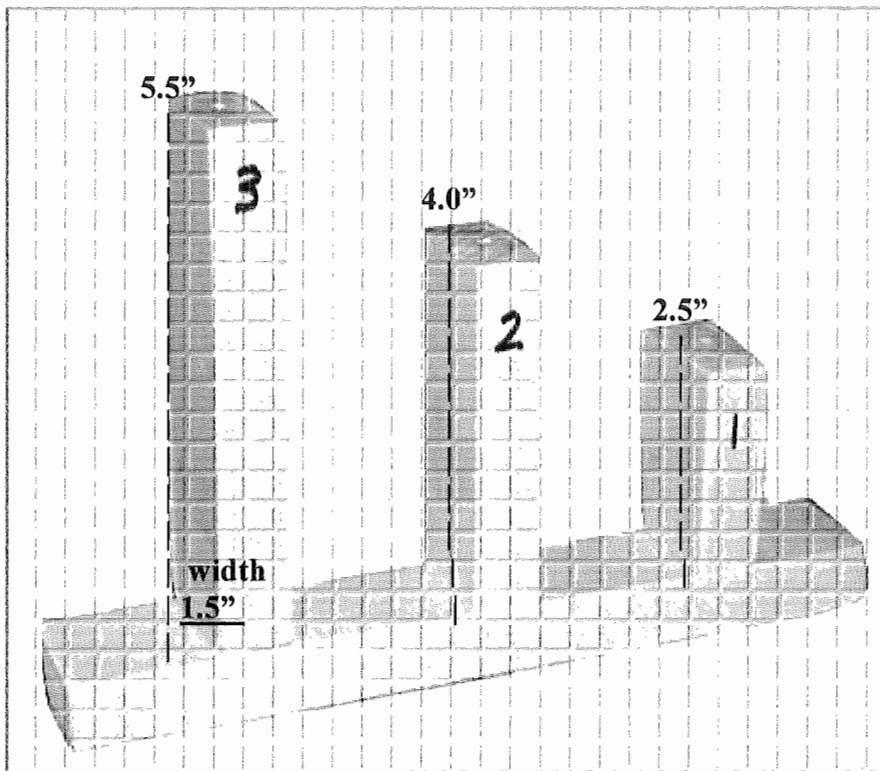
Figure 6. Items from the Anger Disorders Interview for Persons with Mental Retardation (ADIMR) developed for the present investigation. Portions in parentheses refer to the alternate item forms.

Anger-In Scale

2)   Do you stay mad at people who bother (upset) you?
3)   How often do you talk to people when you are mad?
9)   When you are mad, do you tell people about being mad?
30)   Do you get very mad, but you do not tell anybody?
32)   Do you get mad at people and have bad thoughts about them?

Physiological Arousal Scale

8)   Do you sometimes get so mad that you feel hot?
10)   Do you sometimes get very mad and your heart beats fast (hard)?
16)   Do you sometimes get very mad and it is hard to breathe (you breathe faster)?
19)   Do you sometimes get so mad that your hands shake?
41)   Do you sometimes get so mad that your arms and legs are tight (your body hurts)?

Physical Aggression Scale

34)   Do you hit things like tables or walls when you are mad (Do you hit when you get mad)?
40)   Do you push and shove people when you are mad at them?
43)   Do you hit people when you are mad at them?

Verbal Expression Scale

15)   Do you say bad or mean things to people when you are mad at them?
18)   Do you tell people you are mad at that you will hit (hurt) them? For example, you might say, "I'm gonna hit (hurt) you!"
20)   Do you call people names when you are mad?
27)   Do you say bad words to people when you are mad at them?
28)   Do you slam doors shut (stomp your feet) when you get mad?
29)   Do you yell (scream) at people when you get mad?

Rumination Scale

21)   When you are mad, do you think the same thing (stuff) over and over?
25)   Does this sound like you: when you are mad, you cannot think right?
37)   Is it hard to think when you are mad?
44)   If you are mad about something, do you think about it all the time?

Impulsivity Scale

26)   Do you have outbursts (you "act up") when you are mad?
39)   When you are mad, is it hard to behave well?
46)   When you are mad do you do things you should not do?

Figure 7. Items from the Anger Disorders Interview for Persons with Mental Retardation

(ADIMR) developed for the present investigation. Portions in parentheses refer to the

alternate item forms.

Coercion Scale

7)   When you get mad, do people leave you alone (stop bugging you)?
12)   Do you get mad at people to help you win (get what you want)?
17)   Do you fight so people will give you things (give you what you want)?
23)   Are you mean to (Do you act mad at) people to get what you want?
38)   Do you scare people to get your own way (to get them to give in)?

Duration of Anger Scale

5)   Are you mad right now?
11)   Do people say that you get mad all the time?
31)   Have you been mad a lot?

Episode Length Scale

6)   Do you get mad and stay mad?
13)   When you get mad, do you stay mad for awhile?
45)   Does this sound like you: when you are mad you stay mad, but you do not show it?

Scope of Anger Scale

1)   Do you get mad about many different types of (many different kinds of) things?
22)   Do you get mad easily about things?
33)   Do you usually get mad about things?
35)   Do you get upset (bothered) about things?

Hurt/Social Rejection Scale

4)   Do you get mad when someone calls you names (teases you)?
14)   Do you get mad when someone is mean to you?
24)   Do you get mad when people hurt your feelings (upset you)?
36)   Do you get mad when someone tells stories about you (talks to others about you)?
42)   Do you get mad when people make fun of you (embarrass you)?

Resentment Scale

47)   Do you get mad because you have a bad life (life is unfair)?
48)   Do you get upset because Other people are lucky (Other people have a better life than you)?
49)   Do you have a hard life and other people have it easy (other people have a better life than you)?
50)   Are you jealous that other people have an easy life (are lucky)?

Suspiciousness Scale

51)   Do you think friends tell bad stories about you (talk bad about you) and Do Not tell you?
52)   Do you think people lie to you (try to trick you)?
53)   Are you scared people will stop liking you?
54)   Do you think if you like people they will be mean to you (be bad to you)?

Figure 8. Items from the Anger Disorders Interview for Persons with Mental Retardation

(ADIMR) developed for the present investigation. Portions in parentheses refer to the

alternate item forms.

Relational Aggression Scale

60)   When you get mad at somebody, do you tell other people to hate them (be mad at them)?
65)   When you get mad at people, do you tell stories about them (lie about them)?
69)   When you get mad at somebody, do you stop people from talking to them?

Tension Reduction Scale

56)   When you get mad do you want to feel better right away (right now)?
62)   When you are mad, do you do things to stop feeling upset (to make you feel better)?
68)   When you are mad, do you want the feelings to go away (to stop) before you do anything
        else (right away)?

Revenge Motives Scale

57)   When someone makes you mad, do you want to hurt them (the person who made you mad)?
64)   Do you want to get even with (get back at) people who make you mad?
70)   When someone makes you mad, do you want to make them feel what you feel (feel mad, too)?
72)   When somebody makes you mad, do you keep trying until you upset (get back at) them?
74)   When you are mad at somebody do you think about how to bother (get back at) them?

Passive Aggressive Scale

55)   When you are mad at somebody, do you keep your friends away from them (tell your friends,
        "Do Not talk to that person!")?
58)   When you are mad at somebody, do you refuse to do what they want (do you stop listening to
        them)?
61)   When you get mad at somebody, do you act out (act inappropriately) for them?
71)   When you are mad at your best friend, do you stop helping your friend (doing nice things for your
        friend)?

Indirect Aggression Scale

59)   When you are mad at somebody do you break their things and hide what you did (Do Not tell
        anyone)?
63)   When you were mad at somebody, did you ever break their things and nobody saw you do it
        (when nobody was looking)?
66)   When you get mad at work [or insert program name] do you stop working (Do you quit
        working hard)?
67)   When you get mad at somebody do you secretly make them do things wrong?
73)   When you get mad at somebody, do you want to get rid of them (make them go away)?

Table 1. Results from the AAMR Adaptive Behavior Scales-Residential and Community (ABS-RC:2) which provide an index of ADIMR study participants' ability to perform interpersonally. The subscales represented below assess behaviors including anger, aggression, and attitude during social interactions.

Adaptive Behavior Scale Results / ADIMR Sample

SOCIAL ADJUSTMENT

Mean	22.900	Median	17.500	Mode	19.000
Range	63.000	Minimum	5.000	Maximum	68.000

SOCIAL BEHAVIOR

Mean	18.400	Median	16.000	Mode	16.000
Range	48.000	Minimum	2.000	Maximum	50.000

DISTURBING INTERPERSONAL BEHAVIOR

Mean	32.700	Median	31.000	Mode	2.000
Range	73.000	Minimum	2.000	Maximum	75.000

Figure 9. Episode Description Form (EDF) Designed for the study by the investigators.

Angry & /or Aggressive Episode Frequency and Intensity Description		
Rating/Number (Please Circle One)	Notes	Description
9		Deliberately Assaulted Other or Damaged Property, without provocation, without making Verbal Threats (or Gestures).
8		Deliberately Assaulted Other or Damaged Property, without provocation, after making Verbal Threats (or Gestures)
7		Deliberate Attempt to Assault Other or to Damage Property, without provocation, after making Verbal Threats (or Gestures).
6		Deliberate Attempt to Assault Other or to Damage Property, after making Verbal Threats (or Gestures), in response to provocation
5		Verbal Threats (or Gestures) to Assault Other or to Damage Property, without provocation
4		Verbal Threats (or Gestures) to Assault Other, in response to provocation
3		Verbal Threats (or Gestures) to Damage Property, in response to provocation
2		Increased Physical signs of Distress, without provocation
1		Increased Physical signs of Distress, in response to provocation
0		No Response to provocation

This Episode Occurred (Date/Time of Day/Place):_____

Episode Duration (Please Circle One):

0 = 10 seconds or less.

1 = 10 to 30 seconds.

2 = 30 to 60 seconds

3 = greater than 1 minute

4 = greater than 5 minutes_____

Episode Intensity (Please Circle One):

0 = No damage or injury

1 = Damage or Injury without need for repair or medical attention

2 = Damage or Injury requiring repair, replacement, or medical attention_____

Scoring: Rating Number ____ + Duration ____ + Intensity ____ = TOTAL SCORE _____

Figure 10. ADIMR study participants arranged hierarchically from least to most

aggressive based on Episode Description Form (EDF) ratings. Participants were first

arranged in order by total number of high scores for episode type, then in order by

total number of high intensity rating scores, and lastly by total number of high episode

duration scores.
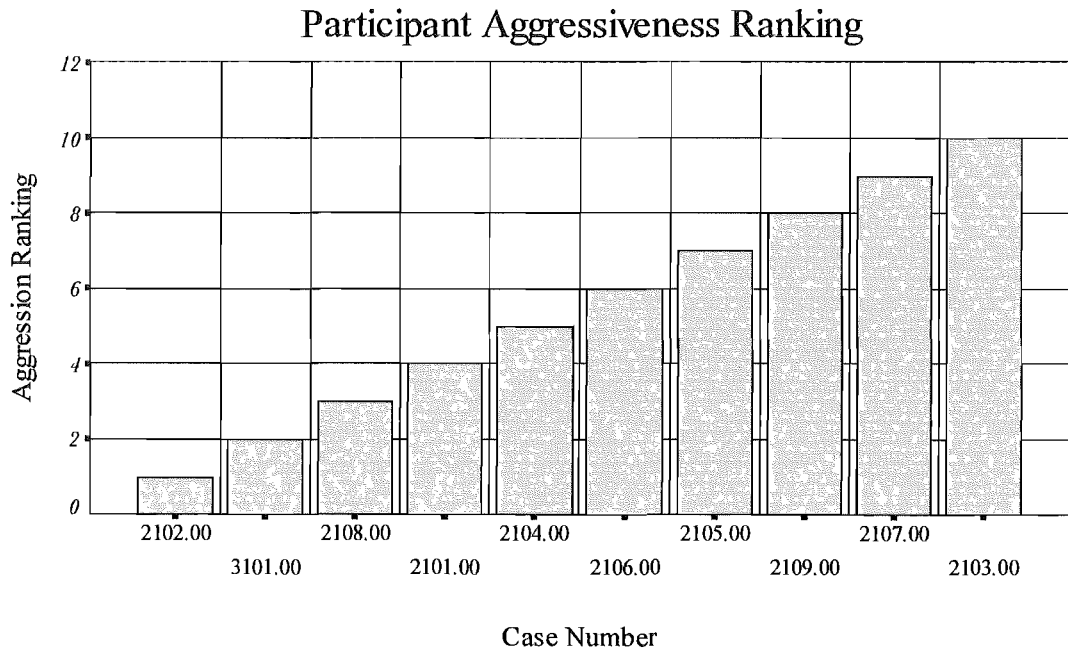

Participant Aggressiveness Ranking

Figure 11. DSM-IV referral diagnoses for the ADIMR study participants. Intermittent

Explosive Disorder, mood disorder, and personality disorder diagnoses were the most
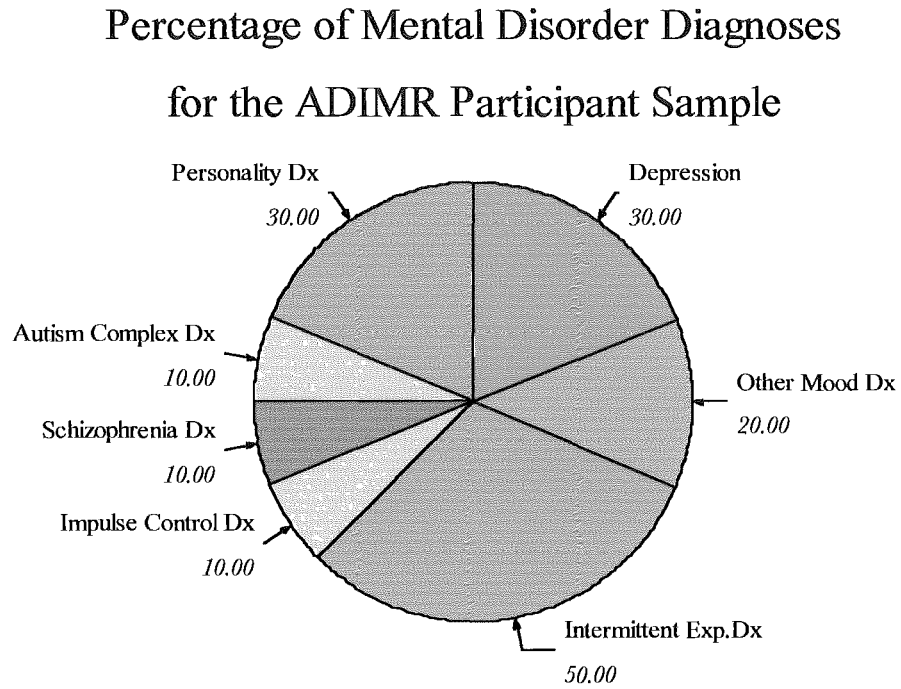
prevalent.

Percentage of Mental Disorder Diagnoses
for the ADIMR Participant Sample

Personality Dx
30.00

Depression
30.00

Autism Complex Dx
10.00

Other Mood Dx
20.00

Schizophrenia Dx
10.00

Impulse Control Dx
10.00

Intermittent Exp.Dx
50.00

Table 2. ADIMR study participants' total scores for the ADIMR as compared with scores obtained from caregiver/informants. Caregiver/informant scores were usually higher. Seventy percent of the participants' total scores for the ADIMR were lower than those obtained from caregiver/informants.

ADIMR Total Score Results

Participant Total Score for the ADIMR

Mean	149.600	Median	172.000	Mode	42.000
Range	210.000	Minimum	42.000	Maximum	252.000

Caregiver/Informant Total Score for the ADIMR

Mean	176.200	Median	179.000	Mode	91.000
Range	173.000	Minimum	91.000	Maximum	264.000

Figure 12. Mean Discrepancy scores for the eighteen ADIMR subscales. These are

calculated as the absolute value of the difference between participant and

caregiver/informant scores.

Mean Discrepancy Scores:

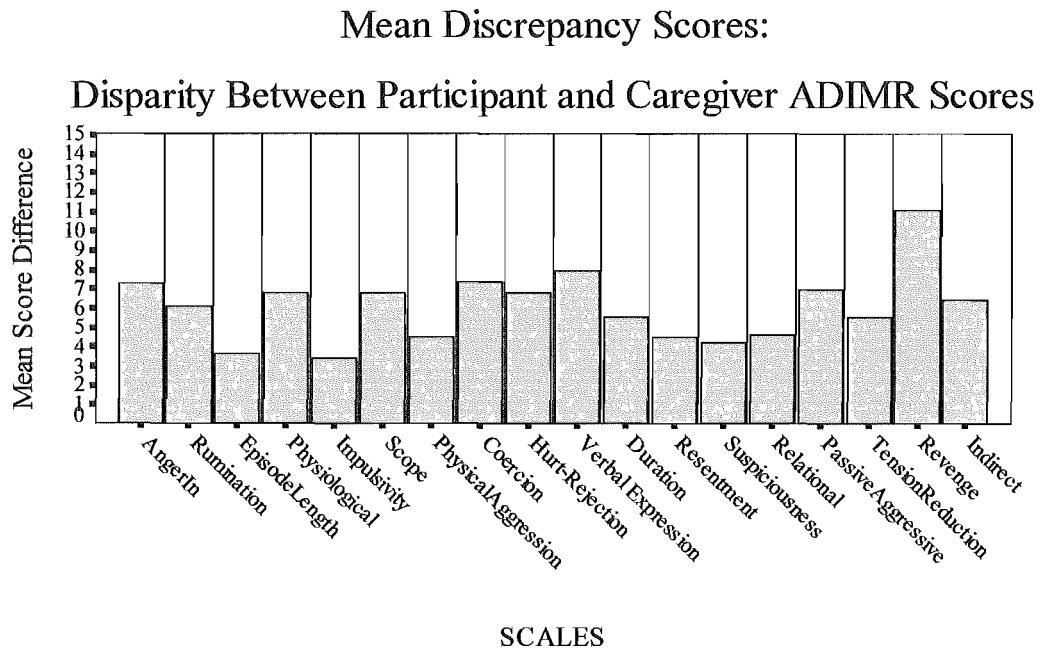Disparity Between Participant and Caregiver ADIMR Scores

SCALES

Figure 13. Individual ADIMR subscale discrepancy scores (i.e., the absolute values of the differences between participants' and caregivers' subscale scores). Only the percentage of discrepancy scores that were within a range equivalent to the value of one ADIMR item or less (i.e., those equal to, or less than, five points) are shown below. Eight subscales were found to have a fifty percent or greater amount of discrepancies within five points.

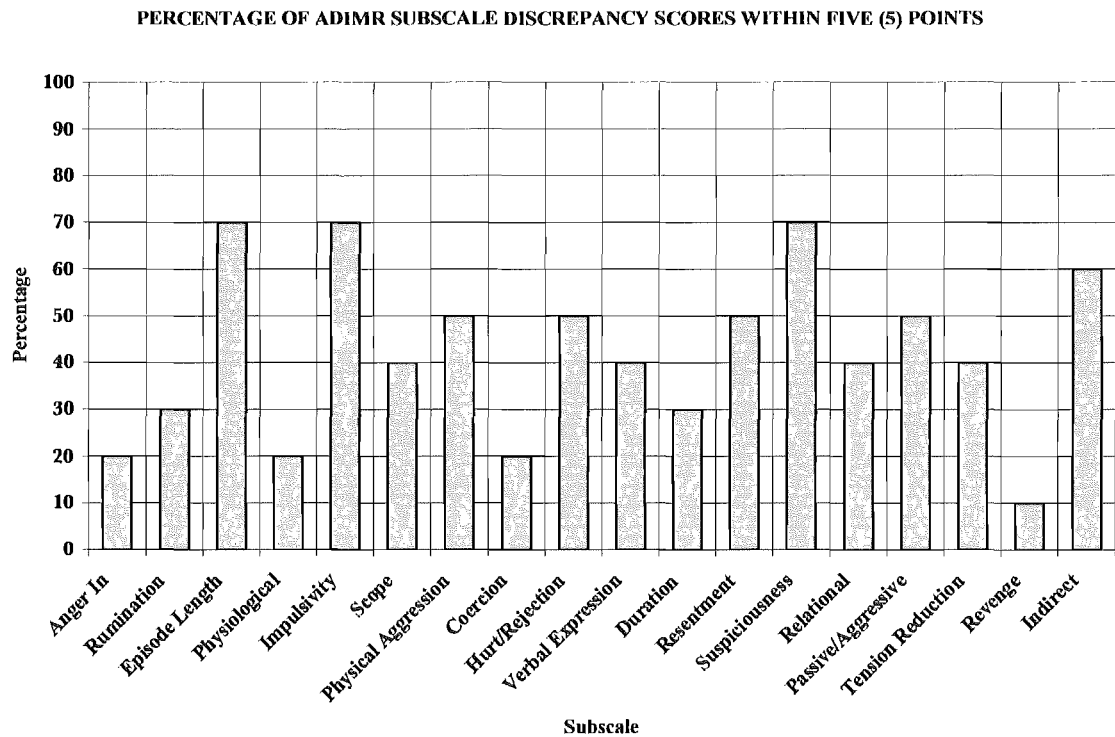PERCENTAGE OF ADIMR SUBSCALE DISCREPANCY SCORES WITHIN FIVE (5) POINTS

Figure 14. Pattern of discrepancy scores for the total possible ADIMR and PIMRA

scores. The scores presented below are the mean percentage discrepancies for each scale,

and represent the average percentage difference between participants' and caregivers'

ADIMR scores, and between their PIMRA scores.

Mean Percentage Discrepancy for ADIMR and PIMRA
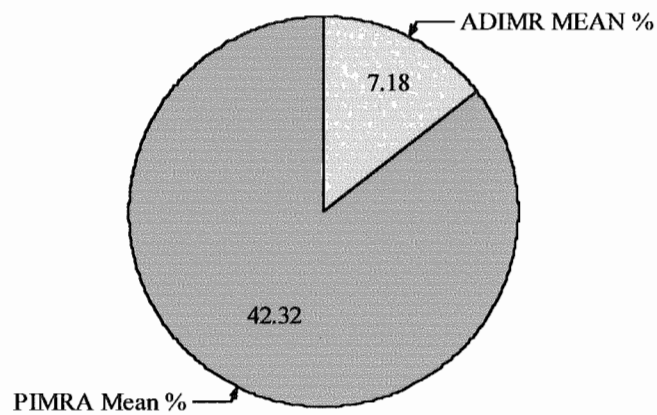## Between Participants & Caregivers Scores

Figure 15. The elevations of total ADIMR participant scores, compared with the levels of participants' aggressiveness as defined by the Episode Description forms (EDFs). Scores presented below represent only 40 % of the sample (cases 2101, 2102, 2104, 2106, 2107 and 3101 were excluded).

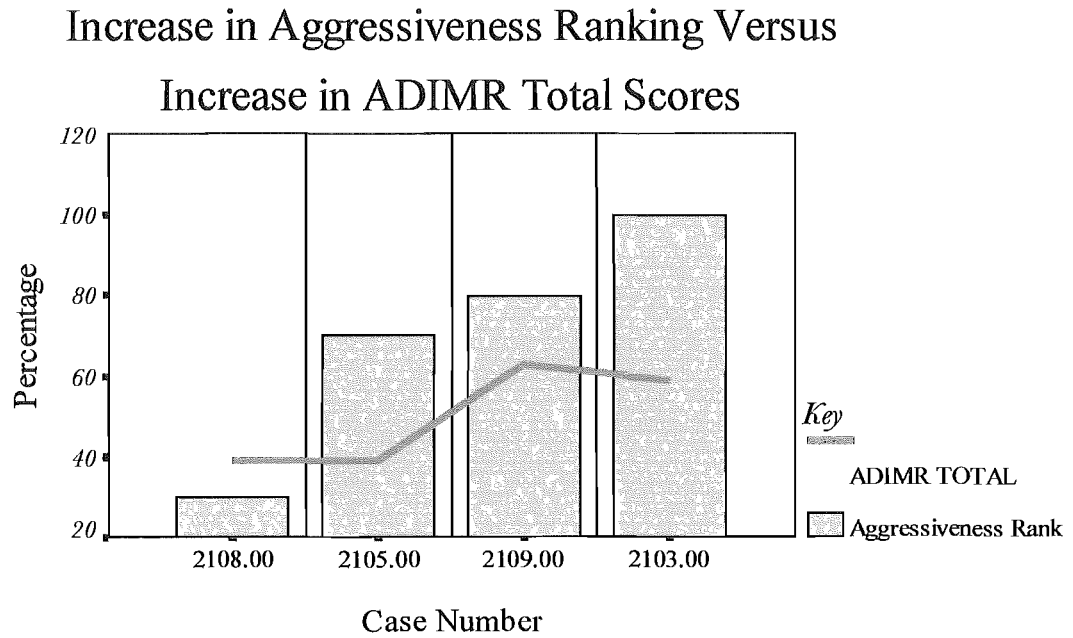## Increase in Aggressiveness Ranking Versus Increase in ADIMR Total Scores

Figure 16. Aggressiveness rankings compared with ADIMR discrepancy scores for 80 %

of the ADIMR study participants. Pattern displayed shows that aggressiveness rankings

generally increased in keeping with the increase in the number of ADIMR subscale score

discrepancies at or within five points.

Participant Aggressiveness Ranking
Compared with Subscale Discrepancies

Case Number
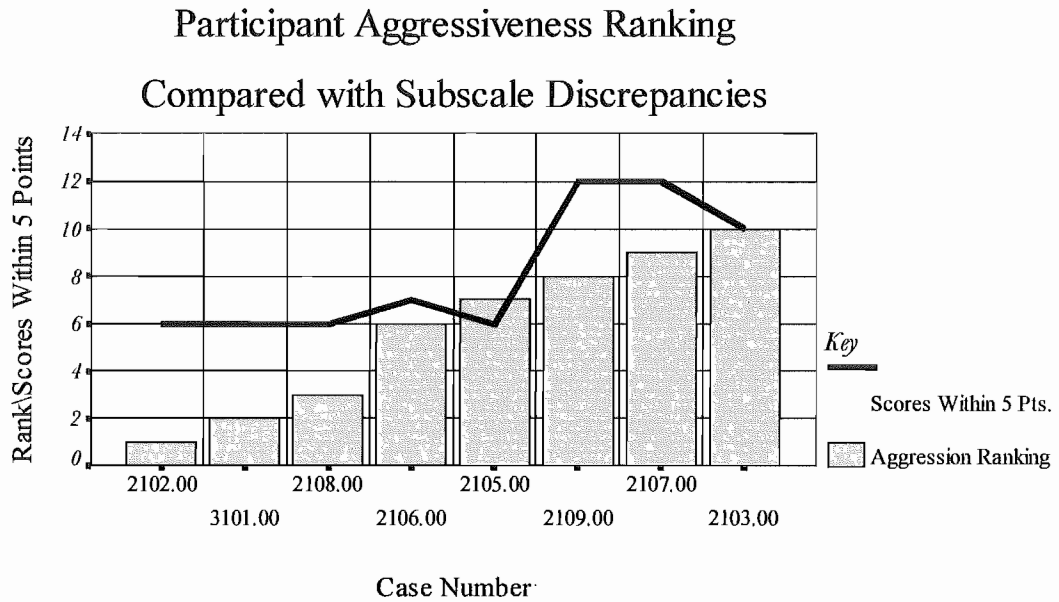
(Note: PSs 2101 and 2104 were excluded).